SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
(AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Institute Vision

To emerge as a Centre of Excellence for Learning and Research in the domains of engineering, computing and management.

Institute Mission

- Provide congenial academic ambience with state-art of resources for learning and research.
- Ignite the students to acquire self-reliance in the latest technologies.
- Unleash and encourage the innate potential and creativity of students.
- Inculcate confidence to face and experience new challenges.
- Foster enterprising spirit among students.
- Work collaboratively with technical Institutes / Universities / Industries of National and International repute

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

VISION

To contribute for the society through excellence in Computer Science and Engineering with a deep passion for wisdom, culture and values.

MISSION

M 1: Provide congenial academic ambience with necessary infrastructure and learning resources.

M 2: Inculcate confidence to face and experience new challenges from industry and society.

M 3: Ignite the students to acquire self-reliance in State-of-the-Art Technologies

M 4: Foster Enterprising spirit among students

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

Graduates of Computer Science and Engineering shall

PEO1: Excel in Computer Science and Engineering program through quality studies, enabling success in computing industry. **(Professional Competency)**

PEO2: Surpass in one's career by critical thinking towards successful services and growth of the organization, or as an entrepreneur or in higher studies. **(Successful Career Goals)**

PEO3: Enhance knowledge by updating advanced technological concepts for facing the rapidly changing world and contribute to society through innovation and creativity. **(Continuing Education and Contribution to Society)**

PROGRAM SPECIFIC OUTCOMES (PSO's):

Students Shall

PSO1: Have Ability to understand, analyze and develop computer programs in the areas like algorithms, system software, web design, big data analytics, and networking.

PSO2: Deploy modern computer languages, environment, and platforms in creating innovative products and solutions.

PROGRAMME OUTCOMES (PO's)

Computer Science and Engineering Graduates will be able to:

PO1 - Engineering knowledge: Apply the knowledge of mathematics, science, engineering Fundamentals, and an engineering specialization for the solution of complex engineering problems.

PO2 - Problem analysis: Identify, formulate, research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3 - Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for public health and safety, and cultural, societal, and environmental considerations.

PO4 - Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5 - Modern tool usage: Ability to design and develop hardware and software in emerging technology environments like cloud computing embedded products, real-time systems, Internet of Things, Big Data etc.

PO6- Engineering and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7- Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8- Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9 - Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10 - Communication: Communicate effectively on complex engineering activities with the engineering community and with the society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11 - Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12 - Life-long learning: Basic knowledge in hardware/software methods and tools for solving real-life and R&D problems with an orientation to lifelong learning.

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
(AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

ACADEMIC REGULATIONS FOR B. TECH (REGULAR-FULL TIME)

(Effective for the students admitted into I year from the Academic Year 2018-2019 onwards)

1. ELIGIBILITY FOR ADMISSION

Admission of the B.Tech program shall be made subjects to the eligibility qualifications and Specialization prescribed by the University for each Program from time to time. Admission shall be made either on the basis of Merit/ Rank Obtained by the Qualifying candidates in EAMCET/ECET or otherwise specified whichever is relevant.

2. AWARD OF B.TECH. DEGREE

A student will be declared eligible for the award of the B.Tech. Degree if he/she fulfils the following academic regulations:

i. Pursues a course of study for not less than four academic years and in not more than eight academic years.

ii. For Lateral entry students, shall pursue a course of study for not less than three academic years and in not more than six academic years.

iii. Registers for 160 credits and secure all 160 credits.

iv. Lateral entry students shall register for 126 credits and secure all 126 credits

3. ACADEMIC REQUIREMENTS

Students, who fail to fulfil all the academic requirements for the award of the degree within eight academic years (for Regular Entry) / Six academic years (for Lateral entry) from the year of their admission, shall forfeit their seat in B.Tech. Course and their admission stands cancelled.

4. CURRICULUM AND COURSE STRUCTURE

The curriculum shall comprise Humanities and Social Science (HS), Basic Sciences (BS), Engineering Science (ES), Professional Core (PC), Core Elective (CE), Open Elective (OE), Project Work (PW), Audit Course (AC), On-line Comprehensive Test (OCT).

4.1. SUBJECT COURSE CLASSIFICATION

All subjects/ courses offered for the under graduate programme in B.Tech. degree programs are broadly classified as follows. The Institution has followed almost all the guidelines issued by AICTE/UGC.

S.No	Broad Course Classification	Course Group Category	Course Description
1	Foundation Courses	BS - Basic Sciences	Includes mathematics, physics and chemistry subjects
		ES - Engineering Sciences	Includes fundamental engineering subjects
		HS - Humanities and Social Sciences	Includes subjects related to humanities, social sciences and management
2	Core Courses	PC – Professional Core	Includes core subjects related to the parent discipline/ department / branch of Engineering.
3	Elective Courses	CE - Core Electives	Includes electives subjects related to the parent discipline department branch of engineering
		OE - Open Electives	Elective subjects which include inter disciplinary subjects or subjects in an area outside the parent discipline department branch of engineering
		MOOC – Electives	Online courses which include inter disciplinary subjects or subjects in an area outside the parent discipline department
4	Employability Enhancement Courses	Project Work	B.Tech major project work
		On-line Comprehensive Test	Comprehensive Exams (with one credit)
		Industrial training	Industrial Internship or Industrial visit or Industrial training (non-credit)
		Reasoning and Aptitude	Courses which includes mathematical analysis to understand and Solve the real life problems. (non-credit)

5	Minor Courses	Communication and Soft SkillsLab	Courses which includes improve the communication skills and personality development (with one credit)
6	Audit Course	1.Constitution of India 2.Environmental sciences 3.Professional Ethics	Mandatory Courses (non-credit)

5. INDUCTION PROGRAM for I. B.Tech

When new students enter an institution, they come with diverse thoughts, backgrounds and preparations. It is important to help them adjust to the new environment and inculcate in them the ethos of the institution with a sense of larger purpose. Precious little is done by most of the institutions, except for an orientation program lasting a couple of days. We propose a 3-week long induction program for the UG students entering the institution, right at the start. Normal classes start only after the induction program is over. Its purpose is to make the students feel comfortable in their new environment, open them up, set a healthy daily routine, create bonding in the batch as well as between faculty and students, develop awareness, sensitivity and understanding of the self, people around them, society at large, and nature. The time during the Induction Program is also used to rectify some critical lacunas, for example, English background, for those students who have deficiency in it. The following (Physical Activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Familiarization to Department / Branch & Innovations, Basic Science and Foundation of Mathematics) are the activities under the induction program in which the student would be fully engaged throughout the day for the entire duration of the program.

6. CONTACT PERIODS

Depending on the complexity and volume of the course, the number of contact hours per week will be assigned. Each Theory and Laboratory course carries credits based on the number of hours / week as follows.

- Contact classes (Theory): 1 credit per lecture hour per week.
- Laboratory Hours (Practical): 1 credit for 2 Practical hours, per week.
- Project Work: 1 credit for 2 hours of project work per week

6.1 DEFINITION OF CREDIT

1 Hr. Lecture (L) per week	1 credit
1 Hr. Tutorial (T) per week	1 credit
1 Hr. Practical (P) per week	0.5 credit
2 Hours Practical (Lab)/week	1 credit

7. SUPPLEMENTARY EXAMINATIONS

The student eligible to appear the supplementary external examinations if he was absent for it or failed in it or not registered. However, IV-II semester students there will be an advanced Supplementary Examinations.

8. DISTRIBUTION AND WEIGHTAGE OF MARKS

The performance of a student in each semester shall be evaluated subject–wise with a maximum of 100 marks for theory and 100 marks for practical subject. In addition, project work shall be evaluated for100 marks whereas audit courses shall be evaluated for a maximum of 30 internal marks.

i. For theory subjects the distribution shall be 30 marks for Internal Evaluation and 70 marks for the End-Examination.

ii. For practical subjects the distribution shall be 30 marks for Internal Evaluation and 70 marks for the End- Examination.

8.1 Internal Examinations

For theory subjects, during the semester, there shall be two mid-term examinations. Each mid-term examination consists of objective paper for 10 marks and subjective paper for 15 marks with duration of 1hour 50 minutes (20 minutes for objective and 90 minutes for subjective paper). However 5 marks are awarded for 5 assignments (unit-wise). Assignments one & two are collected from the students before I mid-term examinations and assignments three, four and five are collected from the students before II mid-term examinations for every theory subjects.

Objective paper shall be for 10 marks. Subjective paper shall contain 5 questions of which student have to answer 3 questions for 15 marks.

Note 1: The subjective paper shall contain 5 questions of equal Weightage of 10 marks and the marks obtained for 3 questions shall be condensed to 15 marks; any fraction shall be rounded off to the next higher mark.

Note 2: The midterm examination shall be conducted first by distribution of the Objective paper, simultaneously marking the attendance, after 20 minutes the answered objective paper shall be collected back. The student is not allowed to leave the examination hall. Then the descriptive question paper and the answer booklet shall be distributed. After 90minutes the answered booklets are collected back.

If the student is absent for the internal examination, no re-exam or make up shall be conducted and internal marks for that examination shall be considered as zero.

First midterm examination shall be conducted for I& II units of syllabus and second midterm examination shall be conducted for III, IV & V units.

Final Internal marks shall be arrived at by considering the marks secured by the student in both the mid examinations with 80% weightage to the better mid exam and 20% to the other

For Ex:

Marks obtained in first mid: 20

Marks obtained in Second mid: 20

Internal Marks: (20x0.8) + (20x0.2) = 20

Final internal marks= Internal Marks+ Assignment marks

If the student is absent for any one midterm examination, the final internal marks shall be arrived at by considering 80% Weightage to the marks secured by the student in the appeared examination and zero to the other.

For Ex:

Marks obtained in first mid: Absent Marks obtained in Second mid: 20

Internal Marks: (20x0.8) + (0x0.2) =16

Final internal marks= Internal Marks+ Assignment marks

8.2 End Examinations

8.2.1 End examinations (Theory subjects)

(i). End examination of theory subjects shall have the following pattern:

a. There shall be two parts, Part-A and Part-B.

b. Part-A shall contain 10 compulsory short answer questions for a total of 20 marks such that each question carries 2 marks. There shall be 2 short answer questions from each unit.

c. Part-B Shall be either-or type questions of 10 marks each. Student shall answer any one of them.

d. Each of these questions from Part-B shall cover one unit of the syllabus.

(ii). End examination of theory subjects consisting of two parts of different subjects, for ex: Electrical & Mechanical Technology, shall have the following pattern:

a. Question paper shall be in two parts viz., Part A and Part B with equal Weightage

b. In each part, there shall be 3 either-or type questions for 12, 12 and 11 marks.

Note: The answers for Part A& Part B shall be written in two separate answer books.

8.2.2 End examinations (Practical subjects)

For practical subjects there shall be a 30 sessional marks (15 marks allotted for internal practical examination to be conducted before the last working day and 15 marks for Day-to-day work in the laboratory shall be evaluated by the concerned laboratory teacher based on the regularity / record / viva-voce) and end examination shall be for 70 marks.

The end examination shall be conducted by the concerned laboratory teacher and senior expert in the same subject of the department.

In a practical subject consisting of two parts (ex: Engineering Workshop & IT Workshop), the end examination shall be conducted for 35 marks in each part. Internal examination shall be evaluated as above for 30 marks in each part and final internal marks shall be arrived by considering the average of marks obtained in two parts.

8.2.3 Drawing Courses

For the subject having design and/or drawing, such as Engineering Drawing / Graphics, the distribution shall be 30 marks for internal evaluation and 70 marks for end examination.

All the drawing related courses are evaluated in line with laboratory courses. The distribution shall be 30 marks for internal evaluation (15 marks for day to day evaluation (unit wise chart work) and 15 marks for unit-wise assignments) and 70 marks for semester end examinations.

There shall be two midterm examinations in a semester for duration of 2hrs each for 15 marks with weightage of 80% to better mid marks and 20% for the other. The subjective paper shall contain 5 questions of equal weightage of 10 marks and the marks obtained for 3 questions shall be condensed to 15 marks, any fraction shall be rounded off to the next higher mark. There shall be no objective paper in internal examination. The sum of day to day evaluation with assignments and the internal test marks will be the final sessional marks for the subject.
In the end examination pattern for Engineering Drawing / Graphics there shall be 5 questions, either-or type, of 14 marks each. There shall be no objective / short answer type questions in the end examination.

8.2.4 Audit courses

There shall three audit pass courses in Constitution of India, Environmental Science and Professional Ethics with no credits. There shall be no external examination. However, attendance in the audit course shall be considered while calculating aggregate attendance and student shall be declared pass in the audit course only when he / she secures 40% or more in the internal examinations. In case if student fails, re-exam shall be conducted for failed candidates every six months / semester at a mutual convenient date of college / student satisfying the conditions mentioned in item 1 of the regulations.

8.2.5 On-line Comprehensive Test (OCT)

There shall be two On-line comprehensive Tests, one at the end of the II year II semester and the other at the end of III year – II semester, with 100 objective questions for 100 marks on the subjects studied in the respective semesters. The Controller of Examination is given responsibility of preparing question bank / question paper conducting online examination maintains confidentiality. A student shall acquire one credit assigned to the On-line Comprehensive Test only when he / she secure 40% or more marks. In case, if a student fails in On-line Comprehensive Test, he / she shall reappear at the next supplementary examination when offered.

8.2.6 Massive Online Open Course's (MOOC'S)

The college in line with the developments in Learning Management Systems (LMS) intends to encourage the students to do online courses in MOOCs, offered nationally / internationally. The main intension to introduce MOOCs is to obtain enough exposure through online

tutorials, self-learning at one's own pace, attempt quizzes, discuss with professors from various universities and finally to obtain certificate of completion of the course from the MOOCs providers. Institution intends to encourage the students to do one MOOC in III year II Semester of the B.Tech. Programme. The respective departments shall give a list of standard MOOCs providers among NPTEL, edx, Udacity, Coursera, or any other standard providers, whose credentials are endorsed by the HoD. Each department shall appoint Coordinators / Mentors and allot the students to them who shall be responsible to guide students in selecting online courses and provide guidance for the registration, progress and completion of the same. A student shall choose an online course (relevant to his / her programme of study) from the given list of MOOCS providers, as endorsed by the teacher concerned, with the approval of the HOD.

Students may be permitted to register one online course (which is provided with certificate) in 3rd year 1st semester and they should produce the course completion certificate of that course to the controller of Examination to become eligible for fulfilment of the degree.

9. CHOICE BASED CREDIT SYSTEM (CBCS)

The CBCS, also called as Open Electives (OEs) will be implemented in the college. The CBCS provides choice for students to select from the prescribed courses. In which students can take courses of their choice, learn at their own pace and adopt an interdisciplinary approach to learning. It is mandatory for Under Graduate (UG) students to study 2 CBCS courses. The students have to choose one open elective (OE -I) in III year IIsemester, and one (OE-II) in IV year I semester, from the list of open electives given. However, the student cannot opt for an open elective subject offered by their own (parent) department, if it is already listed under any category of the subjects offered by parent department in any semester.

10. CORE ELECTIVES

Students have to choose core electives (CE-I and CE-II) in IV year I semester and core electives (CE-III and IV) in IV year II semester, from the list of core electives courses given. However, the students may opt for core elective subjects offered in the related area.

11. VALUE ADDED COURSES (VAC)

Every student to undergo one Value Added Course (VAC) per semester from second year first semester (II-I) to fourth year fourth year first semester (IV-I). The details of the syllabus, time table and faculty may be sent to the Controller of Examinations after approval from the Head of the Institution concerned at-least one month before the course is offered. Students can take a minimum of 30 lectures / Practices / Training session per course.

12. INDUSTRIAL VISIT

Industrial Visit for every student is required to go for at least one Industrial Visit starting from the second year of the Programme. The Heads of Departments shall ensure that necessary arrangements are made in this regard.

13. INDUSTRIAL TRAINING / INDUSTRIAL INTERNSHIP

Industrial Training / Industrial Internship for every student is required to go for at least one Industrial Training / Industrial Internship starting from the third year of the Programme. The Heads of Departments shall ensure that necessary arrangements are made in this regard.

14. PRESERVATION OF RECORDS

The laboratory records, internal test papers and end examination answer booklets shall be preserved for minimum of 2 years in the institution.

15. ATTENDANCE REQUIREMENTS

15.1 A student shall be eligible to appear for University examinations if he/she acquires a minimum of 75% of attendance in aggregate of all the subjects in a semester.

15.2 Shortage of Attendance below 65% in aggregate shall in NO case be condoned.

15.3 Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in each semester may be granted by the College Academic Committee.

15.4 Students whose shortage of attendance is not condoned in any semester are not eligible to take their end examination of that class and their registration shall stand cancelled.

15.5 A student will not be promoted to the next semester unless he satisfies the attendance requirements of the present semester. They may seek readmission for that semester when offered next.

15.6 A stipulated fee shall be payable towards Condonation of shortage of attendance to the College.

16. MINIMUM ACADEMIC REQUIREMENTS (Regular Students)

The following academic requirements have to be satisfied in addition to the attendance requirements.

16.1 A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory, practical, design, drawing subjects or project if he secures not less than 35% of marks in the end examination and a minimum of 40% of marks in the sum total of the internal evaluation and end examination taken together. In case of audit courses he/she should secure 40% of the total marks.

16.2 A student shall be promoted from II to III year only if he / she fulfils the academic requirement of securing 40% of the credits in the subjects that have been studied up to II year II semester from the following examinations, if any fraction shall be rounded off to the next higher credit.

For I/I semone regular and two supplementary examinations
For I/II sem one regular and one supplementary examinations.
For II/I sem one regular examinations.
For II/II sem one regular examinations.

16.3 A student shall be promoted from III year to IV year only if he / she fulfils the academic requirements of securing 40% of the credits in the subjects that have been studied up to III year II semester from the following examinations, if any fraction shall be rounded off to the next higher mark.

For I/I sem one regular and four supplementary examinations.
For I/II sem one regular and three supplementary examinations.
For II/I sem one regular and two supplementary examinations.
For II/II sem one regular and one supplementary examinations.
For III/I sem one regular examinations.
For III/II sem one regular examinations.

And in case if student is already detained for want of credits for particular academic year by sections 16.2 and 16.3 above, the student may make up the credits through supplementary

exams of the above exams before the commencement of third or fourth year I semester class work respectively of next year.

17. MINIMUM ACADEMIC REQUIREMENTS (For Lateral Entry Students)

The Following academic requirements have to be satisfied in addition to the attendance requirements.

17.1 A students shall be deemed to have satisfied them minimum academic requirements and earned the credits allotted to each theory practical, design drawing subjects or projects if he secures not less than 35% of marks in the end examinations and a minimum of 40 % of marks in the sum total of the internal evaluation and examination taken together. In the Seminar he/she should secure 40 %

17.2 A Student shall be promoted from III year to IV year only if he / she fulfils the academic requirements of securing 40% credits of the subjects that have been studied up to III year II semester (if any fraction shall be rounded off to the next higher credit) from

For II/I sem one regular and two supplementary examinations.

For II/II sem one regular and one supplementary examinations.

For III/I sem one regular examinations.

For III/II sem one regular examinations.

In case if student is already detained for want of credits for particular academic year by sections 16.2 and 16.3 above, the student may make up the credits through supplementary exams of the above exams before the commencement of third or fourth year I semester class work respectively of next year.

17.3 A student shall register and put up minimum attendance in all 160 credits and earn all the 160 credits. Marks obtained in all 160 credits shall be considered for the calculation of aggregate percentage of marks obtained.

18. COURSE PATTERN

18.1 The entire course of study is for four academic years. All years shall be on semester pattern.

18.2 A student eligible to appear for the end examination in a subject, but absent or has failed in the end examination may appear for that subject at the next supplementary examination when offered.

18.3 When a student is detained due to lack of credits / shortage of attendance he may be re-admitted when the semester is offered after fulfillment of academic regulations. In such case, he / she shall be in the academic regulations into which he / she is readmitted.

19. WITH–HOLDING OF RESULTS:

If the candidate has any dues not paid to the university or if any case of indiscipline or malpractice is pending against him, the result of the candidate shall be withheld and he will not be allowed / promoted into the next higher semester. The issue of awarding degree is liable to be withheld in such cases.

20. GRADING

After each subject is evaluated for 100 marks, the marks obtained in each subject will be converted to a corresponding letter grade as given below, depending on the range in which the marks obtained by the student fall.

Table – Conversion into Grades and Grade Points assigned

Range in which the Marks In the Subject Fall	**Grade**	**Grade Points** Assigned
≥ 90	S	10
80-89	A	9
70-79	B	8
60-69	C	7
50-59	D	6
40-49	E	5
< 40	F (Fail)	0
Absent	Abs (Absent)	0

i. A student obtaining Grade F shall be considered failed and will be required to reappear for that subject when the next supplementary examination offered.

ii. For non-credit courses “Pass” shall be indicated instead of the letter ‘P’ and this will not be counted for the computation of SGPA/CGPA.

20.1. SEMESTER GRADE POINT AVERAGE (SGPA) AND CUMULATIVE GRADE POINT AVERAGE (CGPA):

i. The Semester Grade Point Average (SGPA) is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student, i.e.

$SGPA = \Sigma (Ci \times Gi) / \Sigma Ci$

Where, Ci is the number of credits of the ith subject and Gi is the grade point scored by the student in the ith course.

ii. The Cumulative Grade Point Average (CGPA) will be computed in the same manner taking into account all the courses undergone by a student over all the semesters of a program, i.e.

$CGPA = \Sigma (Ci \times Si) / \Sigma Ci$

Where Si is the SGPA of the ith semester and Ci is the total number of credits in that semester.

iii. Both SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.

iv. SGPA will be given to those who cleared all the subjects in that semester

v. GRADE POINT: It is a numerical weight allotted to each letter grade on a 10-point scale.

vi. LETTER GRADE: It is an index of the performance of students in a said course. Grades are denoted by letters S, A, B, C, D, E and F.

21. AWARD OF CLASS:

After a student has satisfied the requirements prescribed for the completion of the program and is eligible for the award of B. Tech. Degree he shall be placed in one of the following four classes:

Class Awarded	CGPA Secured
First Class with Distinction	≥ 7.5
First Class	$\geq 6.5 < 7.5$
Second Class	$\geq 5.5 < 6.5$
Pass Class	$\geq 5.0 < 5.5$

22. TRANSITORY REGULATIONS

Discontinued, detained, or failed candidates are eligible for readmission as and when the semester is offered after fulfilment of academic regulations. Candidates who have been detained for want of attendance or not fulfilled academic requirements or who have failed after having undergone the course in earlier regulations or have discontinued and wish to continue the course are eligible for admission into the unfinished semester from the date of commencement of class work with the same or equivalent subjects as and when subjects are offered, subject to Section 2 and they will be in the academic regulations into which they get readmitted.

Candidates who were permitted with Gap Year shall be eligible for rejoining into the succeeding year of their B.Tech from the date of commencement of class work, subject to Section 2 and they will be in the academic regulations into which the candidate is presently rejoining.

23. MINIMUM INSTRUCTION DAYS:

The minimum instruction days including exams for each semester shall be 90 days.

24. REVALUATION

A candidate can apply for revaluation of his / her end examination answer paper in a theory courses. The examination section shall issue a notification inviting applications for the revaluation after publishing the results. The application forms can be obtained from the examination section. A candidate can apply for revaluation of answer scripts in not more than 5subjects at a time.

Issue of Photocopy of Answer Script

i. A student can request for the photo copy of answer script of any theory examination within one week after the declaring the results by paying fee.

ii. The examination section shall issue a notification inviting applications for the issue of photocopy of answer script after publishing the results.

iii. The application forms can be obtained from the examination section.

Challenge Valuation

i. A student can apply for challenge valuation by prescribed fee.

ii. Challenging valuation shall be carried out by an external subject expert.

iii. The challenging valuation should be done strictly as per the scheme of valuation supplied by the examination section in the presence of Principal.

iv. The examination section shall issue a notification inviting applications for the challenging valuation after publishing the results. The application forms can be obtained from the examination section.

No revaluation for comprehensive Examination, practical and project work.

25. CONDUCT AND DISCIPLINE

(i) Students shall conduct themselves within and outside the precincts of the Institute in a manner befitting the students of an Institute of National importance

(ii) As per the order of the Hon'ble Supreme Court of India, ragging in any form is banned: acts of ragging will be considered as gross indiscipline and will be severely dealt with.

(iii) The following additional acts of omission and /or commission by the students within or outside the precincts of the college shall constitute gross violation of code of conduct and are liable to invoke disciplinary measures

(a) Ragging

(b) Lack of courtesy and decorum: indecent behaviour anywhere within or outside the campus.

(c) Wilful damages or stealthy removal of any property /belongings of the Institute / Hostel or of fellow students

(d) Possession, consumption of distribution of alcoholic drinks or any kind of hallucinogenic drugs

(e) Mutilation or unauthorized possession of library books

(f) Hacking in computer systems

(g) Furnishing false statements to the disciplinary committee, or willfully withholding information relevant to an enquiry

(h) Organizing or participation in any activity that has potential for driving fellow students along lines of religion caste batch of admission hostel or any other unhealthy criterion .

(i) Resorting to noisy and unseemly behavior, disturbing studies of fellow students

(j) Physical or mental harassment of fresher through physical contact or oral abuse

(k) Adoption of unfair means in the examination

(l) Organizing or participating in any group activity except purely academic and scientific Programmers in company with others in or outside campus without prior permission of the Principal

(m) Disturbing in drunken state or otherwise an incident in academic or students function or any other public event.

(n) Not obeying traffic rules in campus not following safety practices or causing potential danger to oneself or other persons in any way.

(o) Any other act or gross indiscipline

(iv). Commensurate with the gravity of the offence the punishment may be reprimand fine and expulsion from the hostel debarment from an examination rustication for a specified period or even outright expulsion from the College

(v). The reprimanding Authority for an offence committed by students in the Hostel and in the Department or the classroom shall be respectively, the managers of the Hostels and the Head of the concerned Department

(vi). In all the cases of offence committed by students in jurisdictions outside the purview of clause (19.v) the Principal shall be the Authority to reprimand them.

(vii). All Major acts of indiscipline involving punishment other than mere reprimand shall be considered and decided by the Principal Students Disciplinary Committee appointed by the Principal

(viii) All other cases of Indiscipline of Students like adoption of unfair means in the examinations shall be reported to the Vice-Principal for taking appropriate action and deciding on the punishment to be levied.

(ix) In all the cases of punishment levied on the students for any offence committed the aggrieved party shall have the right to appeal to the Principal who shall constitute appropriate Committees to review the case.

26. TRANSFER DETAILS

Student transfers shall be as per the guidelines issued by the Government of Andhra Pradesh from time to time.

27. GENERAL

27.1 The academic regulations should be read as a whole for purpose of any interpretation.

27.2 Malpractices rules- nature and punishments are appended.

27.3 Where the words “he”, “him”, “his”, occur in the regulations, they also include “she”, “her”, “hers”, respectively.

27.4 The college may change or amend the academic regulations or syllabi at any time and the changes or amendments shall be made applicable to all the students on rolls with effect from the dates notified by the college.

NATURE OF MALPRACTICES/ IMPROPER CONDUCT PUNISHMENT	PUNISHMENT
1. (a) possesses or keeps access in examination hall, any paper, note book, programmable calculators, cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory/ practical) in which he/she is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination) Expulsion from the examination hall and cancellation of the performance in that subject only.	Expulsion from the examination hall and cancellation of the performance in that subject Only.
1. (b) Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons inside or outside the exam hall in respect of any matter. Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, he/she will be handed over to the police and a case is registered against him/her.	Expulsion from the examinations hall and cancellation of the performance in that subject only of all the candidates involved in case of an outsider He / She will be handed over to the police and a case is registered against him/her.

2. Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examinations hall and cancellation of the performance in that subject and all other subjects the candidates has already appeared including practical examinations and projects work and shall not be permitted to appear for the reaming examinations of the subjects of that semester/Year The Hall Ticket of the candidate will be cancelled and retained by the CE.
3. Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from examination hall and forfeits the seat. The performance of the original candidate, who has been impersonated, shall be cancelled in all the subjects of the examination (including practical's and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all university examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
4. Smuggles in the answer book or additional sheet or takes out or arranges to send out the question paper or answer book or additional sheet, during or after the examination.	If the imposter is an outsider, he/she will be handed over to the police and a case is registered against him/her. Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared

	including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all university examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5. Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject.
6. Refuses to obey the orders of the Chief Superintendent/Assistant-Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination hall or causes any injury to his person or to any of his relatives whether by offensive words spoken or written or by signs or by visible representation or assaults the officer-in-charge, or any person on duty inside or outside the examination hall or any of his relatives, or indulges in any other act of misconduct or mischief which results in damage to or destruction of property in the examination hall or any part of the college campus or engages in any other act which in the opinion of the officer on duty	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The candidates are also debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.

amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	
7. Leaves the exam hall taking away answer script or intentionally tears off the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all the external examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
8. Possesses any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat.
9. Belongs to college, who is not a candidate for the particular examination or any person not connected with the college but indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the college will be expelled from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also

	debarred and forfeits the seat. Person(s) who do not belong to the college will be handed over to police and, a police case will be registered against them.
10. Comes in a drunken state to the examination hall.	Expulsion from the examination hall and cancellation of the performance.
11. Copying is detected on the basis of internal evidence, such as, during valuation or during special scrutiny	Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester/year examinations.
12. If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the Principal for further action to award suitable punishment.	

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
(AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CURRICULUM and SYLLABUS – 2018

I.B.Tech. I Sem.

S.No	Subject Code	Subject	Subject Category	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
				L	T	P/D	C	I	E	Total
1	18SAH111	Communicative English	HS	2	-	-	2	30	70	100
2	18SAH114	Engineering Mathematics - I	BS	2	1	-	3	30	70	100
3	18SAH113	Engineering Chemistry	BS	2	1	-	3	30	70	100
4	18CSE111	Computer Programming	ES	2	1	-	3	30	70	100
5	18EEE111	Basic Electrical Engineering	ES	2	1		3	30	70	100
6	18SAH116	Engineering Chemistry Lab	BS	-	-	2	1	30	70	100
7	18CSE112	Computer Programming Lab	ES			2	1	30	70	100
8	18EEE112	Basic Electrical Engineering Lab	ES	-	-	2	1	30	70	100
Contact hours per week				10	4	6	-	-	-	-
Total hours per week				20			-	-	-	-
Total credits (5 Theory + 3 Labs)							17	-	-	-
Total Marks								240	560	800

I.B.Tech. II Sem.

S.No	Subject Code	Subject	Subject Category	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
				L	T	P/D	C	I	E	Total
1	18SAH121	Technical English	HS	2	-	-	2	30	70	100
2	18SAH122	Engineering Mathematics - II	BS	2	1	-	3	30	70	100
3	18SAH112	Engineering Physics	BS	2	1	-	3	30	70	100
4	18MEC111	Engineering Graphics	ES	1	-	4	3	30	70	100
5	18CSE121	Problem Solving using Python Programming	ES	2	1	-	3	30	70	100
6	18SAH115	Engineering Physics Lab	BS	-	-	2	1	30	70	100
7	18CSE122	Problem Solving using Python Programming Lab	ES	-	-	2	1	30	70	100
8	18MEC112	Engineering Workshop and IT Workshop	ES	-	-	2	1	30	70	100
Contact hours per week				9	3	10	-	-	-	-
Total hours per week				22			-	-	-	-
Total credits (5 Theory + 3 Labs)							17	-	-	-
Total Marks								240	560	800

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

II.B.Tech. I Sem.

S.No	Subject Code	Subject	Subject Category	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
				L	T	P/D	C	I	E	Total
1	18SAH211	Engineering Mathematics -III	BS	2	1	-	3	30	70	100
2	18ECE215	Fundamentals of Electronics Engineering	ES	2	1	-	3	30	70	100
3	18ECE216	Digital Logic Design	ES	2	1	-	3	30	70	100
4	18CSE211	Mathematical Foundations of Computer Science	PC	2	1	-	3	30	70	100
5	18MBA217	Business Management	SH	2	1	-	3	30	70	100
6	18CSE212	Advanced Data Structures	PC	2	1	-	3	30	70	100
7	18ECE217	Fundamentals of Electronics Engineering Lab	ES	-	-	2	1	30	70	100
8	18CSE213	Advanced Data Structures Lab	PC	-	-	2	1	30	70	100
9	18AUD212	Environmental Science	AC	2	-	-	-	-	-	-
10	18SAH212	Reasoning and Aptitude-I	HS	2	-	-	-	-	-	-
Contact hours per week				16	6	4	-	-	-	-
Total hours per week				26			-	-	-	-
Total credits (6 Theory + 2 Labs)							20	-	-	-
Total Marks								240	560	800

II.B.Tech. II Sem.

S.No	Subject Code	Subject	Subject Category	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
				L	T	P/D	C	I	E	Total
1	18SAH222	Probability and Statistics	BS	2	1	-	3	30	70	100
2	18CSE221	Computer Organization	PC	2	1	-	3	30	70	100
3	18CSE222	Programming With JAVA	PC	2	1	-	3	30	70	100
4	18CSE223	Database Management Systems	PC	3	-	-	3	30	70	100
5	18CSE224	Design and Analysis of Algorithms	PC	2	1	-	3	30	70	100
6	18CSE225	Formal Languages and Automata Theory	PC	2	1	-	3	30	70	100
7	18CSE226	Programming With JAVA Lab	PC	-	-	2	1	30	70	100
8	18CSE227	Database Management Systems Lab	PC	-	-	2	1	30	70	100
9	18CSE228	Online Comprehensive Test-I	PC	2	-	-	1	-	100	100
10	18AUD211	Constitution of India	AC	2	-	-	-	-	-	-
11	18SAH223	Reasoning and Aptitude-II	HS	2	-	-	-	-	-	-
Contact hours per week				19	5	4	-	-	-	-
Total hours per week				28			-	-	-	-
Total credits (6 Theory + 2 Labs)							21	-	-	-
Total Marks								240	560	800

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
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III.B.Tech. I Sem.

S.No	Subject Code	Subject	Subject Category	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
				L	T	P/D	C	I	E	Total
1	18CSE311	Operating Systems	PC	2	1	-	3	30	70	100
2	18CSE312	Computer Networks	PC	2	1	-	3	30	70	100
3	18CSE313	Software Engineering	PC	3	-	-	3	30	70	100
4	18CSE314	Unix and Shell Programming	PC	2	1	-	3	30	70	100
5	18ECE419	Microprocessors &Microcontrollers	ES	3	-	-	3	30	70	100
6	18CSE315	Compiler Design	PC	2	1	-	3	30	70	100
7	18CSE316	Network Simulation Lab	PC	-	-	2	1	30	70	100
8	18CSE317	Unix and Shell Programming Lab	PC	-	-	2	1	30	70	100
9	18SAH311	Communication and Soft Skills Lab	HS	-	-	2	1	30	70	100
10	MOOC	Massive Online Open Course's	OE	-	-	-	-	-	-	-
Contact hours per week				14	4	6	-	-	-	-
Total hours per week				24			-	-	-	-
Total credits (6 Theory + 3 Labs)							21	-	-	-
Total Marks								270	630	900

III.B.Tech. II Sem.

S.No	Subject Code	Subject	Subject Category	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
				L	T	P/D	C	I	E	Total
1	18CSE321	Data Mining and Warehousing	PC	2	1	-	3	30	70	100
2	18CSE322	Object Oriented Analysis and Design Using UML	PC	2	1	-	3	30	70	100
3	18CSE323	Web Technologies	PC	2	1	-	3	30	70	100
4	18CSE324	Software Testing Methodologies	PC	2	1	-	3	30	70	100
5	18CSE325	Artificial Intelligence	PC	3	-	-	3	30	70	100
6	OE-I	**Open Elective-I**	OE	3	-	-	3	30	70	100
7	18CSE326	Web Technologies Lab	PC	-	-	2	1	30	70	100
8	18CSE327	Unified Modeling Language & Data mining Lab	PC	-	-	2	1	30	70	100
9	18CSE328	Project Skills Lab	PW		-	2	1	30	70	100
10	18CSE329	On-line Comprehensive Test-II	PC	2	-	-	1	-	100	100
Contact hours per week				16	4	6	-	-	-	-
Total hours per week				26			-	-	-	-
Total credits (6 Theory + 3 Labs)							22	-	-	-
Total Marks								270	730	1000

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
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IV.B.Tech. I Sem.

S.No	Subject Code	Subject	Subject Category	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
				L	T	P/D	C	I	E	Total
1	18CSE411	Cryptography and Network Security	PC	2	1	-	3	30	70	100
2	18CSE412	Big Data Analytics	PC	2	1	-	3	30	70	100
3	18CSE413	Mobile Application Development	PC	2	1	-	3	30	70	100
4	18CSE414	**Core Elective-I**	CE	3	-	-	3	30	70	100
5	18CSE415	**Core Elective-II**	CE	3	-	-	3	30	70	100
6	OE-II	**Open Elective-II**	OE	3	-	-	3	30	70	100
7	18CSE416	Big Data Analytics Lab	PC	-	-	2	1	30	70	100
8	18CSE417	Mobile Application Development Lab	PC	-	-	2	1	30	70	100
9	18AUD411	Professional Ethics	AC	2	-	-	-	-	-	-
Contact hours per week				17	3	4	-	-	-	-
Total hours per week				24			-	-	-	-
Total credits (6 Theory + 2 Labs)							20	-	-	-
Total Marks								240	560	800

IV.B.Tech. II Sem.

S.No	Subject Code	Subject	Subject Category	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
				L	T	P/D	C	I	E	Total
1	18CSE421	Internet of Things	PC	3	-	-	3	30	70	100
2	18CSE422	Internetworking with TCP/IP	PC	3	-	-	3	30	70	100
3	18CSE423	**Core Elective-III**	CE	3	-	-	3	30	70	100
4	18CSE424	**Core Elective-IV**	CE	3	-	-	3	30	70	100
5	18CSE425	Project Work	PW	-	-	20	10	30	70	100
Contact hours per week				12	-	20	-	-	-	-
Total hours per week				32			-	-	-	-
Total credits (4 Theory + 1Project Work)							22	-	-	-
Total Marks								150	350	500

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
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CORE ELECTIVES

IV.B.Tech. I Sem. (Core Elective-I)

S.No	Subject Code	Subject	Subject Category	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
				L	T	P/D	C	I	E	Total
1	18CSE414A	Computer Graphics and Multimedia	CE	3	-	-	3	30	70	100
2	18CSE414B	Principles of Programming Languages	CE	2	1	-	3	30	70	100
3	18CSE414C	Design Patterns	CE	3	-	-	3	30	70	100
4	18CSE414D	Fuzzy Logic and Neural Networks	CE	3	-	-	3	30	70	100
5	18CSE414E	Network Management Systems	CE	3	-	-	3	30	70	100

IV.B.Tech. I Sem. (Core Elective-II)

S.No	Subject Code	Subject	Subject Category	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
				L	T	P/D	C	I	E	Total
1	18CSE415A	Software Project Management	CE	3	-	-	3	30	70	100
2	18CSE415B	Advanced Computer Architecture	CE	3	-	-	3	30	70	100
3	18CSE415C	Soft Computing	CE	3	-	-	3	30	70	100
4	18CSE415D	System Modeling and Simulation	CE	2	1	-	3	30	70	100
5	18CSE415D	Image Processing	CE	3	-	-	3	30	70	100

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IV.B.Tech. II Sem. (Core Elective-III)

S.No	Subject Code	Subject	Subject Category	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
				L	T	P/D	C	I	E	Total
1	18CSE423A	Cloud Computing	CE	3	-	-	3	30	70	100
2	18CSE423B	Machine Learning	CE	3	-	-	3	30	70	100
3	18CSE423C	Distributed Systems	CE	3	-	-	3	30	70	100
4	18CSE423D	Network Programming and Management	CE	3	-	-	3	30	70	100
5	18CSE423D	Computational Intelligence	CE	3	-	-	3	30	70	100

IV.B.Tech. II Sem. (Core Elective-IV)

S.No	Subject Code	Subject	Subject Category	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
				L	T	P/D	C	I	E	Total
1	18CSE424A	Distributed Databases	CE	3	-	-	3	30	70	100
2	18CSE424B	Data Science using Python	CE	3	-	-	3	30	70	100
3	18CSE424C	Service Oriented Architecture	CE	3	-	-	3	30	70	100
4	18CSE424D	Mobile Computing	CE	3	-	-	3	30	70	100
5	18CSE424E	Real Time Systems	CE	3	-	-	3	30	70	100

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

OPEN ELECTIVE-I

III.B.Tech. II Sem.

Offered Department	Subject Code	Subject	Subject Category	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
				L	T	P/D	C	I	E	Total
S&H	18OSAH321	Introduction to Nano Science and Technology	OE	3	-	-	3	30	70	100
	18OSAH322	Business Communication and Career Skills	OE	3	-	-	3	30	70	100
	18OSAH323	Mathematical Modeling	OE	3	-	-	3	30	70	100
CIV	18OCIV321	Metro Systems and Engineering	OE	3	-	-	3	30	70	100
	18OCIV322	Green Buildings Concept and Energy Conservation	OE	3	-	-	3	30	70	100
	18OCIV323	Climate Change Impact on Water Resources	OE	3	-	-	3	30	70	100
EEE	18OEEE321	Power Electronics for Renewable Energy Systems	OE	3	-	-	3	30	70	100
	18OEEE322	System Analysis using MATLAB	OE	3	-	-	3	30	70	100
	18OEEE323	PLC and SCADA	OE	3	-	-	3	30	70	100
ECE	18OECE321	Machine Vision System	OE	3	-	-	3	30	70	100
	18OECE322	Foundation of NANO Electronics	OE	3	-	-	3	30	70	100
	18OECE323	Medical Electronics	OE	3	-	-	3	30	70	100
MECH	18OMEC321	Industrial Robotics	OE	3	-	-	3	30	70	100
	18OMEC322	Human Factors in Engineering	OE	3	-	-	3	30	70	100
	18OMEC323	Power Generation Technologies	OE	3	-	-	3	30	70	100

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

OPEN ELECTIVE-II

IV.B.Tech. I Sem.

Offered Department	Subject Code	Subject	Subject Category	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
				L	T	P/D	C	I	E	Total
S&H	18OSAH411	Banking and Insurance	OE	3	-	-	3	30	70	100
	18OSAH412	Managing Innovation and Entrepreneurship	OE	3	-	-	3	30	70	100
	18OSAH413	Intellectual Property Rights	OE	3	-	-	3	30	70	100
CIV	18OCIV411	Disaster Mitigation and Management	OE	3	-	-	3	30	70	100
	18OCIV412	Traffic Engineering and Management	OE	3	-	-	3	30	70	100
	18OCIV413	Environmental Safety	OE	3	-	-	3	30	70	100
EEE	18OEEE411	Wind Energy Conversion Systems	OE	3	-	-	3	30	70	100
	18OEEE412	Electrical Drives and Control	OE	3	-	-	3	30	70	100
	18OEEE413	Power Quality	OE	3	-	-	3	30	70	100
ECE	18OECE411	Fundamental of Artificial Intelligence	OE	3	-	-	3	30	70	100
	18OECE412	Fundamental of Embedded Systems	OE	3	-	-	3	30	70	100
	18OECE413	Data Communication and Networks	OE	3	-	-	3	30	70	100
MECH	18MEC411	Statistical Quality Control	OE	3	-	-	3	30	70	100
	18MEC412	Industrial Psychology and Management	OE	3	-	-	3	30	70	100
	18MEC413	Mechatronics	OE	3	-	-	3	30	70	100

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
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SUMMARY OF CREDIT ALLOCATION

S.NO	Subject Area	Credits As Per Semester								Total Credits	Percentage – wise Credit Distribution
		I-I	I-II	II-I	II-II	III-I	III-II	IV-I	IV-II		
1.	HS	2	2	0	3	1	-	-	-	**08**	**05.00%**
2.	BS	7	7	3	3	-	-	-	-	**20**	**12.50%**
3.	ES	8	8	7	-	3	3	3	3	**35**	**21.87%**
4.	PC	-	-	10	15	17	15	8	3	**68**	**42.50%**
5.	CE	-	-	-	-	-	-	6	6	**12**	**07.50%**
6.	OE	-	-	-	-	0	3	3		**06**	**03.75%**
7.	PW	-	-	-	-	-	1	-	10	**11**	**06.87%**
8	AC	-	-	0	0	-	-	0	-	**0**	**0**
Total		**17**	**17**	**20**	**21**	**21**	**22**	**20**	**22**	**160**	**100%**

Note: HS- Humanities and Social Science; BS - Basic Sciences; ES – Engineering Science; PC – Professional Core; CE - Core Elective; OE - Open Elective; PW - Project Work; AC – Audit Course.

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

I B.Tech I Semester

18SAH111	**COMMUNICATIVE ENGLISH**	**L**	**T**	**P/D**	**C**
	(Common to all Branches)	**2**	**-**	**-**	**2**

Course Educational Objectives:

CEO1: To Provide Knowledge on Behavioral aspects, developing vocabulary by deriving various ways of forming words.

CEO 2: To cultivate Individual and Team Work skills, Knowledge on the usage of foreign language words in to English Language,

CEO3: To Cultivate Adaptability Skills in work place, Knowledge on Grammatical aspects of Verbs and Adverbs, words by applying stress, how to express one's opinions and dialogue writing.

CEO4: Acquiring of Entrepreneurship Skills, Usage of grammar aspects of Prepositions, Pronunciation of suffix words, and acquisition of writing skills.

CEO5: Contextual knowledge to recognize the need of ability to engage in independent and life-long learning in the broadest context of technological change.

UNIT-I

"ISWARAN" (A Story from R.K. Narayan's Malgudi Days) - Word Formation: Clipping- Acronym- Blending- Back-formation- Derivation - Borrowing – Coinage- Compounding - Nouns-Kinds and Uses - Pronouns-Kinds and uses - Listening to Vowel Sounds - Introducing self and others - Reading Comprehension.

UNIT-II

"WHITE WASHING THE FENSE" (Team work skills by Mark Twain) - A-Z Root words from foreign languages and their use in English – Adjectives - Degrees of Comparison - Listening to Consonant Sounds – Greetings - Reading Strategies - Sentence Structures and formation.

UNIT-III

"SENOR PAYROLL" (Adaptability skills by William E. Barrett) - Verbs-Forms - List of Regular and Irregular verbs-Be verbs-Gerunds - Adverbs-types and formation of adverbs - Listening to Word Stress - Expressing opinions – Paraphrasing -Dialogue Writing.

UNIT-IV

"ACQUISITION OF ENTREPRENEURSHIP SKILLS" (a brief biography of AZIM PREMJI) – Prepositions - Uses - Listening to Inflections - Describing objects/persons/places – Summarizing - Writing a Moral Story.

UNIT-V

"REFLECTIONS OF FUTURE THE YEAR 2050" by Theodore J. Gordon - Conjunctions – Articles - Listening to a passage - Telephone Conversation - Short Story Review - Expansion of Proverbs.

Course Outcomes:
On successful completion of the course, students will be able to

Course Outcomes		POs related to Cos
CO1	Understand the concepts on behavioral aspects, Development of vocabulary by deriving various ways of forming words, identification of Nouns and Pronouns and their usage, Pronunciation of Phonetic Vowel Sounds, Communicate effectively with others and how to read and understand a passage**.**	PO1, PO10
CO2	Develop Individual and Team Work skills, Knowledge on the usage of foreign language words, identification of and their usage.	PO1, PO9, PO10
CO3	Cultivate Adaptability Skills in work place Knowledge on Grammatical aspects of Verbs and Adverbs. Writing dialogues effectively.	PO1, PO9, PO10
CO4	Understand in Acquiring of Entrepreneurship Skills Usage of grammar aspects on Prepositions Pronunciation of inflectional suffix words by describing objects, persons and places Acquiring writing skills through interpreting moral stories.	PO1, PO9, PO10
CO5	Knowledge to Recognize the need of ability to engage in independent and life-long learning Usage of grammar aspects on Conjunctions and Articles Communicate effectively in English over phone Reviewing a short stories and Expansion of proverbs.	PO1, PO10, PO12

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	-	-	-	-	-	-	3	-	-
CO2	3	-	-	-	-	-	-	-	3	3	-	-
CO3	3	-	-	-	-	-	-	-	3	3	-	-
CO4	3	-	-	-	-	-	-	-	2	2	-	2
CO5	3	-	-	-	-	-	-	-	-	3	-	-
CO*	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2.66**	**2.8**	**-**	**2**

Other References:
1. Exercises in spoken English: Parts I-III, CIEFL, Hyderabad, Oxford University Press.
2. Communication Skills: Sanjay Kumar and PushpaLatha, Oxford University Press. 2011.
3. Practical English Usage: Michael Swan, Oxford University Press, 1995.
4. Remedial English Grammar: F.T. Wood. Macmillan, 2007.

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
(AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

I B.Tech I Sem

		L	T	P/D	C
18SAH114	**ENGINEERING MATHEMATICS – I**				
	(Common to all Branches)	**2**	**1**	**-**	**3**

Course Educational Objectives:

CEO1: To learn the reduction of a given matrix to echelon and normal forms, rank of a matrix, solve system of linear equations by different methods and determining the eigen values and eigen vectors and develop linear transformation with emphasis on the role of eigen-values and eigen-vectors.

CEO2: To understand the Taylor's and Maclaurin's series of function in single variable and to familiarize the knowledge of partial derivatives, extreme values in multivariables.

CEO3: To identify important characteristics of first order ordinary differential equations(FOODE) and develop appropriate method of obtaining solutions of FOODE and explore the use of FOODE as models in various applications

CEO4: To learn the concepts of Laplace Transforms and inverse Laplace Transforms and to explore the solving initial value problems by using Laplace transform method.

UNIT – 1: MATRICES

Rank - Echelon form and Normal form - Solution of linear system of homogeneous and non-homogeneous equations - Direct methods - Gauss elimination, Gauss Jordan method - Eigen values, Eigen vectors - Properties - Cayley-Hamilton theorem(without proof) - Inverse and powers of a matrix. – Diagonalizationof a matrix using similarity transformation only.

UNIT – 2: DIFFERENTIAL CALCULUS AND ITS APPLICATIONS

Taylor's and Maclaurin's series for single variable (simple examples) - Functions of several variables - Jacobian – Taylor's and Maclaurin's series for two variables - Maxima and minima of functions of two variables - Lagrangian method of undetermined multipliers with three variables only.

UNIT – 3:ORDINARY DIFFERENTIAL EQUATIONS OF FIRST ORDER, FIRST DEGREE AND ITS APPLICATIONS & SPECIAL FUNCTIONS

Exact equations, Equations reducible to exact, Linear and Bernoulli's equation Applications: Orthogonal Trajectories, Newton's law of cooling only.

Beta and Gamma functions – Evaluation of Integrals (Simple examples)

UNIT - 4: LAPLACE TRANSFORM - I

Laplace transform of standard functions - First shifting theorem - Second shifting theorem - Transform of Derivatives & Integrals - Inverse transform.

UNIT - 5: LAPLACE TRANSFORM – II

Laplace Transform ofUnit step function, Dirac's delta function and Periodic function - Convolution theorem - Application of Laplace transforms to ordinary differential equations of first and second order.

Course Outcomes

On successful completion of the course, students will be able to

Course Outcomes		POs related to COs
CO1	Demonstrate knowledge in estimating ranks in solving linear equations through matrix methods, eigen values and eigen vectors and to develop analytical skills in solving problems involving diagnoliation using eigen values and eigen vectors	PO1,PO2,P012
CO2	Demonstrate knowledge in Taylor's and Maclaurin's series of a function of single variable, finding maximum and minimum values attained by functions of several variables and Develop analytical skills in solving problems involving functional dependence and independence using partial derivatives	PO1,PO2
CO3	Demonstrate knowledge in first order ordinary differential equations, Develop analytical skills in solving problems involving first order ordinary differential equations and Develop skills in designing Mathematical models for Newton's Law of cooling and orthogonal trajectories	PO1,PO2,P03
CO4	Demonstrate knowledge in Laplace transform and inverse Laplace transform and use the appropriate shift theorems in finding Laplace and inverse Laplace transforms	PO1,PO2
CO5	Develop analytical skills in solving problems involving initial value problems for constant coefficient linear ordinary differential equations using Laplace transform	PO1,PO2,PO3 PO4,PO12

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	3	-	-	-	-	-	-	-	-	2
CO2	3	3	-	-	-	-	-	-	-	-	-	2
CO3	3	3	-	-	-	-	-	-	-	-	-	-
CO4	3	3	-	-	-	-	-	-	-	-	-	2
CO5	3	3	3	-	-	-	-	-	-	-	-	2
CO*	**3**	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**

Text books:

1. Engineering Mathematics–I, 2012, T.K.V. Iyengar, B.Krishna Gandhi, S. Ranganatham and M.V.S.S.N. Prasad, S. Chand and Company Ltd, New Delhi.
2. Higher Engineering Mathematics, 34/e, 1999, Dr. B. S. Grewal, Khanna Publishers, Delhi.

Reference books:

1. Engineering Mathematics for JNTU, 2012, B.V. Ramana, Tata McGraw Hill Publishers, New Delhi.
2. A Text Book of Engineering Mathematics,2011, N.P.Bali,Laxmi publications(P)Ltd, New Delhi.
3. Higher Engineering Mathematics, Dr. M. K. VenkataRamana, National Pub, Madras
4. Engineering Mathematics, Volume - 1, 2012, E.Rukmangadachari, E.Keshava Reddy, Pearson Educations, Chennai.
5. Advanced Engineering Mathematics, 8/e, 2009, Erwin Kreyszig, Wiley India, New Delhi

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

I B.Tech II Sem

		L	T	P/D	C
18SAH113	**ENGINEERING CHEMISTRY**				
	(Common to all Branches)	2	1	-	3

Course Educational Objectives:

CEO1: To learn different purification method and analysis the impurities present in water.

CEO2: To develop skill to describe the mechanism and control of corrosion.

CEO3: To train the students to effectively use the knowledge of polymer science.

CEO4: To learn the concept of refractories and to develop skill to apply the concept of Electrochemistry and fuels

UNIT- 1: WATER AND WATER FOR INDUSTRIAL PURPOSE

Water: Sources of water - Types of Impurities in Water - Hardness of water - Temporary and permanent hardness - Estimation of hardness by EDTA Method and numerical problems - Analysis of water - Dissolved oxygen - Disadvantages of hard water - Methods of treatment of water for domestic purpose - Sterilization - Chlorination -Ozonisation. **Water for industrial purpose:** Water for steam making - Boiler troubles - Priming and foaming - Boiler corrosion - Scales and sludge - Caustic embrittlement - Water treatment - Internal treatment - Colloidal - Phosphate - Calgon - Carbonate - Sodium aluminate conditioning of water - External treatment - Ion - exchange process - Demineralization of brackish water – Reverse osmosis.

UNIT - 2: SCIENCE OF CORROSION

Definition - Types of corrosion - Dry corrosion(Direct chemical attack) - Wet corrosion - Theories of corrosion and mechanism - Electro chemical theory of corrosion - Galvanic corrosion - Concentration cell corrosion - Oxygen absorption type - Factors influencing the corrosion - Control of corrosion - Cathodic protection - Sacrificial anode and impressed currentcathodic protection method.

UNIT - 3: POLYMERS

Polymerization reactions - Basic concepts - Types of polymerization - Addition and condensation polymerization with mechanism - Plastics -Thermosetting and thermoplastics – Composition, Properties and Engineering applications of teflon, bakelite, nylon and rubber - Processing of natural rubber and compounding. **Elastomers:** Buna S - Buna N - Polyurethane Rubber and Silicone Rubber.

UNIT - 4: PHASE RULE, STRUCTURAL MATERIALS AND REFRACTORIES

Phase rule: Definition - Terms involved in phase rule - Phase rule equation - Phase diagrams - One component system (water system) - Two component system (lead- silver system). **Structural materials:** Cement - Composition of Portland cement - Analysis - Setting and hardening of cement (reactions) and role of gypsum in Portland cement. **Refractories:**Definition - Classification with examples - Criteria of a good refractory material - Causes for the failure of refractory materials.

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UNIT - 5: FUELS AND ELECTRO CHEMISTRY

Fuels: Definition and classification of fuels. Liquid fuels- Classification of petroleum, refining of petroleum by Bergius process. Gaseous fuels – natural gas, producer gas, water gas, coal gas and biogas**. Electro Chemistry**: Conductance - Equivalent conductance - Molar conductance – Conduct metric titrations - Conductivity Measurements. **Fuel cells**: Introduction, Hydrogen oxygen fuel cell and methanol fuel cell

Course Outcomes:

On successful completion of course, the student will be able to

Course Outcomes		POs related to COs
CO1	Demonstrate the fundamentals of water technology and develop analytical skills in determination hardness of water and different purification methods.	PO1, PO2
CO2	Demonstrate the knowledge in corrosion phenomenon and develop skills in different methods for control of corrosion	PO1, PO2
CO3	Demonstrate the knowledge on polymeric materials and to prepare polymeric material for environmental safety.	PO1, PO2,PO7
CO4	Analyze the effect of cement materials, causes for the failure of refractory materials and understanding of phase rule.	PO1, PO2
CO5	Understand and apply the concept of electrochemistry and analysis the fuels and different types of fuels cells.	PO1, PO2

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-
CO3	3	2	-	-	-	-	2	-	-	-	-	-
CO4	3	3	-	-	-	-	-	-	-	-	-	-
CO5	3	3	-	-	-	-	-	-	-	-	-	-
CO*	**3**	**2.6**	**-**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**-**	**-**

Text books:

1. Chemistry for Engineers, 4/e, 2009, Prof. K. N. Jayaveera, Dr. G. V. Subba Reddy and Dr. C. Ramachandraiah, Tata McGraw Hill Publishers, New Delhi.
2. Text book of Engineering Chemistry, 15/e, 2008, Jain and Jain, DhanpatRai Publishing Company, New Delhi.
3. Text book of Engineering Chemistry, 18/e, 2008, S. S. Dara, S. Chand & Co, New Delhi.

Reference books:

1. Engineering Chemistry, 5/e, 2009, Dr. K. B. Chandrasekhar, Dr. U.N. Dash, Dr. Sujatha Mishra, Scitech Publications(India) Pvt. Ltd, Hyderabad.
2. Fuel Cells Principles and Applications, 4/e, 2008,B.Viswanath, M. AuliceScibioh, Universities press, Hyderabad.
3. Chemistry of Engineering Materials, 3/e, 2008, C.V.Agarwal, Tara Publication, Varanasi.
4. Physical Chemistry, 12/e, 2009, Glasston&Lewis,DhanptharaiPublishers,New Delhi.
5. Engineering Chemistry (Vol.1&2), 5/e, 2004, J C Kuriacose and J. Rajaram, Tata McGraw Hill Publishers, New Delhi.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

I B. Tech I Semester	**L**	**T**	**P/D**	**C**
	2	**1**	**0**	**3**

18CSE111 **COMPUTER PROGRAMMING**
(Common to CSE, ECE, EEE Branches)

Course Educational Objectives:

The student should be made to:

CEO1: To design an algorithm for a given problem and illustrate the flowchart to develop C programs using operators.
CEO2: To impart adequate knowledge on conditional and iterative statements to write C programs.
CEO 3: To develop programming skills using the arrays, functions and strings.
CEO 4: To enable effective usage of structures, pointers and to implement the Memory management concepts.
CEO 5: To understand the sorting techniques and files concept to show input and output of files.

UNIT 1 - OVERVIEW OF COMPUTERS AND C PROGRAMMING BASICS

Overview of Computers: Computer Software - Algorithm–Flow Chart–Software Development Method.
C Programming Basics: Introduction to "C" Programming – Characteristics of C – Structure of a "C" program – Tokens –Constants- Variables – Data Types – Operators and their types-Expressions – Operator Precedence and Associativity– Managing Input and Output Operations.

UNIT 2 – SELECTION, ITERATION STATEMENTS AND ARRAYS

Selection Statements: if Statements - Switch Statement – goto statement.
Iteration Statements: for statement–while statement–do-while Statement.
Arrays: Initialization–Declaration - One-Dimensional Arrays-Two-Dimensional Arrays.

UNIT 3 –FUNCTIONS AND STRINGS

Functions: Library Functions - User Defined Functions–Function Prototype - Function Definition–Function Call – Return Statements - Category of Functions – Nesting of Functions – Passing Arrays to Functions- Recursion – Storage Classes – Pre-Processor Directives
Strings: Declaring and Initializing String Variables–Reading string from terminal - Writing string to the screen - String Operations – String Handling Functions.

UNIT 4 – POINTERS, STRUCTURES AND UNIONS

Pointers: Definition–Initialization–Pointers Arithmetic–Pointers and Arrays.
Structures and Union: Introduction – Need for Structure Data type – Structure Definition – Structure Declaration – Accessing Structure Members - Structure within a Structure – Copying and Comparing Structure Variables - Structures and Arrays – Union.

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UNIT 5 - FILE HANDLING, SORTING AND SEARCHING TECHNIQUES

File handling: File Accessing Methods – Sequential Access and Random Access- Basic Operations on Files – File Handling Function.
Sorting and Searching techniques: Bubble sort - Selection sort - Insertion sort – Quick sort – Merge sort -- Linear search - Binary search.

Course Outcomes:

On successful completion of the course the student will be able to,

Course Outcomes		POs related to COs
CO1	To obtain the knowledge about the problem solving skills.	PO1, PO2
CO2	To develop programs using the basic elements like iteration statements, Arrays.	PO1, PO2, PO3
CO3	To understand about the code reusability with the help of user defined functions.	PO1, PO2
CO4	To solve the memory access problems by using pointers and design the programs on structures and unions.	PO1, PO2, PO4
CO5	To learn the basics of file handling mechanism that is essential for understanding the concepts of management systems.	PO1, PO2

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	2	3	3	-	-	-	-	-	-	-	-	-
CO3	2	3	-	-	-	-	-	-	-	-	-	-
CO4	3	3	-	3	-	-	-	-	-	-	-	-
CO5	2	3	-	-	-	-	-	-	-	-	-	-
CO*	**2.4**	**2.8**	**3**	**3**	-	-	-	-	-	-	-	-

Text Books:

1. A Structured Programming Approach Using C by Behrouz A. Forouzan & Richard F. Gilberg, Third Edition, Cengage Learning.
2. Programming in C and Data Structures, 2/e, 2012, E.Balaguruswamy, Tata McGraw Hill, New Delhi.

Reference Books:

1. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A. AnandaRao, Pearson Education.
2. Yashavant P. Kanetkar. “Let Us C”, BPB Publications, 2011.
3. Byron S Gottfried, “Programming with C”, Schaum’s Outlines, Second Edition, Tata McGraw-Hill, 2006.
4. Kernighan,B.W and Ritchie,D.M, “The C Programming language”, Second Edition, Pearson Education, 2006.
5. Anita Goel and Ajay Mittal, “Computer Fundamentals and Programming in C”, Dorling Kindersley (India) Pvt. Ltd., Pearson Education in South Asia, 2011.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

I B.TECH -I SEM	**L**	**T**	**P/D**	**C**
	2	**1**	**0**	**3**

18EEE111 BASIC ELECTRICAL ENGINEERING

Course objectives:

CEO1: To demonstrate knowledge on basic electrical circuits
CEO2: To determine and analyze different parameters of periodic waveforms
CEO3: To understand the construction and operation of D.C. machines
CEO4: To understand the construction and operation of A.C. machines
CEO5: To impart knowledge on basic principles of electrical measuring instruments

UNIT-I INTRODUCTIONTO ELECTRICAL ENGINEERING:
Ohm's Law,Basic Circuit Components,Kirchhoff'slaws,SimpleProblems.Types of Sources,Series, Parallel Circuits,Star-Delta Transformation,Network Theorems-Superposition and reciprocity, Thevenin's and Norton's Theoremsand Maximum Power Transfer Theorem.

UNIT-II SINGLE PHASE AC CIRCUITS
R.M.S, Average values and form factor for different periodic waveforms - phase and phase difference of sinusoidal alternating quantities - steady state analysis of R, L and C (in series, parallel and series parallel combinations) with sinusoidal excitation - concept of reactance, impedance, susceptance and admittance - Power triangle, power factor

UNIT-III DC MACHINES:
Principle of Operation of DC Generators, Types of DC Generators, EMF Equation in DC Generator, OCC of a DC Shunt Generator. Principle of Operation of DC Motors, Types of DC Motors, Torque Equation, Losses and Efficiency, Calculation in DC Motors, Speed control of DC Shunt motor –Swinburnes Test and Brake Test

UNIT-IV AC MACHINES:
Principles of Operation of Transformer, Constructional Details, Losses and Efficiency, Regulation of Transformer, O.C and S.C Tests - Principles of Operation of Three Phase Induction motor

UNIT-V MEASURING INSTRUMENTS:
Introduction-Classificationof Instruments-Operating Principles-Essential Features of Measuring Instruments-Moving Coil and Moving Iron Instrument- Dynamometer Wattmeter and Energy meter

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Course Outcomes:

On successful completion of the course the student will be able to,

Course Outcomes		POs related to COs
CO1	Demonstrate knowledge on basic circuit componentsand basic concepts of electrical engineering, Analyze Circuits by different network reduction techniques	PO1, PO2
CO2	To determine and analyze different parameters of periodic waveforms and Analyze the steady state analysis of R, L,C circuits.	PO1, PO2
CO3	Demonstrate knowledge on Construction and performance of DC motor and AnalyzeLosses and Efficiency of motor by different methods	PO1, PO2
CO4	Demonstrate knowledge on Construction and performance of transformer and designof the parameters of equivalent circuit of single phasetransformer	PO1, PO2, PO3
CO5	To understandand evaluatethecalibration of different electrical measuring instruments	PO1, PO2, PO3

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	2	3	-	-	-	-	-	-	-	-	-	-
CO3	2	3	-	-	-	-	-	-	-	-	-	-
CO4	3	3	3	-	-	-	-	-	-	-	-	-
CO5	2	3	3	-	-	-	-	-	-	-	-	-
CO*	**2.4**	**2.8**	**3**	**-**	-	**-**	**-**	**-**	**-**	**-**	**-**	**-**

TEXT BOOKS:

1.Basic Electrical Engineering-by M.S Naidu and S Kamakshaiah.
2. Basic Electrical Engineering by T.KNagasarkar and M.S Sukhija

REFERENCES BOOKS:

1. Theory and Problems of BEE by DP Kothari and IJ Nagrath.
2. Principle of Electrical Engineering by **V.**K Mehtha,S Chand Publications.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

I B.Tech II Sem

18SAH116	**ENGINEERING CHEMISTRY LABORATORY**	**L**	**T**	**P/D**	**C**
	(Common to all branches)	**-**	**-**	**2**	**1**

Course Educational Objectives:

CEO1: Demonstrate Knowledge on measurement of various analysis of water treatment methods

CEO2: Identify the different salt analysis of copper for engineering and technological applications.

CEO3: Provide valid conclusions on phenomena of dissolved oxygen.

Name of the Experiment

1. Preparation of Standard EDTA solution and Estimation of Hardness of Water
2. Preparation of Standard EDTA and Estimation of Copper
3. Estimation of dissolved oxygen in given water sample
4. Estimation of alkalinity of water
5. Estimation of Acidity of water sample
6. Preparation of Standard Potassium Dichromate and Estimation of Ferrous Iron
7. Preparation of Standard Potassium Dichromate and Estimation of Copper by Iodometry
8. Determination of strength of the given Hydrochloric acid against standard sodium hydroxide Solution by Conduct ometric titration
9. Conductometric titration of $BaCl_2$Vs Na_2SO_4 (Precipitation Titration)
10. Determination of viscosity of the given oils through Redwood viscometer

Course Outcomes:

On successful completion of the course the will be able to,

Course Outcomes		**POs related to COs**
CO1	Demonstrate Knowledge on measurement of various analysis of water treatment methods	PO1
CO2	Identify the different salt analysis of copper for engineering and technological applications.	PO2
CO3	Provide valid conclusions on phenomena of dissolved oxygen.	PO4
CO4	Follow ethical values during conducting of alkalinity of water samples.	PO8
CO5	Work individually or in a team effectively.	PO9
CO6	Communicate verbally and in written form pertaining to results of the Experiments.	PO10
CO7	Learns to perform experiments involving physical Phenomena in future years.	PO12

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PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	3	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	3	-	-	-	-
CO5	-	-	-	-	-	-	-	-	3	-	-	-
CO6	-	-	-	-	-	-	-	-	-	3	-	-
CO7	-	-	-	-	-	-	-	-	-	-	-	3
CO8	-	-	-	-	-	-	-	-	-	-	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	-
CO*	**3**	**3**	**-**	**3**	-	**-**	**-**	**3**	3	**3**	**-**	**3**

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I B. Tech I Semester

L	T	P/D	C
0	0	2	1

18CSE112 COMPUTER PROGRAMMING LAB
(Common to CSE, ECE, EEE Branches)

Course Educational Objectives:

CEO1: To provide knowledge on flowchart and algorithm to the given problem
CEO2: To exercise conditional and iterative statements to Write C programs
CEO3: To develop the skill of C programs using arrays, strings and functions.
CEO4: To understand C programs using pointers and allocate memory using dynamic memory Management functions.
CEO5: To analyze the files concept to show input and output of files in C

EXERCISES:

1. a. Write a C Program to Calculate the Simple Interest.
   b. Write a C Program to Convert the Temperature Unit from Fahrenheit to Celsius using the Formula C= (F-32)/1.8.
   c.Assume that any Month is of 30 Days. Now you are given Total Days. Write a C Program to find out the exact Number of Years - Months & Days.

2. a. Write a Program that Prints the Given 3 Integers in Ascending Order using if - else.
   b. Write a Program to Calculate Commission for the Input Value of Sales Amount. Commission is Calculated as per the Following Rules:
   i) Commission is NIL for Sales Amount Rs. 5000.
   ii) Commission is 2% for Sales when Sales Amount is >Rs. 5000and <= Rs. 10000.
   iii) Commission is 5% for Sales Amount >Rs. 10000.
   c. Write a C Program to find the Roots of Quadratic Equation.

3. a. Write a Program, which takes two integer Operands and one Operator from the User, Performs the Operation and then Prints the Result. (Consider the Operators +,-,*, /, %, use switch Statement).
   b. A Character is entered through Keyboard. Write a Program to determine whether the Character Entered is a Capital Letter, a Small Case Letter, a Digit or a Special Symbol. The Following Table shows the Range of ASCII values for various Characters.

Characters	ASCII values
A - Z	65 - 90
a - z	97- 122
0 - 9	48 - 57
Special Symbols	0 - 47, 58 - 64, 91- 96, 123 – 127.

4. a. Write a C Program to find the Sum of Individual Digits of a Positive Integer.
   b.A Fibonacci sequence is defined as follows: the First and Second terms in the Sequence are 0 and 1. Subsequent terms are found by adding the Preceding two terms in the Sequence. Write a C Program to Generate the first n terms of the Sequence.

5. a. i) A Perfect Number is a Number that is the Sum of all its Divisors Except Itself. Six is the Perfect Number. The only Numbers that Divide 6 evenly are 1, 2, 3 and 6 (i.e., 1+2+3=6).
   ii) An Abundant Number is one that is Less than the Sum of its Divisors (Ex: 12 <1+2+3+4+6).

iii) A Deficient number is one that is Greater than the Sum of its Divisors (Ex: 9 > 1+3). Write a Program to Classify N Integers (Read N from keyboard) each as Perfect, Abundant or Deficient.
b. An Armstrong Number is a Number that is the Sum of the Cubes of its Individual Digits. Write a C Program to Print Armstrong Numbers below 1000.

6. a. Write a C Program to generate all the Prime Numbers between 1 And N, Where N is a Value Supplied by the User.
   b. Write a C Program to Calculate the Following Sum: Sum = 1 - x2/2! + x4/4! - x6/6! + x8/8! - x10/10!

7. a.Write a C Program to find both the Largest and Smallest Number in a List of Integers using Arrays.
   b.Write a C Program to Perform the Following:
   i) Addition of Two Matrices. ii) Multiplication of Two Matrices.

8. a. Write C Programs that use both Recursive and Non-Recursive Functions to find the Factorial of
   a given Integer.
   b. Write C Programs that use both Recursive and Non-Recursive Functions to find the GCD (Greatest Common Divisor) of two given integers.
   c. Write C Program to solve Towers of Hanoi Problem using recursive function.

9. a. Write C Programs for Swap/Exchange values of two Integer variables using Call by Reference.
   b. Write a C Program using Pointers to Read in an Array of Integers and Print its Elements in Reverse Order.

10. a.Write a C Program to insert a Sub-String into a Given Main String from a Given Position.
    b. Write a C Program to Determine if the Given String is a Palindrome or Not.
    c. Write a C Program to Count the number of Lines, Words and Characters in a Given Text.

11. You are supposed to generate a Result Table which Consists of Student Id - Student Name - Marks of three Subject and Total Marks. Write a Program which takes Input for Five Students and Displays Result Table. Also Display Student Information Separately Who Got the Highest Total? Use Structures to do it.

12. a.Write a C Program to write into and read from a file.
    b. Write a C Program to merge two Files into a Third File. (Note: The File names are specified on the Command Line.)

13. Write C programs to perform the following searching operations for a Key value in a given list of integers: i) Linear search ii) Binary search

14. Write a C program that implements the following sorting methods to sort a given list of integers in ascending order i) Bubble sort ii) Selection sort iii) Insertion sort

15. Write a C Program that Implements the Following Sorting Methods to Sort a Given List of Integers in Ascending Order i) Quick sort ii) Merge sort

Course Outcomes:

On successful completion of this course, the students should be able to:

Course Outcomes		POs related to COs
CO1	Apply the Knowledge to design the algorithm and flowchart for the given problem.	PO1
CO2	Analyze the concepts of control statements and arrays.	PO2
CO3	Design the programs for functions and strings	PO3
CO4	Solve the memory access problems by using pointers and design the programs on structures and unions.	PO4
CO5	Apply the file handling mechanisms that is essential for understanding the concepts of management systems.	PO5
CO6	Follow the ethical principles in implementing the programs	PO8
CO7	Do experiments effectively as an individual and as a team member in a group.	PO9
CO8	Communicate verbally and in written form, the understanding about the experiments.	PO10
CO9	Continue updating their skill related to loops, pointers and files implementing programs in future.	PO12

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3		-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	2	-	-	-
CO8	-	-	-	-	-	-	-	-	-	2	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO*	**3**	**3**	**3**	**3**	3	-	-	3	2	**2**	**-**	**3**

Reference Books:

1. Programming in C and Data Structures, E.Balaguruswamy, Tata McGraw Hill,2nd edition
2. Let us C, YashavantKanetkar, BPB, Thirteenth Revised and Updated edition (2013)
3. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A. AnandaRao, Pearson Education
4. The Spirit of C, an introduction to modern programming, M.Cooper, Jaico Publishing House.
5. Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publications.
6. Computer Basics and C Programming, V. Rajaraman, PHI Publications.

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I B.TECH -I SEM	**L**	**T**	**P/D**	**C**
	0	**0**	**3**	**2**

18EEE112 BASIC ELECTRICAL ENGINEERING LAB

Course objectives:

CEO1. To gain practical experience on fundamental electric laws.

CEO2. To gain practical experience on verification of theorems.

CEO3. To evaluate the performance characteristics of DC shunt generator

CEO4. To evaluate the efficiency of DC shunt machine

CEO5. To evaluate the performance characteristics of DC shunt motor

CEO6. To evaluate the efficiency of single- phase transformer

List of the Experiments

1. Verification of Kcl and Kvl
2. Verification of Superposition Theorem.
3. Verification of Thevinins Theorem.
4. Verification of Maximum Power Transfer Theorem
5. Verification of Norton's Theorem
6. Verification of Reciprocity Theorem.
7. Magnetization Characteristics of D.C Shunt Generator Determination of Critical Field Resistance.
8. Swinburne's Test of Dc Shunt Machine.
9. Speed Control of Dc Shunt Motor
10. Brake Test on Dc Shunt Motor. Determination Of Performancecharacteristics.
11. Oc&Sc Tests on Single- Phase Transformer To Find The Efficiency.
12. Brake Test on Three Phase Squirrel Cage Induction Motor.

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Course outcomes:
On successful completion of this course, the students should be able to:

Course Outcomes		POs related to COs
CO1	Understand the fundamental electrical laws in engineering applications.	PO1
CO2	Verify different network theorems practically.	PO2
CO3	To evaluate the performance characteristics of DC shunt generator	PO3
CO4	To evaluate the efficiency of DC shunt machine	PO4
CO5	To evaluate the performance characteristics of DC shunt motor	PO5
	To evaluate the efficiency of single- phase transformer	
CO6	Follow the ethical principles in implementing the experiments	PO8
CO7	Do experiments effectively as an individual and as a team member	PO9
CO8	Communicate verbally and in written form, the understanding about the experiments.	PO10
CO9	Continue updating their skill electrical engineering in future.	PO12

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3		-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	3	-	-	-
CO8	-	-	-	-	-	-	-	-	-	3	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO*	**3**	**3**	**3**	**3**	3	-	-	3	3	**3**	**-**	**3**

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I B.Tech II Sem

		L	T	P/D	C
18SAH121	**TECHNICAL ENGLISH (Common to all Branches)**	**2**	**-**	**-**	**2**

Course Educational Objectives:

CEO1: To Provide Knowledge on developing Technical Vocabulary communicating in a verbal manner.

CEO2: To cultivate types of listening skills, Knowledge on the usage of foreign language words in to English Language,

CEO3: To acquire Knowledge on use of technology for societal aspects.

CEO4: To get knowledge on earlier technology used and latter technology in India.

CEO5: To understand the ability to write poems and communicate by using technological words.

UNIT-I COMMUNICATION SKILLS FOR PROFESSIONALS

Verbal-Areas of communication - Suggestions to improve verbal communication - Non-verbal communication - Category and features - Cultural differences in non - verbal communication - Suggestions to improve non-verbal communication – Tenses - Listening to Dialogues - Role Play - Reading Short Stories

UNIT-II ACTIVE LISTENING

Introduction -Types of listening -Traits of a good listener - Active versus passive listening - Implications of effective listening – Verbs - Transitive and Intransitive - Identification of TV and ITV in a sentence - Voice of Verbs - Active and Passive - Listening to Intonation - Welcome/Valedictory speech - Reading Poetry - Note Making.

UNIT-III TECHNOLOGY WITH A HUMAN FACE (A lecture by E.F.Schumacher)

Direct speech and Indirect speech - Modal Verbs - Listening to Short Stories - Conveying Vote of Thanks - Reading News papers - Precise Writing.

UNIT-IV Dr. A.P.J ABDUL KALAM (A missile Man)

Question tags - Subject-Verb agreement - Listening to English Songs - Process Description Reading Articles from Journals - Letter writing –official.

UNIT-V THE EXPRESS – By Stephen Spendor (A Technological poem)

Sentence structures (Simple, Compound and Complex sentence) - Listening to speeches - Product Description - Reading Scientific Texts - Paragraph Writing - Essay writing.

Course Outcomes:
On successful completion of course, the student will be able to

Course Outcomes		POS related to COS
CO1	Acquiring Knowledge on developing Technical Vocabulary by communicating in verbal by using proper tense form in the way of acting and writing.	PO1, PO10
CO2	Acquiring Knowledge on the usage of foreign language words in to English Language through various types of listening skills by observing proper intonation and voice of verbs.	PO1, PO9
CO3	Acquiring Knowledge on the use of technology for societal aspects through listening inspiring biographies of scientists besides learning some grammatical aspects on the usage of direct and indirect speeches by applying modal verbs.	PO1, PO12
CO4	Acquiring knowledge on the achievements made by the scientists on the earth by reading scientific articles from various journals present in the library and through motion pictures in internet.	PO1, PO12
CO5	Understand how to describe a technological gadget through poetical expression by applying technological words besides writing short essays using simple to complex sentence.	PO1, PO10, PO12

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	-	-	-	-	-	-	3	-	-
CO2	3	-	-	-	-	-	-	-	3	-	-	-
CO3	3	-	-	-	-	-	-	-	-	-	-	3
CO4	3	-	-	-	-	-	-	-	-	-	-	3
CO5	3	-	-	-	-	-	-	-	-	2	-	2
CO*	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**2.5**	**-**	**2.66**

Other References:

1. Exercises in spoken English: Parts I-III, CIEFL, Hyderabad, Oxford University Press.

2. Communication Skills: Sanjay Kumar and PushpaLatha, Oxford University Press. 2011.

3. Practical English Usage: Michael Swan, Oxford University Press, 1995.

4. Remedial English Grammar: F.T. Wood. Macmillan, 2007.

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I B.Tech II Sem

18SAH122	**ENGINEERING MATHEMATICS – II**	**L**	**T**	**P/D**	**C**
	(Common to all Branches)	**2**	**1**	**-**	**3**

Course Educational Objectives:

CEO1: To develop skill to analyze appropriate method to find the root of the Algebraic and Transcendental Equations and to develop skill to apply the concept of interpolation for the Prediction of required values

CEO2: To identify important characteristics of higher order ordinary differential equations (HOODE) and develop appropriate method of obtaining solutions of HOODE

CE03: To develop skill to design Sine and Cosine waves with the help of Fourier Series and Transforms.

CEO4: To learn the concepts of z-transformation and inverse z- Transforms and to explore the solving difference equations by using z- transform method.

UNIT – 1: SOLUTION OF ALGEBRAIC AND TRANSCENDENTAL EQUATIONS AND INTERPOLATION

Solution of Algebraic and Transcendental Equations: Introduction - The Bisection method - The method of False position - The Iteration method - Newton-Raphson method (Single Variable). **Interpolation:** Introduction - Finite differences - Forward differences - Backward differences - Newton's forward and backward difference formulae for interpolation - Lagrange's formula.

UNIT – 2: LINEAR DIFFERENTIAL EQUATIONS OF HIGHER ORDER

Non-homogeneous linear differential equations of second and higher order with constant coefficients with RHS term of the type e^{ax} ,Sin ax, Cos ax, polynomials in x, e^{ax} v(x), x^m v(x) - Method of variation of parameters – Differential Equations reducible to constant coefficients: Cauchy-Euler equation and Legendre linear equation

UNIT – 3: FOURIER SERIES

Determination of Fourier coefficients - Fourier series - Even and odd functions - Fourier series in an arbitrary interval - Even and odd periodic continuation - Half-range Fourier sine and cosine expansions.

UNIT – 4: FOURIER TRANSFORMS

Fourier integral theorem(only statement) - Fourier sine and cosine integrals - Fourier transform - Fourier sine and cosine transforms - Properties - Inverse transforms - Finite Fourier transforms.

UNIT –5: Z- TRANSFORMS

Z-transforms - Properties - Damping rule - Shifting rule - Initial and final value theorems - Inverse Z-transform - Convolution theorem - Solution of difference equations by Z-transforms

Course Outcomes:

On successful completion of course, the student will be able to

Course Outcomes		POs related to COs
CO1	Acquire knowledge in solving algebraic and transcendental equations by various mathematical methods and Design novel polynomials to the given data.	PO1,PO2, PO12
CO2	Acquire knowledge in higher order linear differential equations and develop analytical skills in solving problems involving higher order non-homogeneous linear differential equations.	PO1,PO2
CO3	Develop analytical skills in evaluating the properties of functions through Fourier series.	PO1,PO2, PO3
CO4	Acquire knowledge in Fourier transform and its properties, which can be used in communication theory and signal analysis, image processing and filters, data processing and analysis	PO1,PO2
CO5	Acquire knowledge in Z-transform and its properties and develop analytical skills in solving difference equations using Z-transform techniques.	PO1,PO2,PO3, PO4,PO12

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	1
CO2	3	3	-	-	-	-	-	-	-	-	-	-
CO3	3	3	2	-	-	-	-	-	-	-	-	-
CO4	3	3	-	-	-	-	-	-	-	-	-	-
CO5	3	3	2	2	-	-	-	-	-	-	-	1
CO*	**3**	**3**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**

Text books:

1. Mathematical Methods, 2012, T.K.V. Iyengar, B.Krishna Gandhi, S. Ranganatham and M.V.S.S.N. Prasad , S. Chand and Company Ltd, New Delhi.
2. Higher Engineering Mathematics, 34/e, 1999, Dr. B. S. Grewal, Khanna Publishers, Delhi

Reference books:

1. Engineering Mathematics–I, 2012, T.K.V. Iyengar, B.Krishna Gandhi, S. Ranganatham and M.V.S.S.N. Prasad, S. Chand and Company Ltd, New Delhi.
2. Engineering Mathematics for JNTU, 2012, B.V. Ramana, Tata McGraw Hill Publishers, New Delhi.
3. Higher Engineering Mathematics, Dr. M. K. VenkataRamana, National Pub & Co, Madras.
4. A Text Book of Engineering Mathematics,2011, N.P.Bali, Laxmi publications(P)Ltd, New Delhi.
5. Advanced Engineering Mathematics, 8/e, 2009, Erwin Kreyszig, Wiley India, New Delhi.

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I B.Tech II Sem

18SAH112	ENGINEERING PHYSICS	L	T	P/D	C
	(Common to all Branches)	2	1	-	3

Course Educational Objectives:

CEO1: To understand the principles and applications optics, Lasers and Optical Fibers in various Streams of Engineering

CEO2: To analyze the structure of crystals by using X-Ray Diffraction Technique and to study properties, productions and applications of ultrasonic

CEO3: To develop ideas & mathematical solutions to Quantum mechanics & Semiconductors

CEO4: To recognize the concepts of Superconductors and classification of magnetic materials

CEO5: To Introduce Nano-materials & their applications in various fields of science and technology

UNIT - 1: PHYSICAL OPTICS, LASERS AND FIBER OPTICS

Physical Optics: Interference in thin films by reflection (Qualitative Analysis) - Newton's rings (Qualitative) – Diffraction – Fraunhofer Diffraction at single slit- Diffraction Grating. **Lasers:** Laser characteristics – Spontaneous and Stimulated emissions - Population inversion –Pumping Mechanisms-Solid state laser (Ruby laser) - Gas (He-Ne) laser - Applications of lasers. **Fiber Optics**: Principle of Optical Fiber -Structure of optical fiber - Types of optical fibers –Step Index and Graded Index Fibers- Numerical aperture –Acceptance angle-Fiber optics in communications (Block Diagram)–Simple Applications.

UNIT - 2: CRYSTAL STRUCTURES AND ULTRASONICS

Crystal Structures: Introduction - Space lattice –Basis-Unit cell - Lattice parameters - Crystal Systems - Structures of Simple Cubic - Body Centered Cubic - Face Centered Cubic crystals - X-ray diffraction- Bragg's law –Laue Method of X-Ray Diffraction. **Ultrasonics:** Introduction – Properties of ultrasonic waves - Piezoelectric Effect- Production of ultrasonic waves by Piezoelectric method -Applications of Ultrasonics.

UNIT - 3: QUANTUM MECHANICS AND SEMI CONDUCTORS

Quantum Mechanics: de Broglie's Hypothesis- Kinetic Energy and de Broglie wavelength – de Broglie wavelength of electrons -Properties of Matter waves-Time independent Schrodinger's wave equation –Physical Significance of Wave function-Particle in one dimensional potential box (Only upto Eigen Values of Electrons). **Semiconductors:** Intrinsic and extrinsic semiconductors (Qualitative) - Drift and diffusion - Hall Effect –Applications of Hall Effect- Direct and indirect band gap semiconductors

UNIT - 4: MAGNETIC MATERIALS AND SUPERCONDUCTIVITY

Magnetic Materials: Classification of dia - para - ferro magnetic materials on the basis of magnetic moment (Qualitative) - Hysteresis curve - soft and hard magnetic materials and Applications. **Superconductivity:** General properties - Meissner Effect – Type-I and Type-II superconductors - BCS Theory - Josephson's effect - Applications of superconductors.

UNIT - 5: PHYSICS OF NANOMATERIALS

Nanomaterials: Introduction to Nanomaterials –Types of Nano materials (One dimensional, Two dimensional and Three dimensional Nano materials) - Significance of nanoscale-surface to, volume ratio –Quantum Confinement effect-Synthesis of Nanomaterials - Ball milling Method - Chemical vapour deposition methods –Optical, thermal, mechanical and electrical properties of nano materials - Applications of Nanomaterials.

Course Outcomes:
On successful completion of the course the students will be able to

Course Outcomes		POs related to COs
CO1	Acquire the knowledge and applications on Optics, LASERS and Fiber Optics.	PO1, PO2
CO2	Identify appropriate method for the production of Ultrasonics and their usage and understanding different crystal structures	PO1, PO2
CO3	Develop the skills to solve complex problem in quantum mechanics and Semiconductors	PO1, PO2,PO4
CO4	Analyze the concepts of Superconductors and magnetic materials and their appropriate applications in the field of Engineering and Technology	PO1,PO2
CO5	Apply the theoretical concepts pertaining to Nanomaterials in various fields engineering and Technology	PO1,PO12

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	2	-	-		-	-	-	-	-	-	-
CO2	2	3		-	-	-	-	-	-	-	-	-
CO3	2	2		3	-	-	-	-	-	-	-	-
CO4	3	2	-	-	-	-	-	-	-	-	-	-
CO5	3	-	-	-	-	-	-	-	-	-	-	1
CO*	**2.6**	**2.25**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**

Text Books:

1. Engineering Physics, 2011, M.R. Srinivasan, New Age International, Chennai.
2. Engineering Physics, First Edition 2014, K. Thyagarajan, McGraw Hill Publishers, New Delhi.

Reference Books:

1. Concepts of Modern Physics, 8/e, 2007, AurtherBeiser, Tata McGraw Hill Publishers, New Delhi.
2. Modern Engineering Physics, 2012, A.S. Vasudeva, S. Chand & Co., New Delhi.
3. Materials Science, 1/e, 2004,M. Vijaya and G. Rangarajan, Tata McGraw Hill Publishers, New Delhi .
4. Physics, Part I and II(Part I 5/e,2002, Part II 5/e,2001), Halliday and Resnick, John Wiley & Sons (Asia)
5. R5 :Engineering Physics, 7/e, 2006, Gaur & Gupta, DhanpatiRai Publications, New Delhi .

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I B.Tech II Semester

18MEC111	**ENGINEERING GRAPHICS**	**L**	**T**	**P/D**	**C**
	(Common to all branches)	**1**	**-**	**4**	**3**

Course Educational Objectives:

CEO1: To expose them to existing national and international standards related to technical drawings.
CEO2: To develop drawing skills for communication of concepts, ideas and design of engineering products.

CONCEPTS AND CONVENTIONS (Not for Examination)
Importance of drawings in engineering applications - Use of drafting instruments - BIS conventions and specifications - Size and layout of drawing sheets - Lettering, numbering and dimensioning - Basic geometrical constructions.

UNIT – 1: ENGINEERING CURVES
Engineering Curves: Conics – Construction of ellipse, parabola and hyperbola by eccentricity method and rectangular hyperbola – Construction of cycloid, epi cycloid and hypo cycloid – Construction of involutes of square and circle – Tangent and normal for the above curves.

UNIT – 2: PROJECTION OF POINTS, LINES AND PLANE SURFACES
Projection of Points: Principles of orthographic projection – Conventions – First angle projection and third angle projections – Projection of points. **Projection of Lines:** Projection of straight lines (only first angle projections) inclined to one and both the principal planes – Determination of true lengths and true inclinations by rotating line method. **Projection of Planes:** Regular planes inclined to one and both the principal planes by change of position method.

UNIT – 3: PROJECTION OF SOLIDS AND SECTION OF SOLIDS
Projection of Solids: Projection of simple solids like prisms, pyramids, cylinder and cone, when the axis is inclined to one principal plane. **Section of Solids:** Sectioning of right regular solids like prisms, pyramids, cylinder and cone, the solids are in simple vertical position and inclined to one plane, when the cutting plane is inclined to one of the principal planes – Obtaining true shape of section.

UNIT – 4: DEVELOPMENT OF SURFACES AND ISOMETRIC PROJECTIONS
Development of Surfaces: Development of lateral surfaces of simple and sectioned solids like prisms, pyramids, cylinder and cone. **Isometric Projection:** Principles of isometric projection – Isometric scale – Isometric projections of simple solids and truncated solids like prisms, pyramids, cylinder and cone.

UNIT – 5: ORTHOGRAPHIC PROJECTIONS AND PERSPECTIVE PROJECTIONS

Orthographic Projections: Principles and methods of orthographic projections – Plane of projections – Representation of three dimensional objects – Layout of views – Conversion of 3D objects to 2D objects. **Perspective Projection:** Perspective projection of simple solids like prisms and pyramids by visual ray method.

Course Outcomes:
On successful completion of the course, students will be able to

Course Outcomes		POs related to COs
CO1	Construct the Engineering Curves and generate tangent and normal for those curves.	P01,P02,P03,P10
CO2	Draw the Projection of Points, Lines and Plane Surfaces.	P01,P02,P03, P10
CO3	Draw the Projection of Solids, Sections of Solids like Prisms, Pyramids, Cylinder and Cone.	P01,P02,P03, P10
CO4	Construct the Isometric Scale, Projections and develop the development of surfaces.	P01,P02,P03, P10
CO5	Draw the Orthographic and Perspective projections of Solids.	P01,P02,P03, P10

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	2	2	2	-	-	-	-	-	-	1	-	-
CO2	2	3	3	-	-	-	-	-	-	1	-	-
CO3	2	3	3			-	-	-	-	1	-	-
CO4	2	3	3	-	-	-	-	-	-	2	-	-
CO5	2	3	3	-	-	-	-	-	-	2	-	-
CO*	2	2.8	2.8	-	-	-	-	-	-	1.4	-	-

Text Books:

1. Engineering Drawing, N.D. Bhatt and V. M. Panchal, 50th edition, Charotar Publishing House, 2010.
2. A Text book of Engineering Graphics, K.V.Natrajan, 2009, Dhanalakshmi Publishers, Chennai.

References Books:

1. Engineering Drawing, K.L.Narayana and P.Kannaiah, 2/e, 2012, Scitech Publishers.
2. Fundamentals of Engineering Drawing with an Introduction to Interactive Computer Graphics for Design and Production, Luzzader, Warren.J and Duff,John M., 2005, Eastern Economy Edition, Prentice Hall of India Pvt. Ltd, New Delhi.
3. Engineering Graphics, K.Venugopal and V.Prabhu Raja, 2008, New Age International (P) Limited.
4. Engineering Drawing, M.B.Shah and B.C.Rana, 2/e, 2009, Pearson Education.
5. Engineering Drawing, BasantAgarwal and C.M.Agarwal, 2008, Tata McGraw Hill Publishing Company Limited, New Delhi.

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I B. Tech II Semester

18CSE121	**PROBLEM SOLVING USING PYTHON PROGRAMMING**	**L**	**T**	**P/D**	**C**
	(Common to all Branches)	**2**	**1**	**-**	**3**

Course Educational Objectives:

CEO1: To understand the basics of problem solving and python programming.
CEO2: To develop the basic skills of Python program in interactive and script mode.
CEO3: To design control structure like selection control and iterative control statement.
CEO4: To construct Python programs using Lists, Dictionaries and sets
CEO5: To build Python Programs using functions, software object, turtle graphics, file handling to read and write data from/to files.

UNIT- 1: INTRODUCTION TO PROBLEM SOLVING

Fundamentals: what is computer science - Essence of computational problem solving - Limits of computational problem solving - Computer Algorithms - Computer Hardware - Computer software - Computational problem solving.**Python programming language:** IDLE python development environment - python standard library - Bit of python - learning how to use IDLE - First program in Python. **Problem solving example:** Calculating the Drake Equation.

UNIT- 2: DATA AND EXPRESSIONS

Literals: Numeric literals - String literals - Control characters - String formatting - Implicit and explicit line joining. **Variables and Identifiers:** Variable assignment and keyboard input – Identifiers - keywords and other predefined identifiers. **Operators, Expressions and Data types**: Operators - Arithmetic Operators – Expressions - Operator precedence - Operator Associativity - Data type - Multi-type expression. **Computational Problem solving:** Restaurant Tab calculation and Age in seconds.

UNIT- 3: CONTROL STRUCTURES

Control Structures and Boolean expressions: Control structures - Relational operators - Membership operators - Boolean operators - Operator precedence and Boolean Expressions - Short-Circuit Evaluation - Logically Equivalent Boolean Expression. **Selection Control:** If statement - Indentation in python - Multi-Way Selection. **Iterative Control:** While statement - Infinite Error Checking - Infinite loops - Definite Vs Infinite loops - Boolean Flags and Indefinite loops. **Problem Solving:** Numbers of days in month and Calendar month programs.

UNIT-4: LISTS, DICTIONARIES AND SETS

Lists: List structures - Common list operations - List traversal - Lists in Python - Python list type –Tuples – sequences - Nested lists - Iterating over lists in python - For loop - Built-in

range function - Iterating over list elements vs. List index values - While loops and lists - More on Python lists. **Dictionaries and Sets**: Dictionary types in Python - Set data type. **Problem solving:** Chinese Zodiac Program - Password Encryption/Decryption Program - Calendar Month program and A Food Co-op's Worker Scheduling Simulation.

UNIT-5: FUNCTIONS, SOFTWARE OBJECTS AND TEXT FILES

Functions: Function routines - Defining Functions - Calling Value-Returning Functions - Calling Non-Value-Returning Functions - Parameter Passing -Keyword Arguments in Python - Default Arguments in Python - Variable Scope. **Software Objects:** Object references - Turtle graphics - creating a Turtle Graphics Window - the "Default" Turtle - Fundamental Turtle Attributes and Behavior - Additional Turtle Attributes - Creating Multiple Turtles. **Text Files:** Fundamentals – opening - reading and writing text files - string processing – traversal - operations and methods. **Problem solving:** Temperature conversion - GPA calculation and Credit card calculation.

Course Outcomes

On successful completion of this course the students should be able to

Course Outcomes		POs related to COs
CO1	Demonstrate problem approaches techniques and acquire knowledge in IDLE development environment in interactive and script mode	PO1, PO2,PO5
CO2	Indentify computational problem solving approaches to solve problems using python variables, expression and operators	PO1, PO2, PO5
CO3	Identify and develop python programs using control structures like selection control and iterative control statements.	PO1, PO2, PO3, PO5
CO4	Analyze lists, set, tuples and dictionaries to develop python program.	PO1, PO2, PO3, PO5
CO5	Understand and Build Python Programs using functions, software objects, turtle graphics and file handling to read and write data from/to files.	PO1, PO2, PO3, PO4,PO5

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	2	-	-	-	-	-	-	-
CO2	3	3	-	-	2	-	-	-	-	-	-	-
CO3	3	2	2	-	2	-	-	-	-	-	-	-
CO4	3	3	2	-	2	-	-	-	-	-	-	-
CO5	3	3	3	2	2	-	-	-	-	-	-	-
CO*	3	2.8	2.3	2	2	-	-	-	-	-	-	-

Text Books:

1. Charles Dierbach, Introduction to Computer Science using Python: A Computational Problem-Solving Focus, Wiley India Edition, 2016.
2. Mark Lutz, "Programming Python," O'Reilly Publications, Fourth Edition, 2011.

Reference Books:

1. Kenneth Lambert and B.L. Juneja, Fundamentals of Python, Cengage Learning, Third Edition, 2012.
2. Python Programming: A Modern Approach, VamsiKurama, Pearson.
3. Learning Python, Mark Lutz, Orielly.
4. Introduction to Python, Kenneth A. Lambert, Cengage.

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
(AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

I B.Tech II Sem

		L	T	P/D	C
18SAH115	**ENGINEERING PHYSICS LABORATORY**				
	(Common to all branches)	**-**	**-**	**2**	**1**

Course Educational Objectives:

CEO1: To Demonstrate Knowledge on measurement of various physical quantities using optical Methods and fundamentals of magnetic fields.

CEO2: To Identify different physical properties of materials like band gap, magnetic field Intensity etc, for engineering and technological applications

CEO3: To provide valid conclusions on phenomena Interference and Diffraction.

Name of the Experiments

1 Diffraction grating - Measurement of wavelength of given Laser.
2 Determination of magnetic field along the axis of a current carrying circular coil - Stewart Gees method
3 Determination of numerical aperture and acceptance angle of an optical fiber
4 Determination of particle size using a laser source
5 Parallel fringes – Determination of thickness of thin object using wedge method
6 Newton's rings – Determination of radius of curvature of given plano convex lens
7 B-H curve – Determination of hysteresis loss for a given magnetic material
8 Determination of Energy band gap of semiconductor

Course Outcomes:
On completion of the laboratory course the student will be able to

Course Outcomes		**POs related to COs**
CO1	Demonstrate Knowledge on measurement of various physical quantities using optical methods and fundamentals of magnetic fields	PO1
CO2	Identify different physical properties of materials like band gap, magnetic field intensity etc, for engineering and technological applications	PO2
CO3	Provide valid conclusions on phenomena Interference and Diffraction	PO4
CO4	Follow ethical values during conducting of Experiments	PO8
CO5	Work individually or in a team effectively	PO9
CO6	Communicate verbally and in written form pertaining to results of the Experiments	PO10
CO7	Learns to perform experiments involving physical Phenomena in future years	PO12

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
(AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3		-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	3	-	-	-
CO8	-	-	-	-	-	-	-	-	-	3	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO*	**3**	**3**	**3**	**3**	3	-	-	3	3	**3**	-	**3**

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
(AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

I B.Tech II Sem

18CSE122	**PROBLEM SOLVING USING PYTHON PROGRAMMING LAB (Common to all branches)**	**L**	**T**	**P/D**	**C**
		-	**-**	**2**	**1**

Course Educational Objectives:

CEO1: To design the algorithms and flowchart for python programs.
CEO2: To understand the concepts of expressions and control structures in python
CEO3: To develop the python programs using functions.
CEO4: To analyze the concepts of python lists, tuples and dictionaries.
CEO5: To gain knowledge on file handling using python programming

Recommended Systems/Software Requirements:

- For Windows: IDLE/ Spyder python development environment.
- For Linux: Default python version installed/ higher version.

LIST OF EXERCISES:

Task-1:

Develop and analyze various phases of Software Development Life cycle (SDLC) through Gantt chart.

Task-2:

a) Design a flowchart for biggest of three numbers.
b) Design a flowchart to find whether the given input is leap year or not.
c) Develop a flowchart to display the multiple of 3 up to 100.

Task-3:

a)Write a python script to calculate the Drake equation.
b) Develop a simple python scripts to illustrate numeric literals and string literals.

Task-4:

a) Write a python script to calculate Restaurant Tab calculation.
b) Write a python program to calculate the approximate number of atoms that the average person contains and the percentage of the universe that they comprise.
c) Write a Python program to read temperature from the user in Fahrenheit and displays the equivalent temperature in Celsius.

Task-5:

a) Write a python program to determine the approximate age of an individual in seconds.
b) Write a Python program that prompts the user for two integer values and displays the result of the first number divided by the second with exactly two decimal places displayed.
c) Write a Python program that prompts the user for two floating-point values and displays the result of the first number divided by the second with exactly six decimal places displayed.

Task-6:

a) Write a Python program in which the user enters either 'A' - 'B'or 'C'. If 'A' is entered the program should display the word 'Apple' - if 'B' is entered it displays 'Banana' - and if 'C' is entered it displays 'Coconut'.

b) Repeat 6a) using if statement with elif headers instead.

c) Write a Python program in which a student enters the number of college credits earned. If the number of credits is greater than 90 - 'Senior Status' is displayed- if greater than 60 – 'Junior Status' is displayed - if greater than 30 - 'Sophomore Status' is displayed else 'Freshman Status' is displayed.

Task-7:

a) Write a program to sum a series of (positive) integers entered by the userexcluding all numbers that are greater than 100.

b) Write a program in which the user can enter any number of positive and negative integer values that displays the number of positive values entered as well as the number of negative values.

Task-8:

a) Write a program containing a pair of nested while loop that displays the integer values 1–100. ten numbers per row - with the columns aligned as shown below

```
 1  2  3  4  5  6  7  8  9 10
11 12 13 14 15 16 17 18 19 20
21 22 23 24 25 26 27 28 29 30
.
.
91 92 93 94 95 96 97 98 99 100
```

b) Display the integer values 1–100 as given in question 8a) using only *one* while loop.

Task-9:

a) Write a python script to calculate the number of days in a month.

b) Write a python program to display a calendar month for any given month between January 1800 and December 2099.

Task-10:

a) Write a Python program that prompts the user for a list of integers - stores in another list only those values between1–100 and displays the resulting list.

b) Write a Python program that prompts the user to enter a list of first names and stores them in a list. The program should display how many times the letter 'a' appears within the list.

Task-11:

Write a Python script to generate all the possible spellings of the last four digits of any given phone number – use Dictionaries.

Task-12:

a) Write a Python function named **zeroCheck** that is passed with three integers and returns true if any of the integers is 0 otherwise it returns false.

b) Write a Python function named **ordered3** that is passed three integers, and returns true if

the three integers are in order from smallest to largest otherwise it returns false.

Task-13:

a) Write a python script that allows a user to convert a range of values from Fahrenheit to Celsius or Celsius to Fahrenheit using functions.

b) Write a Python function named **Hello World** that displays "Hello World, my name is *name* "for any given name passed to the routine.

Task-14:

Write a python script to create a simple text file. Write the contents into the created file and read the contents from the file and display the same on to the console screen.

Task-15:

Mini project: Horse Race Simulation

Create a visualization of a horse race using python script in which horses are moved ahead a random distance at fixed intervals until there is a winner.

Course Outcomes:

On successful completion of this course the students should be able to

Course Outcomes		POs related to COs
CO1	Acquire knowledge on algorithms and flowcharts for given problems	PO1
CO2	Implement conditionals and loops to design the python programming	PO2
CO3	Develop Python programs step-wise by defining functions and calling them.	PO3
CO4	Analysis and Design the lists, set, tuples and dictionaries	PO4
CO5	Use Python Programming tools for file handling mechanisms to read and write data from/to files.	PO5
CO6	Follow the ethical principles in implementing the programs	PO8
CO7	Do experiments effectively as an individual and as a team member in a group.	PO9
CO8	Communicate verbally and in written form, the understanding about the experiments.	PO10
CO9	Continue updating their skill related to lists, tuples and dictionaries implementing programs in future.	PO12

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	-	-	-	-	-	-	-	-	-	-	-	3	3
CO2	-	3	-	-	-	-	-	-	-	-	-	-	3	3
CO3	-	-	3	-	-	-	-	-	-	-	-	-	3	3
CO4	-	-	-	3	-	-	-	-	-	-	-	-	3	3
CO5	-	-	-	-	3	-	-	-	-	-	-	-	3	3
CO6	-	-	-	-	-	-	-	3	-	-	-	-	3	3
CO7	-	-	-	-	-	-	-	-	2	-	-	-	3	3
CO8	-	-	-	-	-	-	-	-	-	2	-	-	3	3
CO9	-	-	-	-	-	-	-	-	-	-	-	3	3	3
CO*	**3**	**3**	**3**	**3**	3	-	-	3	2	**2**	-	**3**	**3**	**3**

Reference Books:

1. Charles Dierbach, Introduction to Computer Science using Python: A Computational Problem-Solving Focus, Wiley India Edition, 2016.
2. Mark Lutz, “Programming Python,” O’Reilly Publications, Fourth Edition, 2011.

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
(AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

I B.Tech II Semester

		L	T	P/D	C
18 MEC112	**ENGINEERING WORKSHOP AND IT WORKSHOP (Common to all branches)**	**-**	**-**	**2**	**1**

Course Educational Objectives:

CEO1: To provide exposure to the students with hands on experience on various basic engineering practices in civil, mechanical and electrical engineering.

CEO2: To include training on PC Hardware, Internet & World Wide Web and Productivity Tools including Word, Excel and Power Point.

A. ENGINEERINGWORKSHOP

TRADES FOR EXERCISES:

1. **Carpentry:** Two exercises from: Middle T lap joint – Dove tail lap joint – Mortise and tenon joint from out of 300 x 50 x 35 mm soft wood stock.
2. **Sheet Metal:** Two exercise from: Square tray – Open scoop – Frustum of pyramid from out of 22 or 20 gauge G.I. sheet.
3. **Fitting:** Two exercises from: Square joint – V joint – Dove tail joint from out of 50 x 50 x 5 mm M.S. flat piece.
4. **House Wiring:** Two exercise from: Two lamps controlled by one switch in series and parallel – One lamp controlled by 2 two way switches (stair case) – Wiring for fluorescent lamp.
5. **Plumbing:** Two exercise from: Basic pipe connections – Mixed pipe material connection – Pipe connections with different joining components.
6. **Machining:** Exercise on drilling and tapping.

TRADES FOR DEMONSTRATION:

a. Lathe machine.
b. Grinding machine.
c. Arc and gas welding.

Course Outcomes (EngineeringWorkshop):

On successful completion of the course, students will be able to

Course Outcomes		POs related to COs
CO1	Demonstrate the knowledge on differ tools used in carpentry, fitting, sheet metal, basic machining process, house wiring and plumbing sections	PO1
CO2	Analyze the basic pipeline connection using different joining connections	PO2
CO3	Design small components using different materials includes wood, GI sheet and MS plates	PO3
CO4	Apply basic electrical engineering tools on the house wiring practice	PO5
CO5	Follow the ethical principles in while doing the exercises.	PO8
CO6	Do the exercises effectively as an individual and as a team member in a group.	PO9
CO7	Communicate verbally among team members and in written form, the understanding about the trade exercises.	PO10
CO8	Continue updating their skill related to trades.	PO12

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CO – PO MAPPING

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	-	-	-	-	-	-	-	-	-	-	3	-
CO2	-	2	-	-	-	-	-	-	-	-	-	-	2	-
CO3	-	-	1	-	-	-	-	-	-	-	-	-	1	-
CO4	-	-	-	-	1	-	-	-	-	-	-	-	1	-
CO5	-	-	-	-	-	-	-	2	-	-	-	-	2	-
CO6	-	-	-	-	-	-	-	-	3	-	-	-	3	-
CO7	-	-	-	-	-	-	-	-	-	2	-	-	2	-
CO8	-	-	-	-	-	-	-	-	-	-	-	2	2	-
CO*	3	2	1	-	1	-	-	2	3	2	-	2	2	-

Text Books:

1. Lab manual provided by the department.

IT WORKSHOP

PC HARDWARE

1. Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

2. Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video shall be given as part of the course content.

3. Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.

4. Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot with both windows and Linux. Lab instructors should verify the installation and follow it up with a Viva

5. **Hardware Troubleshooting:** Students have to be given a PC which does not boot due to improper assembly or defective peripherals. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva

6. **Software Troubleshooting:** Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva.

LaTeX and Word

7. **Word Orientation:** The mentor needs to give an overview of LaTeX and Microsoft (MS) office 2007/ equivalent (FOSS) tool word: Importance of LaTeX and MS office 2007/ equivalent (FOSS) tool Word as word Processors, Details of the four tasks and features that would be covered in each, Using LaTeX and word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word.

8. Using LaTeX and Word to create project certificate. Features to be covered:-Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both LaTeX and Word.

Excel

9. **Excel Orientation:**The mentor needs to tell the importance of MS office 2007/ equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the four tasks and features that would be covered in each. Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources.

10. Creating a Scheduler - Features to be covered:- Gridlines, Format Cells, Summation, auto fill, Formatting Text

LaTeX and MS/equivalent (FOSS) tool Power Point

11. Students will be working on basic power point utilities and tools which help them create basic power point presentation. Topic covered during this Exercise includes :- PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in both LaTeX and PowerPoint. Students will be given model power point presentation which needs to be replicated (exactly how it's asked).

12. Second Exercise helps students in making their presentations interactive. Topic covered during this Exercise includes: Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts

Internet& World Wide Web

13. **Internet & World Wide Web** -Orientation & Connectivity Boot Camp : Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.
    Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers.

14. Search Engines & Netiquette: Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated by the student to the satisfaction of the instructors.

Cyber Hygiene: Students would be exposed to the various threats on the internet and would be asked to configure their computers to be safe on the internet. They need to first install an anti virus software, configure their personal firewall and windows update on their computer.

Course Outcomes (ITWorkshop):

On the successful completion of this course, the student should be able to

Course Outcomes		POs related to COs
CO1	Acquire knowledge on computer system such as system unit, input devices, and output devices connected to the computer.	PO1
CO2	Analyze the booting process that includes switching on the system, execution of POST routine, then bootstrap loader, and loading of the operating system, and getting it ready for use.	PO2
CO3	Demonstrate the working of the internet that include the use of protocols, domains, IP addresses, URLs, web browsers, web servers, mail-servers, etc.	PO3
CO4	Familiarize with parts of MS Office, To create and save a document, To set page settings, create headers and footers, To use various formatting features such as bold face, italicize, underline, subscript, superscript, line spacing, etc.	PO5
CO5	Follow the ethical principles in implementing the programs	PO8
CO6	Do experiments effectively as an individual and as a team member in a group.	PO9
CO7	Communicate verbally and in written form, the understanding about the experiments and	PO10
CO8	Continue updating their skill related to MS Office, Internet and Computer in future.	PO12

CO – PO MAPPING

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO 11	PO 12
CO.1	3	-	-	-	-	-	-	-	-	-	-	-
CO.2	-	2	-	-	-	-	-	-	-	-	-	-
CO.3	-	-	1	-	-	-	-	-	-	-	-	-
CO.4	-	-	-	-	1	-	-	-	-	-	-	-
CO.5	-	-	-	-	-	-	-	2	-	-	-	-
CO.6	-	-	-	-	-	-	-	-	3	-	-	-
CO.7	-	-	-	-	-	-	-	-	-	2	-	-
CO.8	-	-	-	-	-	-	-	-	-	-	-	2
CO*	3	2	1	-	1	-	-	2	3	2	-	2

Reference books:

1. Comdex Information Technology course tool kit , 2003, Vikas Gupta, WILEY Dream tech, New Delhi
2. The Complete Computer upgrade and repair book, 3/e, 2008, Cheryl A Schmidt, WILEY Dream Tech,New Delhi
3. Introduction to Information Technology, 2008, ITL Education Solutions limited, Pearson Education, New Delhi

4. PC Hardware and A+ Handbook, 2004, Kate J. Chase, Microsoft press
5. LaTeX Companion,2/e, 2002, Leslie Lamport, Addison Wesley, New Delhi
6. IT Essentials PC Hardware and Software Companion Guide, 3/e, 2008, David Anfinson and Ken Quamme, CISCO Press, Pearson Education, New Delhi
7. IT Essentials PC Hardware and Software Labs and Study Guide, 3/e, 2008, Patrick Regan, CISCO Press, Pearson Education, New Delhi
8. Troubleshooting, Maintaining and Repairing PCs, 5/e, 2008, S.J.Bigelow, TMH, New Delhi

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
(AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

II B.Tech I Sem

		L	T	P/D	C
18SAH211	**ENGINEERING MATHEMATICS – III**				
	(Common to all Branches)	**2**	**1**	**0**	**3**

Course Educational Objectives:

CEO1: To learn the method of evaluation of numerical integration and to solve ordinary differential equations numerically using numerical methods

CEO2: To learn the concepts of double and triple integrals and compute double and triple integrals

CEO3: To learn partial differential equations and how they can serve as models for physical processes and also master the technique of separation of variables to solve partial differential equation

CEO4: To develop skill to explain the characteristics of scalar and vector valued functions and master these in calculations, provide a physical interpretation of the gradient, divergence, curl and related concepts and carry out differentiation and integration of vector valued functions

UNIT – 1: NUMERICAL INTEGRATION AND NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS

Numerical integration: Trapezoidal rule - Simpson's 1/3 Rule - Simpson's 3/8 Rule.
Numerical solution of Ordinary Differential equations: Solution by Taylor's series - Picard's method of successive approximations - Euler's method - Runge-Kutta methods - Predictor- Corrector method - Milne's method.

UNIT – 2: MULTIPLE INTEGRALS

Multiple Integrals: Double and triple integrals - Change of variables - Change of order of integration.

UNIT - 3: PARTIAL DIFFERENTIAL EQUATIONS

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions - Method of separation of variables.

UNIT - 4: VECTOR DIFFERENTIATION

Introduction to Vector Differentiation, Scalar and Vector point functions- Gradient of a Scalar function - Divergence & Curl of a Vector function and their properties.

UNIT - 5: VECTOR INTEGRATION

Line Integral - Potential function - Area , Surface and volume integrals - Green's , Stoke's and Gauss divergence theorem(excluding their proof) - Verification of Green's, Stoke's and Gauss divergence theorems.

Course Outcomes:

On successful completion of the course, students will be able to

Course Outcomes		POs related to COs
CO1	Demonstrate knowledge in finding the numerical values to integrals through different mathematical methods and solving ordinary differential equations numerically through various methods and Design novel mathematical methods for solving the ordinary differential equations.	PO1,PO2, PO12
CO2	Demonstrate knowledge in evaluating double and triple integrals	PO1,PO2, PO12
CO3	Develop analytical skills for the problems involving partial differential equations and the methods to solve them	PO1,PO2, PO12
CO4	Demonstrate knowledge in differentiation of vector functions and to provide an understanding of characteristics of scalar and vector valued functions and master these in calculations, provide a physical interpretation of the gradient, divergence, curl and related concepts.	PO1,PO2, PO12
CO5	Demonstrate knowledge in integration of vector functions and to Develop skills in(AUTONOMOUS) providing solutions for line, surface and volume integrals by vector methods and work done, flux through vector integrations and correlate them with the applications of various integral theorems	PO1,PO2, PO12

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	2
CO2	3	3	-	-	-	-	-	-	-	-	-	2
CO3	3	3	-	-	-	-	-	-	-	-	-	2
CO4	3	3	-	-	-	-	-	-	-	-	-	2
CO5	3	3	-	-	-	-	-	-	-	-	-	2
CO*	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**

Text Books:

1. Mathematical Methods, 2012, T. K. V. Iyengar, B. Krishna Gandhi, S. Ranganatham and M.V.S.S.N. Prasad , S. Chand and Company Publishers, New Delhi.
2. Higher Engineering Mathematics, 34/e, 1999, Dr. B. S. Grewal, Khanna Publishers, Delhi

Reference books:

1. Engineering Mathematics–I, 2012, T.K.V. Iyengar, B.Krishna Gandhi, S. Ranganatham and M.V.S.S.N. Prasad, S. Chand and Company Ltd, New Delhi.
2. Engineering Mathematics for JNTU, 2012, B.V. Ramana, Tata McGraw Hill Publishers, New Delhi
3. Advanced Engineering Mathematics, 8/e, 2009, Erwin Kreyszig, Wiley India, New Delhi.

4. Introductory Methods of Numerical Analysis, S SSastry, 4/e 2005, PHI Publishers.
5. A Text Book of Engineering Mathematics, 2011, N.P.Bali, Laxmipublications(P)Ltd, New Delhi.

II Year B. TECH – I SEMESTER

L	T	P/D	C
2	1	0	3

18ECE215 FUNDAMENTALS OF ELECTRONICS ENGINEERING
(CSE Department)

Course Objectives:

CEO1: To study the basic concepts and characteristics of the electronic diodes.
CEO2: To understand the operation of Rectifiers, Filters and Voltage Regulators as application of PN junction diode.
CEO3: To analyze the transfer characteristics of the BJTs and its biasing methods.
CEO4: To familiarize the students with DC biasing circuits of BJT and FET and analysing bias transistor amplifier circuits.
CEO5: To provide knowledge on Special purpose devices such as LDR, LEDs, inverting and Non inverting amplifiers.

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UNIT -1: JUNCTION DIODES AND CHARACTERISTICS
PN Diode construction and operation, PN Diode Equation, Volt-Ampere (V-I) Characteristics, Ideal Versus Practical Static and Dynamic Resistances, Diode Equivalent circuits, Break down Mechanisms in semiconductor Diodes, Zener Diode Characteristics.

UNIT-2: APPLICATIONS OF PN JUNCTION DIODE
PN Junction as a Rectifier, Half wave rectifier, ripple factor, full wave rectifier, Bridge Rectifier, Capacitor filter, Use of Zener Diode as a Regulator, Series and shunt regulators, UPS.

UNIT -3: TRANSISTOR CHARECTERISTICS
Transistor construction, BJT Operation, BJT Symbol, Transistor as an Amplifier, Common Emitter, Common Base and Common Collector Configurations and their characteristics, Self Bias circuit, Bias stability.

UNIT -4: FET CHARECTERISTICS
The Junction Field Effect Transistor (Construction, Principle of Operation, Symbol) - Pinch-Off Voltage – Volt-Ampere Characteristics, FET as Voltage Variable Resistor, Comparison between BJT and FET, MOSFET- Basic Concepts, Construction, modes(depletion & enhancement), symbol, principle of operation, characteristics, Self Bias circuit, Bias stability.

UNIT -5: SPECIAL PURPOSE DEVICES
LDR, LED, Photo diodes, Photo Transistor, Operational amplifiers: Ideal operational amplifier, Open loop operation, Feedback inverting and non-inverting, differential amplifier.

Course Outcomes
On successful completion of the course, students will be able to

Course Outcomes		POs related to COs
CO1	To analyze the concepts and characteristics of the electronic diodes.	PO1, PO2
CO2	To *Examine*the operation of Rectifiers & Filters and its application.	PO1,PO3,PO4
CO3	To design and investigate the working of BJT and biasing techniques.	PO1,PO2,PO3
CO4	To design and analyze the working of FET, MOSFET and biasing techniques.	PO1, PO2,PO3
CO5	To Analyze different special purpose devices such as LDR, LED, amplifiers.	PO1, PO2

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	-	3	3	-	-	-	-	-	-	-	-
CO3	3	3	3	-	-	-	-	-	-	-	-	-
CO4	3	3	3	-	-	-	-	-	-	-	-	-
CO5	3	3	-	-	-	-	-	-	-	-	-	-
CO*	**3**	**3**	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Text Books:

1. K .Lalkishore, “Electronic Devices and Circuits”, BSP. 2nd edition, 2005.
2. D.Roychoudhury, shailB.Jain ,”Linear Integrated Circuits” 3rd edition, New Age pulishers.

Reference Books:

1. R.L. Boylestad, “Introductory Circuit Analysis”, PEARSON,12th edition, 2013
2. N.Salivahanan, and N.Suresh Kumar, “Electronic Devices and Circuits”, TMH ,3rd Edition,2012

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II B. TECH – I SEMESTER	**L**	**T**	**P/D**	**C**
	2	**1**	**0**	**3**

18ECE216 DIGITAL LOGIC DESIGN

Course Educational Objectives:

CEO1: To Provide Knowledge On
- Fundamentals of Digital logic design, Different Types Of Number Systems
- Conversions Of Number Systems, Arithmetic And Logical Operations, Weighted And Non Weighted Codes.
- Differences Between Boolean And Ordinary Algebra and Minimization Of Switching Functions Using Boolean Algebra.

CEO2: To develop skill to minimize switching functions in effective way using K-MAP
CEO3: To develop skill to design combinational logic circuits and realize the design using PLD's.
CEO4: To provide knowledge on memory elements and develop skill to design sequential circuits.
CEO5: To develop the skill to design and analyze finite state machines of different models.

UNIT - 1: Number Systems & Codes
Review of Number Systems- Binary Arithmetic-subtraction with r and (r-1)'s Complements-Weighted & Non Weighted Codes.
Boolean Algebra : Boolean Theorems-Basic Logic Operations (NOT,OR,AND)-Complement and Dual of Logical Expressions- Universal Gates- EX-OR & EX-NOR Gates-Standard SOP and POS-Minimization of Logic Functions Using Theorems.

UNIT - 2: Minimization of Switching Functions
Minimization of Switching Functions Using K-Map Up to 5 variables- Minimal SOP And POS Realization-Problem Solving Using K-Map for Boolean Functions in SOP and POS Forms.

UNIT - 3:
Combinational Logic Circuits:
Design of Half Adder - Full Adder - Half Subtractor- Full Subtractor- 4-bit binary adder-4-bit adder Subtractor- BCD adder-carry look ahead adder -Magnitude Comparator – Decoder-Encoder- Multiplexer – De multiplexer.
PLD's:
PROM – PLA – PAL ,Realization of Switching Functions Using PROM - PLA and PAL - Comparison of PROM, PLA, and PAL.

UNIT - 4: Sequential Circuits I
Classification of Sequential Circuits (Synchronous And Asynchronous)-Basic Latches & Flip Flops-SR,D,JK,T –Conversion between Flip Flops- Design of Synchronous and Asynchronous Counters-Design of Shift Registers-Universal Shift Register.

UNIT - 5: Sequential Circuits II
Finite State Machine - Capabilities and Limitations- Analysis of Clocked Sequential Circuits-Design Procedures- Reduction of State Tables and State Assignment-Realization of Circuits Using Various Flip flops - Mealy and Moore State Machines.

Course Outcomes:

On successful completion of the course the student will be able to,

	Course Outcomes	POs related to COs
CO1	Demonstrate knowledge on types and conversion of number systems, arithmetic and logical operations of different radix and applying Boolean algebra for switching functions reduction.	PO1, PO2
CO2	Identify the most efficient grouping to minimize the switching functions using k-map.	PO1,PO2
CO3	Design the combinational logic circuits and realize the PLD's for given specifications.	PO1,PO2,PO3
CO4	Understand the knowledge on latches and flip flops and design the sequential logic circuits.	PO1,PO2,PO3
CO5	Analyze and design finite state machines of different models by implementing state tables and state diagrams.	PO1,PO2,PO3,PO4

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	-	.-	-	-	-	-	-	-	-
CO3	3	3	3	-	-	-	-	-	-	-	-	-
CO4	3	3	2	-	-	-	-	-	-	-	-	-
CO5	3	3	2	3	-	-	-	-	-	-	-	-
CO*	**3**	**2.8**	**2.3**	**3**	-	-	-	-	-	-	-	-

Text books:

1. Digital Design, 3/e,2006,MorrisMano,Prentice Hall of India, New Delhi.
2. Digital Fundamentals, 10/e,2008,ThomasL.Floyd,Pearson/Prentice Hall, New Delhi.

Reference books:

1. Fundamentals of Logic Design, 5/e, 2004,CharlesH.Roth ,Thomas Publications, New Delhi.
2. Switching & Finite Automata Theory, 2/e, ,ZviKohavi,Tata McGraw Hill, NewDelhi.

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II B. Tech I Semester

L	T	P	C
2	1	0	3

18CSE211 MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

Course Educational Objectives:

CEO1: To gain the knowledge on connectives and normal forms.
CEO2: To learn the various concepts related to predicate logic.
CEO3: To perform the operations associated with sets, functions, and relations and study the basic properties of lattices.
CEO4: To understand the concept of groups, Abelian groups and group homomorphism and isomorphism.
CEO5: To study the fundamentals of graphs, sub graphs, planar graphs, Hamiltonian graphs, Euler graphs, spanning trees and graph traversals.

UNIT - 1: Mathematical Logic
Statements and Notations - Connectives(Negation, Conjunction , Disjunction, Conditional and Biconditional - Statements Formulas and Truth Tables - Well-Formed Formulas, Tautologies - Equivalence of Formulas - Duality Law - Tautological Implications - Normal Forms(DNF, CNF, PDNF, PCNF) - Theory of Inference for Statement Calculus: Validity using Truth tables - Rules of Inference - Consistency of Premises and Indirect Method of Proof.

UNIT - 2: Predicate Calculus
Predicates - The Statement Function - Variables - Quantifiers - Predicate Formulas - Free and Bound Variables - The Universe of Discourse - Theory of Inference for Predicate Calculus: Valid Formulas and Equivalences - Some Valid Formulas over Finite Universes - Special Valid Formulas Involving Quantifiers.

UNIT -3: Relations & Functions
Relations: Properties of Binary Relations, Equivalence - Closure of Relations - Compatibility and Partial Ordering Relations - Hasse Diagram - Lattices (Basic Concepts).

Functions: Inverse function - Composition of Functions - Recursive Functions - Pigeon Hole Principles and its Applications.

UNIT - 4: Algebraic Structures
Algebraic Systems - Examples and General Properties - Semi Groups - Monoids - Groups and Subgroups - Homomorphism and Isomorphism.

UNIT - 5: Graph Theory
Basic Terminology - Multi Graphs - Weighted Graphs - Digraphs and Relations - Representations of Graphs (Incidence Matrix, Adjacency Matrix) - Operations on Graphs - Isomorphism and Sub Graphs.
Paths and Circuits - Graph Traversals(DFS, BFS) - Shortest Paths in Weighted Graphs - Eulerian Paths and Circuits - Hamiltonian Paths and Circuits - Planar Graph - Graph Coloring - Spanning Trees - Minimum Spanning Trees - Kruskal’s Algorithm - Prim’s Algorithm.

Course outcomes:

On successful completion of this course, the students should be able to:

Course Outcomes		POs related to COs
CO1	Understand the validity of statements using connectives, tautologies, equivalence, implications and solve the problems using normal forms.	PO1, PO2, PO3
CO2	Solve the problems using statement calculus, predicate calculus and analyze the equivalence of quantified statements.	PO1, PO2, PO3
CO3	Identify and describe various types of relations (Compatibility, Partial ordering and Equivalence relations) and analyze the functions concepts and distinguish different types of functions.	PO1, PO2, PO3,PO4
CO4	Understand the concept of groups, Abelian groups and analyze whether the given set satisfies the properties of group or not.	PO1,PO2
CO5	Design network applications using Prim's and Kruskal's Algorithms and Demonstrate different traversal methods for graphs.	PO1, PO2, PO3,PO4

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	3	--	-	-	-	-	-	-	-	-
CO2	3	3	3	--	-	-	-	-	-	-	-	-
CO3	3	3	2	3	-	-	-	-	-	-	-	-
CO4	2	3	--	--	-	-	-	-	-	-	-	-
CO5	2	3	3	3	-	-	-	-	-	-	-	-
CO*	2.6	3	2.75	3	-	-	-	-	-	-	-	-

Text Books:

1. Discrete Mathematical Structures with Applications to Computer Science, J.P. Tremblay and R. Manohar, 27/e, Tata McGraw Hill Publishers, 2006, New Delhi.
2. Elements of Discrete Mathematics – A Computer Oriented Approach, C.L. Liu, D.P. Mohapatra, 3/e, Tata McGraw Hill Publishers, 2008, New Delhi.

Reference Books:

1. Discrete and Combinational Mathematics – An Applied introduction, Ralph. P. Grimaldi, 5/e, Pearson Education, 2008, New Delhi.
2. Discrete Mathematics and its applications,Kenneth H. Rosen, 6/e, Tata McGraw Hill Publishers, New Delhi.
3. Discrete Mathematics for Computer Science, 4/e, 2007, Gary Haggard, John Schlipf, Sue Whitesides, Thomson Pulication, 2008,New Delhi.
4. Discrete Mathematics for ComuterScientists&Mathematicans, Mott,Kandel, Banker, 2/e, Prentice Hall India, 2007, New Delhi.
5. Discrete Mathematics, Lipschutz, Lipson, Schaum's outlines, 2/e, Tata McGraw Hill Publishers, 2006, New Delhi.

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II B. TECH I-SEM	**L**	**T**	**P/D**	**C**
	3	**1**	**0**	**3**

18MBA 219 **BUSINESS MANAGEMENT**
(Common to all Branches)

Course Educational Objectives:

CEO1: To make students understand the basic perspectives of Business management concepts, theories and practices
CEO2: To gain and apply the basic knowledge for understanding areas of Production and cost analysis
CEO3: To provide the students with the conceptual framework of Management and business organizations
CEO4: To make students understand the concepts of HRM ans Marketing concepts
CEO5: To analyze the contemporary issues in management

UNIT - 1: Business Economics:
Nature and scope of business economics - **Demand analysis**: Demand Determinants, Law of Demand - **Elasticity of demand:** Types, Measurement and Significance of Elasticity of Demand

UNIT - 2: Production and Cost Analysis :
Production Function - Laws of returns to scale – Meaning of Cost – Cost Concepts – Cost Function- Cost Output Relationship in Short run and Long run – Break-even Analysis: Meaning, Assumptions, Graphical Representation of BEA, Determination of BEP, Margin of Safety Make or Buy Decision (Simple Problems)

Unit – 3: Management and Business Organisations:
Management:Nature, Significance and Functions of Management.

Features of Business, Types of Business Organizations: Sole Proprietorship, Partnership, Joint Stock Company, and Public enterprises.

Unit – 4: HR and Marketing Management:
Introduction to HR, Functions of HR Manager (Manpower Planning Recruitment, Selection, Training & Development, Performance Appraisal), Grievances handling and negotiations

Marketing**:** Functions of Marketing- Marketing Mix- Pricing methods- Promotional practices and Channels of distribution - Product Life Cycle - Basic concepts of Advertising-Marketing Research - e-Marketing - Marketing through social media, pricing strategies in internet era.

Unit – 5: Contemporary Issues in Management:
Basic Concepts of MIS and ERP – Total Quality Management (TQM) – Six Sigma – Business Process Re-engineering – Just-In-Time (JIT) – Business Process Outsourcing (BPO) – Knowledge Process Outsourcing (KPO)

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On successful completion of this course, the students should be able to:

COURSE OUTCOMES		POs related to COs
CO1	Understand the business economics	PO3, PO5, PO7
CO2	Understand the production and cost analysis and apply the break-even analysis	PO2, PO4, PO5
CO3	Understand the management and various types of business organisations	PO7
CO4	Understand human resource and marketing management and apply techniques to measure the performance	PO5
CO5	know the contemporary issues in management and apply techniques	PO1, PO5, PO7, PO9, PO12

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	-	-	2	-	2	-	2	-	-	-	-	-
CO2	-	2	-	2	2	-		-	-	-	-	-
CO3	-	-	-	-		-	2	-	-	-	-	-
CO4	-	-	-	-	2	-		-	-	-	-	-
CO5	-	1	-	-	2	-	2	-	2	-	-	2
CO*	-	1.5	2	2	2	-	2	-	2	-	-	2

Reference Books:

1. Managerial Economics and Financial Analysis, 4/e, 2011, Dr.A.R.Aryasri, TMH, New Delhi.
2. Management Science, 1/e, 2009, Dr. G. SreenivasaRao, High tech Publishers, Hyderabad.
3. Management Science, 3/e, 2008, A.R.Aryasri, TMH, New Delhi.
4. Introduction to Management Science, 1/e, 2011, P.Vijaykumar, Cengage Learning India, New Delhi
5. Managerial Economics, Analysis, Problems and Cases, 17/e, 2011, P.L.Mehta, Sultan Chand & Sons,
   New Delhi.
6. Marketing Management, 4/e, 2010, RajanSaxena, TMH, New Delhi.
7. Personnel and Human Resource Management, 2009, SubbaRao, HPIL.

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II B. Tech I Semester

L	T	P/D	C
2	1	0	3

18CSE212 ADVANCED DATA STRUCTURES

Course Educational Objectives:

CEO1: To provide knowledge on different object-oriented programming concepts.
CEO2: To develop skills to analyze the complexity of algorithms and to review the List, Stack and Queue ADTs.
CEO3: To introduce the concepts of dictionaries, Hashing and priority queues.
CEO4: To develop skill to work on advanced trees concept in data structures.
CEO5: To develop skill to apply different pattern matching algorithms and tries concepts.

UNIT – 1 Introduction to C++

Class & Objects- Class Members- Access Control- Constructors and Destructors- Inline Functions- Static Class Members- this pointer- Friend Functions- Dynamic Memory Allocation and De-allocation (New and Delete)-Operator Overloading- Function Overloading- Inheritance Basics- Base and Derived Classes- Inheritance Types- Base Class Access Control- Runtime Polymorphism using Virtual Functions- Generic Programming- Function and Class Templates.

UNIT – 2 Basic Data Structures

Basic Data Structures - The List ADT - Implementation using Template Classes in C++ - Stack ADT - Implementation using Template Classes in C++ - Queue ADT - Implementation using Template Classes in C++ - Circular Queue – Double ended Queue ADT - Implementation using Template Classes in C++.

UNIT – 3 Dictionaries, Hashing and Priority Queues

Dictionaries - Linear List Representation - Skip List Representation-Hash Table Representation of Dictionary - Hash Functions - Collision Resolution - Separate Chaining-Open Addressing-Linear Probing - Quadratic Probing - Double Hashing - Extendible Hashing - Priority Queues - Realizing a Priority Queue using Heaps- Operations - Insertion, Deletion.

UNIT – 4 Balanced Trees

Binary Search Tree – Operations- Searching, Insertion and Deletion – Implementation using C++ - AVL Trees - Height of an AVL Tree - Operations – Insertion, Deletion and Searching -Red –Black trees Operations – Insertion, Deletion and Searching –B-Trees - Height of a B-Tree –Operations - Insertion, Deletion and Searching.

UNIT – 5 Pattern Matching and Tries

Pattern Matching Algorithms: Brute Force Algorithm - Boyer Moore Algorithm –Knuth Morris Pratt Algorithm -Applications
Tries: Standard Tries - Compressed Tries - Suffix Tries – Applications.

Course Outcomes:

On successful completion of the course the student will be able to,

Course Outcomes		POs related to COs
CO1	Identify and apply the concepts of Object Oriented languages such as C++	PO1, PO2
CO2	Analyze step by step and develop algorithms to solve real world problems, implement the data structures like List, Stack and Queue ADTs	PO1, PO2
CO3	Implementdictionaries, hash functions and priority queues for different applications	PO1, PO4, PO5
CO4	Understand and apply the advanced trees concepts	PO1, PO5
CO5	Identify suitable pattern matching algorithms and Tree techniques for various applications.	PO1, PO4

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-
CO3	3	-	-	3	2	-	-	-	-	-	-	-
CO4	3	-	-	-	2	-	-	-	-	-	-	-
CO5	3	-	-	3	-	-	-	-	-	-	-	-
CO*	3	3	-	3	2	-	-	-	-	-	-	-

Text Books:

1. Data structures and Algorithms using C++, AnandaRaoAkepogu and RadhikaRajuPalagiri, 1/e, Pearson Education, New Delhi.
2. Data structures and Algorithms in C++, Wiley student edition, Michael T.Goodrich, R.Tamassia and Mount, John Wiley and Sons. Replica Press Pvt. Ltd., 2004,Kundli.

Reference Books:

1. Fundamentals of Data Structures in C++ by Ellis Horowitz, SartajSahni, Dinesh Mehta, Second Edition ,Universities Press.
2. Data structures and Algorithm Analysis in C++, Mark Allen Weiss, Pearson Education. Ltd., 2/e, 2006,New Delhi,.
3. Data structures and algorithms in C++, Adam Drozdek, Thomson, 3/e,India Edition, 2005.
4. Data structures using C and C++,Langsam, Augenstein and Tanenbaum, 2/e,Prentice Hall Inc., 2002,New Delhi.

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II Year B. TECH I SEM	**L**	**T**	**P/D**	**C**
	0	**0**	**2**	**1**

18ECE217 FUNDAMENTALS OF ELECTRONICS ENGINEERING LAB (CSE Department)

Course Educational Objectives:

CEO1: To understand the functionality & specifications of basic electronic passive components.

CEO2: To know the functionality & specifications of electronic active components and special devices.

CEO3: To study the operation of Analog and digital meters which are used for practical experiments

CEO4: To know the practical knowledge of diodes and transistors with their input-output characteristics.

CEO5: To Understand the CRO operation and its measurements.

PART A: Electronic Workshop Practice

1. Identification, Specifications, Testing of R, L, C Components (Colour Codes), Potentiometers, Coils, Gang Condensers, Relays, Bread Boards.
2. Identification, Specifications and Testing of active devices, Diodes, BJTs, JFETs, LEDs, LCDs, UJT.
3. Study and operation of Ammeters, Voltmeters, Transformers, Analog and Digital Multimeter, Function Generator, Regulated Power Supply and CRO.

PART B: List of Experiments
(For Laboratory Examination-Minimum of Six Experiments)

1. P-N Junction Diode Characteristics
2. Zener Diode Characteristics
3. Rectifiers (without and with C-filter)
4. BJT Characteristics (CE & CB Configuration)
5. FET Characteristics (CS Configuration)
6. UJT Characteristics
7. CRO Operation and its Measurements
8. CE Amplifier

Equipments required for Laboratory

1. Regulated Power supplies
2. Analog/Digital Storage Oscilloscopes
3. Analog/Digital Function Generators
4. Digital Multimeters
5. Decade Résistance Boxes/Rheostats
6. Decade Capacitance Boxes
7. Ammeters (Analog or Digital)
8. Voltmeters (Analog or Digital)
9. Bread Boards
10. Connecting Wires

11. CRO Probes etc.

Course Outcomes:

On successful completion of the course the student will be able to,

Course Outcomes		POs related to COs
CO1	Demonstrate knowledge on identification and specification, testing of active ,passive components, operation of PN diode and Zener diode characteristics	PO1
CO3	Analyze the practical characteristics of transistor in CB, CE, CC configurations	PO2, PO4
CO5	Design the various biasing methods of transistor amplifier.	PO3
CO6	Do experiments effectively as an individual and as a member in a group.	PO9
CO7	Communicate verbally and in written form, the understandings about the experiments.	PO10
CO8	Follow ethical principles on analysis of different electronic circuits which is used for project works.	PO8
CO9	Continue updating their skill related to electronic devices and their applications during their life time	PO12

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	3	-	3	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	3	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	3	-	-	-
CO7	-	-	-	-	-	-	-	-	-	3	-	-
CO8	-	-	-	-	-	-	-	3	-	-	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO*	**3**	**3**	**3**	**3**	-	-	-	3	3	**3**	-	**3**

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II B. Tech I Semester	**L**	**T**	**P/D**	**C**
	0	**0**	**3**	**2**

18CSE213 ADVANCED DATA STRUCTURES LAB

Course Educational Objectives:

CEO1: To provide knowledge about the object oriented programming concepts
CEO2: To inculcate skill to investigate the template concepts
CEO3: To develop skill to implement the data structure concepts of stack and queue using array and linked list.
CEO4: To provide knowledge to implement various trees and sorting methods using class template.
CEO5: To develop and implement pattern matching algorithms and its applications

EXERCISES:

1. Write a C++ Program to Illustrate the Following Concepts:
   a) Class. b) Constructors.
2. Write a C++ Program to Illustrate the Concept of Unary and Binary Operator Overloading.
3. Write a C++ Program to Illustrate the Following Concepts:
   a) All types of Inheritance. b) Virtual Functions.
4. Write a C++ Program to Illustrate the Following Concepts:
   a) FunctionTemplates. b) Class Templates.
5. Write a C++ Programs to Implement the Following using an Array and class templates.
   a) Stack ADT. b) Queue ADT.
6. Write a C++ Programs to Implement the Following using a Singly Linked List and class templates.
   a) Stack ADT. b) Queue ADT
7. Write a C++ Programs to Implement the Dequeue (Double Ended Queue) ADTusing a Doubly Linked List and an Array and class templates.
8. Write a C++ Program to Perform the Following Operations:
   a) Insert an Element into a Binary Search Tree.
   b) Delete an Element from a Binary Search Tree.
   c) Search for a Key Element in a Binary Search Tree.
9. Write a C++ Programs that use Non-Recursive Functions to Traverse the givenBinary Tree in
   a)Preorder b) Inorder c) Postorder.
10. Write a C++ Programs for Implementing the Following Sorting Methods:
    a) Merge Sort b) Heap Sort.
11. Write a C++ Program to Perform the Following Operations
    a) Insertion into an AVL Tree. b) Deletion from an AVL-Tree.
12. Write a C++ Program to implement all the Functions of a Dictionary (ADT) using Hashing.

13. Write a C++ Program for Implementing Knuth-Morris- Pratt Pattern Matching Algorithm.
14. Write a C++ Program for Implementing Boyer – Moore Patten Matching Algorithm.

Course Outcomes:

On successful completion of the course the student will be able to,

Course Outcomes		POs related to COs
CO1	Acquire the knowledge on object oriented programming concepts	PO1
CO2	Identify and design the software using templates	PO2
CO3	Develop solutions for the complex engineering problems using data structure concepts like stack and queue	PO3
CO4	Design and analysis of the trees and sorting methods for different applications	PO4
CO5	Develop the pattern matching algorithms for advanced technologies	PO5
CO6	Follow the ethical principles in implementing the programs	PO8
CO7	Do experiments effectively as an individual and as a team member in a group.	PO9
CO8	Communicate verbally and in written form, the understanding about the experiments.	PO10
CO9	Continue updating their skill related to ADT structures andimplementing programs in future.	PO12

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	2	-	-	-
CO8	-	-	-	-	-	-	-	-	-	2	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO	**3**	**3**	**3**	**3**	3	-	-	3	2	**2**	-	**3**

Text Books:

1. Data Structures and Algorithms in C++, Adam Drozdek, Third Edition, Thomson.
2. C++ Programing, D.S. Malik, Thomson, 3rd Edition, CengageindiaPvt. Ltd. , 2007,Canada.

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
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II B.Tech I Sem

L	T	P/D	C
2	0	0	0

18AUD212 ENVIRONMENTAL SCIENCE
(Common to all branches)

Course Educational Objectives:

CEO1: Recognize the interconnectedness of multiple factors in environmental challenges and engage constructively with diverse forms of knowledge and experience

CEO2: Identify the multiple scales, actors, and stakes of an issue, recognize and Apply methodological approaches of the social sciences, natural sciences, and humanities.

CEO3: Identify assumptions inherent in arguments and perspectives, evaluate and interpret various forms of evidence, including text, data, and other media about the environment

CEO4: Work productively with those within and beyond the academy on interdisciplinary Collaborative projects

CEO5: Communicate clearly and competently matters of environmental concern and understanding to a variety of audiences in appropriate forms

SYLLABUS Unit 1: Introduction to environmental studies and Natural resources

Multidisciplinary nature of environmental studies Definition, scope and importance. Need for public awareness.

Natural Resources: Renewable and non-renewable resources: Natural resources and associated problems. a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people. b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. e) Energy resources: Growing energy needs renewable and non renewable energy resources.

Case studies: Organic farmin

Unit 2 • Concept of Ecosystem and Biodiversity

Structure and function of an ecosystem. • Producers, consumers and decomposers. • Energy flow in the ecosystem. • Ecological succession. • Food chains, food webs and ecological pyramids. • Introduction, types, characteristic features, structure and function of the following

ecosystem: - a. Forest ecosystem b. Grassland ecosystem c. Desert ecosystem d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Biodiversity and its conservation • Introduction – Definition: genetic, species and ecosystem diversity. • Biogeographical classification of India • Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values • Biodiversity at global, National and local levels. • India as a mega-diversity nation • Hot-sports of biodiversity. • Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. • Endangered and endemic species of India • Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

Unit 3: pollution and waste management

Environmental Pollution Definition • Cause, effects and control measures of :- a. Air pollution b. Water pollution c. Soil pollution d. Marine pollution e. Noise pollution f. Thermal pollution g. Nuclear hazards • Solid waste Management : Causes, effects and control measures of urban and industrial wastes. • Role of an individual in prevention of pollution. • Pollution case studies. • Disaster management: floods, earthquake, cyclone and landslides

Unit 4: Social Issues and the Environment

Water conservation Measures: rain water harvesting, watershed management • Resettlement and rehabilitation of people; its problems and concerns. Case Studies • Role of NGO's. • Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies. • Sustainable development: Definition – objectives – Environmental dimensions of sustainable development.

Unit 5: **Environmental legislation andHuman Population**

From Unsustainable to Sustainable development • Urban problems related to energy • Water conservation, rain water harvesting, watershed management • Resettlement and rehabilitation of people; its problems and concerns. Case Studies • Environmental ethics: Issues and possible solutions. • Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies. • Wasteland reclamation. • Consumerism and waste products. • Environment Protection Act. • Air (Prevention and Control of Pollution) Act. • Water (Prevention and control of Pollution) Act • Wildlife Protection Act • Forest Conservation Act • Issues involved in enforcement of environmental legislation. • Public awareness

Field work • Visit to a local area to document environmental assets river/ forest/ grassl and /hill /mountain • Visit to a local polluted site-Urban/Rural/Industrial/Agricultural • Study of common plants, insects, birds. • Study of simple ecosystems-pond, river, hill slopes, etc.

Mini Project: Organic Farm work

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Course Outcomes:

On successful completion of the course the student will be able to,

Course Outcomes		POs related to COs
CO1	Demonstrate knowledge on fundamentals of Environment.andAnalyze the availabity of non-conventional energy resources.	PO1, PO2, PO6, PO8, PO9 PO12
CO2	Identify appropriate types of habitates in the surrounding and analyze the influence of habitats on survivial.	PO1, PO2 PO7, PO8, PO12
CO3	Identify appropriate method of controlling of pollution and design the ecofriendly techniques	PO1, PO2, PO6, PO7, PO8, PO12
CO4	Analyze the effect of climatic changes	PO1, PO2, PO6, PO7 PO8, PO12
CO5	Understand the population growth and variation- environmental acts	PO1, PO2, PO6, PO7, PO8, PO12

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	2	3	3	1	-	-	3
CO2	3	3	-	-	-	-	2	1	-	-	-	3
CO3	3	3	-	-	-	3	1	3	-	-	-	3
CO4	3	3	-	-	-	3	3	3	-	-	-	3
CO5	3	3	-	-	-	3	3	3	-	-	-	3
CO*	**3**	**3**	**-**	**-**	**-**	**2.7**	**2.4**	**2.6**	**1**	**-**	-	**3**

Text Book:

1. "Textbook of Environmental Studies for Undergraduate Courses", 2nd edition 2013, University grants commission

Reference Books:

1. C.P.Kaushik and Anubhakaushik "Text book of environmental studies", 4th Edition, New age International publishers.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

II B.Tech I Semester

18SAH212	**REASONING AND APTITUDE - I**	**L**	**T**	**P/D**	**C**
		2	**-**	**-**	**-**

REASONING AND APTITUDE

Numbers and fractions – LCM and HCF – Simplification and roots – Averages – Percentages – Ratios and proportions – Profit and loss – Partnership and shares – Simple and compound interest – Series (Verbal) – Coding and decoding – Blood relations – Venn diagrams – Problems on ages – Directions – Assertion and reasoning – Logarithms – Syllogism.

Text Books:

1. Quantitative Aptitude, Dr.R.S.Aggarwal, 2012, S.Chand and Company Ltd, New Delhi.
2. A Modern Approach to Verbal and Non-Verbal Reasoning, Dr.R.S.Aggarwal, 2012, S.Chand and Company Ltd, New Delhi.

Reference Books:

1. Quantitative Aptitude for Competitive Examinations, AbhijitGuha, 14/e, 2010, Tata McGraw Hill Publishers, New Delhi.
2. Course in Mental Ability and Quantitative Aptitude, Edgar Thorpe, 3/e, 2012, Tata McGraw Hill Publishers, New Delhi.
3. Fast Track Objective Arithmetic, Rajesh Verma, 2012, Arihant Publications, Meerut.

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II B.Tech II Semester

18SAH222	**PROBABILITY AND STATISTICS**	**L**	**T**	**P/D**	**C**
	(Common to CSE, MEC, CE)	**2**	**1**	**-**	**3**

Course Educational Objectives

CEO1: To develop skill to analyze the discrete and continuous data using appropriate Statistical Distributions like Binomial, Poisson, Normal..etc
CEO2: To develop skill to design different graphical representations like pie chart, Bar graph, scatter Diagram, line graph, Regression line etc.,
CEO3: To inculcate skill to investigate different applications of statistical distributions and the Corresponding conclusions required for the analysis of sample data.
CEO4: To develop skill to apply the concept of test of significance using t-test, f-test, chi-square test, ANOVA suitable of the required conclusion.

UNIT - 1: PROBABILITY AND RANDOM VARIABLES

Probability: Sample space and events - Probability - The axioms of probability - Some elementary theorems - Conditional probability - Baye's theorem.
Random variables: Discrete and continuous distributions – Statistical Parameters (Mean, Variance and Standard Deviation) of distribution functions.

UNIT - 2: PROBABILITY DISTRIBUTIONS

Binomial - Poisson and Normal distributions - Related properties.

UNIT - 3: SAMPLING DISTRIBUTION AND ESTIMATION

Sampling distribution: Populations and samples - Sampling distributions of mean (known and unknown) - Proportions - Sums and differences.
Estimation: Point estimation - Interval estimation - Bayesian estimation.

UNIT - 4: TEST OF HYPOTHESIS AND TEST OF SIGNIFICANCE

Test of Hypothesis: Means - Hypothesis concerning one and two means - Type I and Type II errors - One tail, two-tail tests.
Test of Significance: Student's t-test - F-test - Chi-square test of goodness of fit.

UNIT - 5: CURVE FITTING & ANOVA

Curve fitting: The method of least squares – Linear, Parabola, Exponential and Power form.
ANOVA: ANOVA for one-way and two-way classification data.

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Course Outcomes:
On successful completion of the course, students will be able to:

Course Outcomes		POs related to
CO1	Demonstrate knowledge on use the probability and Random Variables in the field of engineering	PO1,PO2, PO3
CO2	Demonstrate knowledge in probability distributions and develop analytical skills for the problems involving means, probability distributions and standard deviations sampling techniques for decision	PO1, PO2, PO3
CO3	Construct confidence intervals on parameters for a single sample	PO1,PO2, PO3,PO12
CO4	Demonstrate knowledge in testing of hypotheses and Tests of significance for small and large samples and Develop skills for analyzing the data with suitable tests of significance for practical situations through probability distributions	PO1, PO2, PO3, PO4, PO12
CO5	Demonstrate knowledge on constructing a curve, or mathematical function, that has the best fit to a series of data points, possibly subject to constraints and develop skills for analyzing to test whether there are any statistically significant differences between the means of three or more independent (unrelated) groups using ANOVA	PO1,PO2, PO3, PO4, PO12

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	2	-	-	-	-	-	-	-	-	2
CO2	3	3	2	-	-	-	-	-	-	-	-	2
CO3	3	3	2	-	-	-	-	-	-	-	-	2
CO4	3	3	2	2	-	-	-	-	-	-	-	2
CO5	3	3	2	2	-	-	-	-	-	-	-	2
CO*	**3**	**3**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**

Text Books:

1. Fundamentals of Mathematical Statistics, 10/e, 2001, S.C. Gupta, V.K. Kapoor, S. Chand and Company Publishers, New Delhi.
2. Probability and Statistics, 2012, T.K.V. Iyengar, B. Krishna Gandhi, S. Ranganatham and M.V.S.S.N. Prasad , S. Chand and Company Publishers, New Delhi.

Reference Books:

1. Probability and Statistics, 2011, V. Ravindranath, T.S.R. Murthy, I.K. International Pvt. Ltd, New Delhi.

2. Probability and Statistics for Engineers, 6/e, 2006, Johnson A. Richard, Miler &Fruends, Pearson Education, New Delhi.
3. Higher Engineering Mathematics, 34/e, 1999, Dr. B. S. Grewal, Khanna Publishers, Delhi
4. Probability and Statistics for Engineers, 2011, Dr. J. Ravichandran, Wiley-India Publishers, New Delhi.
5. Probability and Statistics for Engineers and Scientists, 7/e, 2002, Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, Keying Ye, Pearson Education Asia, New Delhi.
6. Probability and Statistics for Engineers and Scientists, 7/e, 2002, Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, Keying Ye, Pearson Education Asia, New Delhi.

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II B.Tech II Semester	**L**	**T**	**P/D**	**C**
	2	**1**	**0**	**3**

18CSE221 COMPUTER ORGANIZATION

Course Educational Objectives:

CEO 1: To conceptualize the basics of organizational and architectural issues of a digital computer.
CEO 2: To articulate design issues in the development of processor or other components that satisfy design requirements and objectives.
CEO 3: To study various data transfer techniques in digital computer and the design of control unit.
CEO 4: To learn the function of each element of a memory hierarchy and I/O devices.
CEO 5: To develop skill to apply the concept of Pipelining in designing multiprocessor system.

UNIT-1: BASIC STRUCTURE OF COMPUTERS
Computer Types - Functional Units - Basic Operational Concepts - Bus Structures – Software – Performance - Multiprocessors and Multi Computers - Data Representation- Fixed Point Representation - Floating Point Representation - Error Detection Codes.

UNIT-2: CPU DESIGN AND COMPUTER ARITHMETIC
CPU Design: Instruction Cycle - Memory Reference Instructions–Input/output and Interrupt -Addressing Modes - DATA Transfer and Manipulation - Program Control
Computer Arithmetic: Addition and Subtraction - Multiplication Algorithms - Division Algorithms -Floating Point Arithmetic Operations - Decimal Arithmetic Unit.

UNIT-3: REGISTER TRANSFER LANGUAGE AND DESIGN OF CONTROL UNIT
Register Transfer: Register Transfer Language - Register Transfer - Bus and Memory Transfers -Arithmetic Micro operations - Logic Micro Operations - Shift Micro Operations.
Control Unit: Control Memory - Address Sequencing–Micro program Example - Design of ControlUnit.

UNIT- 4: MEMORY AND INPUT/OUTPUT ORGANIZATION
Memory Organization: Memory Hierarchy–Main Memory–Auxiliary Memory–AssociativeMemory – Cache Memory – Virtual Memory.
Input/output Organization: Input-Output Interface - Asynchronous data transfer - Modes ofTransfer - Priority Interrupt - Direct memory Access.

UNIT- 5: PIPELINE AND MULTIPROCESSOR
Pipeline: Parallel Processing–Pipelining - Arithmetic Pipeline - Instruction Pipeline.
Multiprocessor: Characteristics of Multiprocessors - Interconnection Structures–Inter processorArbitration - Inter Processor Communication and Synchronization.

Course Outcomes:

On successful completion of the course the student will be able to,

Course Outcomes		POs related to COs
CO1	Demonstrate the knowledge on fundamentals of organizational and architectural issues of a digital computer	PO1, PO2
CO2	Identify design issues in the development of processor or other components	PO1, PO2, PO3, PO4
CO3	Demonstrate control unit operations and conceptualize various data transfer operation among registers.	PO1, PO3
CO4	Categorize memory organization and explain the function of each element of a memory hierarchy and compare different methods for computer I/O mechanisms.	PO1, PO3, PO5
CO5	Understand and use the concept of Pipelining in various multiprocessor applications.	PO1, PO4, PO5

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	2	3	3	3	-	-	-	-	-	-	-	-
CO3	3	-	2	-	-	-	-	-	-	-	-	-
CO4	3	-	3	-	3	-	-	-	-	-	-	-
CO5	2	-	-	2	2	-	-	-	-	-	-	-
CO*	**2.6**	**2.5**	**2.6**	**2.5**	**2.5**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Text Books:

1. Computer Organization – Carl Hamacher, ZvonksVranesic, SafeaZaky, 5/e, MCG, 2002.
2. Computer Systems Architecture – M.Moris Mano, 3/e, PEA, 2007.

Reference Books:

1. Computer Systems Organization and Architecture- John D. Carpinelli, PEA, 2009
2. Computer Organization and Architecture – William Stallings,6/e, Pearson/PHI.
3. Structured Computer Organization – Andrew S. Tanenbaum, 4/e, PHI/Pearson.
4. Fundamentals or Computer Organization and Design - SivaraamaDandamudi Springer Int. Edition.
5. Computer Architecture a quantitative approach, John L. Hennessy and David A. Patterson, 4th Edition, Elsevier.
6. Computer Architecture: Fundamentals and principles of Computer Design, Joseph D. Dumas II, BS Publication.

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II B. Tech II Sem	**L**	**T**	**P/D**	**C**
	2	**1**	**0**	**3**

18CSE222 PROGRAMMING WITH JAVA

Course Educational Objectives:

CEO1: To study the syntax, semantics and features of Java Programming Language.
CEO2: To understand the principles of packages and inheritance.
CEO3: Todevelop Java application programs using exceptions and interfaces.
CEO4: To gain knowledge on multithreading and applets
CEO5: To create GUI applications & perform event handling.

UNIT – 1 Basics of Java

History of Java - Java Buzzwords - Overview of Java - Data Types - Variables - Arrays - Operators - Control Statements – Introducing Classes &Objects - Constructors - Methods - Access Control – this Keyword - Garbage Collection - Overloading Methods and Constructors - Parameter Passing - Recursion – Reading input-Command Line Arguments – Buffer Reader – Scanner.

UNIT – 2 String Handling, Inheritance and Packages

String Handling-Using String Class – String Buffer Class
Inheritance-Basics of Inheritance-Using super-Creating a multilevel hierarchy-Method overriding- Dynamic method dispatch - Using abstract classes -Using final.

Packages-Defining - Creating and Accessing a Package - Understanding CLASSPATH – Importing Packages - Exploring Packages.

UNIT – 3 Interfaces and Exception Handling

Interfaces- Differences between Classes and Interfaces - Defining an Interface – Implementing Interface - Applying Interfaces - Variables in Interfaces and Extending Interfaces.
Exception Handling- Introduction – Exception Types – Uncaught Exception – Using Try and Catch – Multiple Catch clauses – Nested Try Statements – Throw – Throws – Finally – Built-in Exceptions – Creating Own Exception Subclass – Checked and Unchecked Exceptions.

UNIT – 4 Multithreading and Applets

Multithreading -Differences between Multithreading and Multiprocessing - Thread Life Cycle - Creating Threads - Synchronizing Threads.
Applets- Concepts of Applet - Differences between Applet and Application - Life Cycle of an Applet - Types of Applets - Creating Applet - Passing Parameters to Applet – Using Graphics Class.

UNIT – 5 Event Handling and AWT and Swings

EVENT HANDLING A ND AWT - Delegation Event Model - Event Classes - Sources of Events - Event Listeners - Handling Mouse and Keyboard Events - Adapter Classes - Inner Classes - The AWT Class Hierarchy - AWT Controls : Label – Button – TextField -

CheckBox - Layout Managers. Swings - Limitations of AWT – Components - Containers - Exploring Swing - JApplet - JFrame and JComponent - JLabel and Imageicon –JTextfield - JButton - JCheck Box - JRadioButton - JCombobox - JTabbedpane - JScrollpane - JTable.

Course Outcomes:

On Successful completion of this course student will be able to :

Course Outcomes		POs related to COs
CO1	Understand the basic principles of object oriented programming	PO1, PO2, PO3, PO4, PO5, PO12
CO2	Develop Java programs with the concepts of inheritance and packages	PO1, PO2, PO3, PO4, PO5, PO12
CO3	Build Java applications using exceptions and interfaces	PO1, PO2, PO3, PO4, PO5, PO12
CO4	Use multithreading and applet concepts in developing the object oriented programming	PO1, PO2, PO3, PO5
CO5	Develop the interactive Java programs using event handling and swings	PO1, PO2, PO3, PO5

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	3	2	2	-	-	-	-	-	-	2
CO2	3	3	3	3	3	-	-	-	-	-	-	2
CO3	3	3	2	3	3	-	-	-	-	-	-	2
CO4	3	3	2	-	3	-	-	-	-	-	-	-
CO5	3	3	2	-	3	-	-	-	-	-	-	-
CO*	**3**	**3**	**2.4**	**2.6**	**2.8**	**-**	**-**	**-**	**-**	**-**	**-**	**2**

Text Books:

1. Java; The complete reference, Herbert schildt, 7 thediton, TMH.
2. Beginning Java2 JDK , Ivor Horton's, 5 th Edition, WILEY Dream Tech.

Reference Books:

1. An Introduction to programming and OO design using Java, J.Nino and F.A. Hosch, John wiley& sons.
2. An Introduction to OOP, T. Budd, second edition, Pearson education.
3. Introduction to Java programming ,Y. Daniel Liang, 6 th edition, Pearson education.
4. An introduction to Java programming and object oriented application development, R.A. Johnson- Thomson.
5. Core Java 2, Vol 1, Fundamentals, Cay.S.Horstmann and Gary Cornell, 7 th Edition, Pearson Education.

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II B. Tech II Semester	**L**	**T**	**P/D**	**C**
	3	**0**	**0**	**3**

18CSE223 DATABASE MANAGEMENT SYSTEMS

Course Educational Objectives:

CEO1: Discuss the basic database concepts, applications, data models, schemas and instances and design Entity Relationship (E-R) model for a database.
CEO2: Demonstrate the use of integrity constraints, relational algebra operations and relational calculus.
CEO3: Describe the basics of SQL, construct queries using SQL, SQL functions, trigger and cursor concepts in PL/SQL.
CEO4: Understand reasoning about functional dependency and to make the students to identify the role of normalization in database management systems.
CEO5: To present the students with the knowledge of Transaction, concurrency and recovery strategies of DBMS.

UNIT 1 DatabaseSystems and Entity Relationship Modelling
Database System Applications - Purpose of Database Systems - View of Data - Database Languages - Database Users and Administrators - Database Architecture - The Entity-Relationship Model - Attributes and Entity Sets - Relationship Sets - Entity-Relationship Diagrams - Extended E-R Features.

UNIT 2 Relational Data Model
Introduction to the Relational Model - Integrity Constraints - Fundamental Relational Algebra Operations - Tuple Relational Calculus - Domain Relational Calculus.

UNIT 3 Introduction to SQL
Characteristics of SQL - advantages of SQL - SQL Data types and Literals.-Types of SQL Commands - SQL Operators and their Procedures - Form of Basic SQL Query - Examples of Basic SQL Queries - Relational Set Operators – SQL Join operators - Introduction to Nested Queries - Views - Indexes - SQL Functions - Database Triggers - Cursors in SQL – PL/SQL

UNIT 4 Normalization
Introduction to Schema Refinement - Properties of Decompositions – Functional Dependencies - Reasoning about Functional Dependencies - Normal Forms - First - Second - Third – BCNF - MVD - Fourth Normal Form.

UNIT 5 Transaction Processing Concepts and Concurrency Control Techniques
Transaction Concept - Transaction States - Implementation of Atomicity and Durability - Serializability - Recoverability - Concurrent Executions - Lock-Based Protocols for Concurrency Control - Time Stamp-Based Protocol for Concurrency Control - Multiple Granularity - **Recovery System**: Recovery and Atomicity – Log based Recovery – Recovery with Concurrent Transactions – Indexing: Basic Concepts of Indexing – B+ Tree Index Files – B Tree Index Files

Course Outcomes:

On successful completion of the course the student will be able to,

Course Outcomes		POs related to COs
CO1	Demonstrate knowledge on Data models and Database LanguagesandDesign Entity Relationship model for a database	PO1, PO3
CO2	Analyze the relational database theory, and be able to write relational algebra and relational calculus expressions for queries.	PO1, PO2
CO3	Analyze and evaluate the databases using SQL DML/DDL Commands	PO1, PO2, PO3, PO5
CO4	Analyze databases using normal forms to provide solutions for real time applications.	PO1, PO2
CO5	Understand the properties of transactions in a database system, Analyze concurrency control techniques for handling concurrent transactions and understand recovery of data from failures	PO1, PO3,PO4

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	3	-	-	-	-	-	-	-	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-
CO3	2	2	3	-	2	-	-	-	-	-	-	-
CO4	2	3	-	-	-	-	-	-	-	-	-	-
CO5	3	-	2	2	-	-	-	-	-	-	-	-
CO*	**2.6**	**2.6**	**2.6**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

TextBooks:

1. Database System Concepts, 5/e, 2006, Korth, Silberschatz, Sudarshan, Tata McGrawHill, New York.
2. Database Management System, 2/e, 2000,RaghuRamakrishnan, Tata McGrawHill, New York.

Reference Books:

1. Fundamentals of Database Systems, 5/e, 2008, Elmasri, Navathe, Pearson Education, USA.
2. *Database Management Systems* , 5/e, 2003, Peter Rob, A.*AnandaRao* and Carlos Coronel, Cengage Learning, USA.
3. SQL, PL/SQL Programming, 2/e, 2011, Ivan Bayross, BPB Publications, New Delhi, India.
4. Introduction to Database Systems, 8/e, 2004, C.J.Date, Pearson Education, USA.
5. Fundamentals of Database Management Systems, 1/e, 2006, M.L. Gillenson, Wiley, New Delhi, India.

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II B. Tech II Semester	**L**	**T**	**P/D**	**C**
	3	**1**	**0**	**3**

18CSE224 DESIGN AND ANALYSIS OF ALGORITHMS

Course Educational Objectives:

CEO1: To gain knowledge of time complexity, space complexity and Disjoint sets.
CEO2: Todesign searching and sorting algorithms along with greedy method.
CEO3: To analyze Asymptotic Runtime Complexity of Algorithms including Formulating Recurrence Relations.
CEO4: To understand the branch and bound algorithms for solving the complex problems.
CEO5: To determine the computational complexity and analyze the approximation algorithms.

UNIT - 1: INTRODUCTION

Algorithm - Pseudo Code for Expressing Algorithms - Performance Analysis- Space Complexity - Time Complexity- Asymptotic Notation - Big Oh Notation - Omega Notation - Theta Notation and Little Oh Notation**. Disjoint Sets:** Disjoint Set Operations - Union and find Algorithms - Spanning Trees - Connected Components and Bi-Connected Components.

UNIT - 2: DIVIDE AND CONQUER

General Method - Applications-Binary Search – Quick Sort - Merge Sort- Strassen's Matrix Multiplication. **Greedy Method:** General Method –Applications- Job Sequencing with Deadlines - 0/1 Knapsack Problem - Minimum Cost Spanning Trees - Single Source Shortest Path Problem.

UNIT - 3: DYNAMIC PROGRAMMING

General Method –Applications-Matrix Chain Multiplication - Optimal Binary Search Trees - 0/1 Knapsack Problem - All Pairs Shortest Path Problem - Travelling Sales Person Problem - Reliability Design Problem.

UNIT - 4: BACKTRACKING

General Method – Applications-N-Queens Problem - Sum of Subsets Problem - Graph Coloring - Hamiltonian Cycles. **Branch And Bound:** General Method - Applications - Travelling Sales Person Problem - 0/1 Knapsack Problem- LC Branch and Bound Solution - FIFO Branch and Bound Solution.

UNIT - 5: NP-HARD AND NP-COMPLETE PROBLEMS

Basic Concepts - Non deterministic algorithms - NP - Hard and NP Complete Classes - Cook's Theorem.

Course Outcomes:

On successful completion of the course the student will be able to

Course Outcomes		POs related to COs
CO1	To gain knowledge of time complexity, space complexity and Disjoint sets.	PO1, PO2
CO2	To design searching and sorting algorithms along with greedy method.	PO1, PO2, PO3, PO5
CO3	To analyze Asymptotic Runtime Complexity of Algorithms including Formulating Recurrence Relations.	PO1, PO3
CO4	To understand the branch and bound algorithms for solving the complex problems.	PO1, PO2, PO3, PO4
CO5	To determine the computational complexity and analyze the approximation algorithms.	PO1, PO2

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	2	2	2	-	-	-	-	-	-	-	-
CO3	3	2	2	2	-	-	-	-	-	-	-	-
CO4	3	2	2	2	-	-	-	-	-	-	-	-
CO5	2	2	-	-	-	-	-	-	-	-	-	-
CO	**2.8**	**2**	**2**	**2**	-	-	-	-	-	-	-	-

Text Books:

1. Fundamentals of Computer Algorithms , Ellis Horowitz , SatrajSahni and Rajasekharam , Galgotia publications pvt.Ltd , 2/e , Universities press, 2008.
2. Algorithm Design , Foundations , Analysis and Internet examples, M.T.Goodrich and R.Tomassia , John wiley and sons, 1/e, 2002.

Reference Books:

1. Introduction to Algorithms ,T.H.Cormen - C.E.Leiserson - R.L.Rivest and C.Stein , 2/e , Prentice Hall Inc. Pvt. Ltd./ Pearson Education , 2005.
2. Introduction to Design and Analysis of Algorithms A strategic approach ,R.C.T.Lee – S.S.Tseng - R.C.Chang and T.Tsai , 1/e, McGraw Hill, 2005.
3. Data structures and Algorithm Analysis in C++ , Allen Weiss , 2/e, Pearson education , 2006.
4. Design and Analysis of algorithms ,Aho , Ullman and Hopcroft , 8/e, Pearson education , 2005.

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

II B. Tech II Semester

L	T	P	C
2	1	0	3

18CSE225 FORMAL LANGUAGES AND AUTOMATA THEORY

Course Educational Objectives:

CEO1: To construct Finite state Machines without and with outputs.
CEO2: To construct Regular Expressions for the regular languages and equivalent Finite State Machines.
CEO3: To understand the concept of Regular Grammars and Context Free Grammars.
CEO4: To construct pushdown automata equivalent to Context free Grammars.
CEO5: To Construct Turing Machines and understand decidability of problems.

UNIT – 1 Fundamentals and Finite Automata

Strings - Alphabets and languages - Finite state systems – Basic Definitions - Finite Automata - Deterministic finite automata – Non deterministic finite automata - Equivalence of DFA and NFA - Equivalence of NFA with and without ε –moves - Minimization of FA - Finite automata with output – More machines and mealy machines.

UNIT – 2 Regular Expressions and Regular Sets

Regular expressions – Regular languages - Identity rules for regular expressions – Equivalence of Finite automata and regular expressions – Pumping lemma for regular sets – Applications of the Pumping lemma - Closure proportions of regular sets (Without proof).

UNIT – 3 Regular Grammars and Context Free Grammars

Types of Grammar - Regular grammars – Right Linear and Left Linear grammars - Equivalence of regular grammar and Finite Automata - Context Free Grammars - Motivation and introduction - Derivations - Leftmost derivation - Rightmost derivation - Derivation tree - Ambiguity - Simplification of CFG's - Chomsky Normal Form - Greibach Normal Form.

UNIT – 4 Push Down Automata

Definitions - Model of PDA – Acceptance by PDA – Moves - Design of PDA - Equivalence of PDA and CFL - Deterministic PDA - pumping lemma for CFL - Closure properties of CFL (Without proof).

UNIT – 5 Turing Machine and Undecidabality

Definition - Model - Language acceptance - Design of Turing Machine - Computable languages and functions - Modifications of Turing machine - Universal Turing machine - Chomsky hierarchy of languages - Grammars and their machine recognizers - Undecidable Post's correspondence problem.

Course Outcomes:

On successful completion of the course the student will be able to:

Course Outcomes		POs related to COs
CO1	Demonstrate knowledge on Automata Theory, Analyze and Design of finite automata, and prove equivalence of various finite automata.	PO1, PO2, PO3
CO2	Demonstrate knowledge on Regular Expression, Analyze and design of regular expressions from regular languages, and prove the equivalence	PO1, PO2, PO3
CO3	Demonstrate knowledge on context free grammar, Analyze and design of CFG from CFL, simplifications of CFG by applying various Normal	PO1, PO2, PO3
CO4	Analyze and design of PDA and prove the equivalence of languages described by pushdown automata and context free grammars.	PO1, PO2,PO3
CO5	Demonstrate knowledge on Turing Machine, analyze and design of Turing machine.	PO1,PO2, PO3

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	3	-	-	-	-	-	-	-	-	-
CO2	2	3	3	-	-	-	-	-	-	-	-	-
CO3	2	3	3	-	-	-	-	-	-	-	-	-
CO4	2	3	3	-	-	-	-	-	-	-	-	-
CO5	2	3	3	-	-	-	-	-	-	-	-	-
CO*	**2.2**	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Text Book:

1. Hopcroft H.E. and Ullman Jeffrey.D., “Introduction to Automata theory languages and Computation”, 3/e, 2006, Pearson Education, New Delhi, India.
2. Mishra K L P and Chandrasekaran N, “Theory of Computer Science - Automata, Languages and Computation”, 2/e, 2007, PHI, New Delhi, India.

Reference Books:

1. John C Martin, “Introduction to Languages and Theory of Computation”, 1/e, 2009, Tata McGraw Hill Education, Hyderabad, India.
2. Sipser, “Introduction to Theory of Computation”, 2/e, 2005, Thomson, Australia.
3. George Tourlakis, “Theory of computation”, 1/e, 2012, John Wiley, India.
4. Harry R Lewis and Christos H Papadimitriou, “Elements of the Theory of Computation”, Second Edition, Prentice Hall of India, Pearson Education, New Delhi, 2003.
5. Peter Linz, “An Introduction to Formal Language and Automata”, Third Edition, Narosa Publishers, New Delhi, 2002.

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II B. Tech II Semester

L	T	P/D	C
0	0	3	2

18CSE226 PROGRAMMING WITH JAVA LAB

Course Educational Objectives:

Course Educational Objectives:

CEO1: To gain knowledge on object oriented programming concepts

CEO2: To develop the Java programs by using the concepts of inheritance and packages.

CEO3: To design the variety of technologies and on different platforms.

CEO4: To understand the concepts of event handling in Java platform.

CEO5: To design the application using object oriented programming concepts.

Exercises:

1. (a) Write a Java Program that Prints all Real Solutions to the Quadratic Equation ax2 + bx + c = 0.
   (b) Write a Java Program that Uses both Recursive and Non Recursive Functions to Print the `

2. (a) Write a Java Program that Prompts the User for an Integer and then Prints out all Prime Numbers up to that Integer.
   (b) Write a Java Program to Multiply Two Given Matrices.
   (c) Write a java program to accept a string from user and display number of vowels, consonants, digits and special characters present in each of the words of the given text.

3. (a) Write a Java Program that Checks whether a Given String is a Palindrome or Not. Ex: MADAM is a Palindrome.
   (b) Write a Java Program for Sorting a Given List of Names in Ascending Order.
   (c) Write a Java Program to Make Frequency Count of Words in a Given Text.

4. (a) Write a Java Program for Multilevel Inheritance.
   (b) Write java program to create a super class called Figure that receives the dimensions of two dimensional objects. It also defines a method called area that computes the area of an object. The program derives two subclasses from Figure. The first is Rectangle and second is Triangle. Each of the sub class overridden area() so that it returns the area of a rectangle and a triangle respectively.
   (c) Write a Java program for User Defined Exception.

5. (a) Write a Java Program to create an abstract class Named Shape that contains an Empty Method named numberOfSides ( ).Provide three classes Named Trapezoid, Triangle and Hexagon such that each one of the classes extends the class Shape. Each one of the classes Contains only the Method numberOfSides ( ) that Shows the Number of Sides in the Given Geometrical Figures.
   (b) Write a Java Program Which includes class, abstract class and interface.
   (c) Write a Java Program for Creation of User Defined Package and Accessing the Members Present in Package.

6. (a) Write a Java Program for Checked and Unchecked Exceptions.
   (b) Write a program that reads two numbers from the user to perform integer division into Num1 and Num2 variables. The division of Num1 and Num2 is displayed if they are integers. If Num1 or Num2 were not an integer, the program would throw a NumberFormatException. If Num2 were Zero, the program would throw an ArithmeticException.
   (c) Use inheritance to create an exception super class called ExceptionA and exception sub class ExceptionB and ExceptionC, where ExceptionB inherits from ExceptionA and ExceptionC inherits from ExceptionB. Write a java program to demonstrate that the catch block for type ExceptionA catches exception of type ExceptionB and ExceptionC.

7. (a) Write a Java Program that creates three threads. First Thread displays "Good Morning" every one second, the Second Thread displays "Hello" every two seconds and the third thread displays "Welcome" every three seconds.
   (b) Write a Java Program that Correctly Implements Producer Consumer Problem using the Concept of Inter Thread Communication.

8. (a) Develop an Applet that Displays a Moving Banner.
   (b) Develop an AWT that Receives an Integer in one Text Field, and Computes its Factorial Value and Returns it in Another Text Field, When The Button Named "Compute" is Clicked.

9. (a) Write a Java Program for Handling Mouse Events.
   (b) Write a Java Program for Handling Keyboard Events.

10. Write a Java Program that works as a Simple Calculator. Use a Grid Layout to Arrange Buttons for the Digits and for the +, -,*, % Operations. Add a Text Field to Display the Result.

11. (a) Write a Java Program that Creates an User Interface to Perform Integer Divisions. The User Enters Two Numbers in the TextFields, Num1 and Num2. The Division of Num1 and Num2 is displayed in the Result field when the Divide Button is Clicked. If Num1 or Num2 were not an Integer, the Program would throw a NumberFormatException. If Num2 were Zero, the Program would throw an ArithmeticException Display the Exception in a Message Dialog Box.
    (b) Implement a Java Program to add a new ball each time the user clicks the mouse. Provided a maximum of 20 balls randomly choose a color for each ball.

12. (a) Write a Java Program that Simulates a Traffic Light. The Program Lets the User Select one of Three Lights: red, yellow, or green. When a Radio Button is selected, the Light is Turned On, and Only One Light can be on at a Time No Light is on when the Program Starts.
    (b) Write a Java Program that Allows an User to Draw Lines, Rectangles and Ovals.
    (c) Suppose that a Table Named Table.txt is Stored in a Text File. The First Line in the File is the Header, and the Remaining Lines Correspond to Rows in the Table. The Elements are separated by Commas. Write a Java Program to Display the Table using Jtable Component.

Course Outcomes:

On Successful completion of this course student should be able to :

Course Outcomes		POs related to COs
CO1	Acquire the Knowledge on structure and model of the Java programming language.	PO1
CO2	Analyze the complex examples using java programming language.	PO2
CO3	Design solutions for user requirements using software functionality.	PO3
CO4	Investigate on event handlingconcepts in developing the object oriented programming	PO4
CO5	Develop the data base connectivity to the Java application	PO5
CO6	Follow the ethical principles in implementing the programs	PO8
CO7	Do experiments effectively as an individual and as a team member in a group.	PO9
CO8	Communicate verbally and in written form, the understanding about the experiments.	PO10
CO9	Continue updating their skill related to object oriented concepts and implementing programs in future.	PO12

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	3	-	-	-
CO8	-	-	-	-	-	-	-	-	-	3	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO*	**3**	**3**	**3**	**3**	**3**	-	-	**3**	**3**	**3**	-	**3**

Reference Books:

1. Java How to ProgramH.M.Dietel and P.J.Dietel, Sixth Edition, Pearson Education/PHI
2. Introduction to Java programming, Y.Daniel Liang, Sixth edition, Pearson Education
3. Big Java, Cay Horstmann, 2nd edition, Wiley Student Edition, Wiley India Private Limited.

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II B. Tech II Semester	**L**	**T**	**P/D**	**C**
	0	**0**	**3**	**2**

18CSE227 DATABASE MANAGEMENT SYSTEMS LAB

Course Educational Objectives:

CEO1: Demonstrate practical knowledge on creation and alteration of tables, insertion and Querying of data and Analyze and evaluate the databases using SQL DML/DDL commands.
CEO2: Write SQL Queries to implement a Database Schema for the given Database.
CEO3: Design Simple Database using a Tool and Implement it using SQL.
CEO4: Implement DDL and DML commands in SQL and PL/SQL, ORACLE to manage data in databases.
CEO5: Programming PL/SQL including procedures, functions, cursors and triggers.

The Following Topics need to be covered in the Laboratory Sessions:

SQL

Introduction to SQL:
DDL - DML Commands- Basic Data Types- Commands to Create Table- Constraint Definition Commands for Table Handling- Alter Table – Drop Table- Insert - Update – Delete Commands for Record Handling- Select with Operators like Arithmetic - Comparison - Logical Query Expression Operators - Ordering the Records with Order by, Grouping the Records.

SQL Functions:
Date - Numeric - Character – Conversion Functions - Group Functions: avg - max - min - sum -count
Set Operations: Union – Union all - Intersect - Minus
Join concept: Simple - Equi - Nonequi - Self –Outerjoin
Query&Subqueries- View Introduction - Create - Update - and Drop Commands

PL/SQL
Advantages of PL/SQL- Support of SQL - Executing PL/SQL- PL/SQL Character Set & Data Types- Character - Row - rowid - Boolean - Binary integer - Number Variable - Constant
Control structures: Condition–if- Interactive-loop - for – while- Sequential–go to.

Database Triggers
Definition - Syntax - Parts of Triggers- Types of Triggers - Enabling and Disabling Triggers
Cursors - Procedures and Functions- Definition & Implementation.
Note: The Faculty Members are instructed to provide the Necessary Exercises which covers the above Topics.

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Course Outcomes:

On successful completion of this course, the students should be able to:

Course Outcomes		POs related to COs
CO1	Demonstrate practical knowledge on creation and alteration of tables, insertion and Querying of data.	PO1
CO2	Analyze the database schemas for the different types of database	PO2
CO3	Design the databases using SQL DML/DDL Commands	PO3
CO4	Design the complex PL/SQL programs for different problems	PO4
CO5	Use the procedure, function, trigger and cursor concepts in PL/SQL	PO5
CO6	Follow the ethical principles in implementing the programs	PO8
CO7	Do experiments effectively as an individual and as a team member in a group.	PO9
CO8	Communicate verbally and in written form, the understanding about the experiments.	PO10
CO9	Continue updating their skill related to SQL Commands and Queries and implementing programs in future.	PO12

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	-	-	-	-	-	-	-	-	-	-	-	3	2
CO2	-	3	-	-	-	-	-	-	-	-	-	-	3	2
CO3	-	-	3	-	-	-	-	-	-	-	-	-	3	2
CO4	-	-	-	3	-	-	-	-	-	-	-	-	3	2
CO5	-	-	-	-	3	-	-	-	-	-	-	-	3	3
CO6	-	-	-	-	-	-	-	3	-	-	-	-	2	3
CO7	-	-	-	-	-	-	-	-	3	-	-	-	2	2
CO8	-	-	-	-	-	-	-	-	-	3	-	-	2	3
CO9	-	-	-	-	-	-	-	-	-	-	-	3	3	3
CO*	**3**	**3**	**3**	**3**	**3**	**-**	**-**	**3**	**3**	**3**	**-**	**3**	**2.6**	**2.4**

Reference Books:

1. SQL, PL/SQL Programming, Ivan Bayross, 2/e, BPB Publications, 2011, New Delhi, India.
2. Oracle Database 11g: Hands-on SQL and PL/SQL, Satish Ansari, PHI Publishers, 2010.

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II B.Tech II Semester

18CSE228	**ONLINE COMPREHENSIVE TEST-I**	**L**	**T**	**P/D**	**C**
		1	**-**	**-**	**1**

Course Educational Objectives:

CEO1: To assess the comprehensive knowledge gained in basic courses relevant to the branch of study.

CEO2: To comprehend the questions asked and answer them with confidence.

On-line Comprehensive Test:

On-line comprehensive test will be conducted at the end of the II year II semester with 100 objective questions (multiple choice questions) for 100 marks on the courses studied in the respective semesters (II year I semester and II year II semester).

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II B.Tech II Semester

18AUD211	**CONSTITUTION OF INDIA**	**L**	**T**	**P/D**	**C**
		2	**-**	**-**	**-**

Course Educational Objectives:

CEO1: To know about Indian constitution and functionalities of state and central government of India
CEO2: To realize the functions of local administration in rural and urban areas
CEO3: To understand the functions of Chief election and state election commissions.

UNIT – 1: INTRODUCTION

Constitution-meaning of the term, Indian Constitution: Sources and constitutional history, Features: Citizenship, Preamble, Fundamental Rights and Duties, Directive Principles of State Policy

UNIT – 2: UNION GOVERNMENT AND ITS ADMINISTRATION

Structure of the Indian Union: Federalism, Centre- State relationship, President: Role, power and position, PM and Council of ministers, Cabinet and Central Secretariat, LokSabha, RajyaSabha

UNIT – 3: STATE GOVERNMENT AND ITS ADMINISTRATION

Governor: Role and Position, CM and Council of ministers, State Secretariat: Organization, Structure and Functions

UNIT – 4: LOCAL ADMINISTRATION

District's Administration head: Role and Importance, Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation, Pachayati raj: Introduction, PRI: ZilaPachayat, Elected officials and their roles, CEO ZilaPachayat: Position and role, Block level: Organizational Hierarchy (Different departments), Village level: Role of Elected and Appointed officials, Importance of grass root democracy.

UNIT – 5: ELECTION COMMISSION

Election Commission: Role and Functioning, Chief Election Commissioner and Election Commissioners, State Election Commission: Role and Functioning, Institute and Bodies for the welfare of SC/ST/OBC and women.

Course Outcomes

On successful completion of the course the student will be able to

Course Outcomes		**POs related to COs**
CO1	Understand the functions of the Indian constitution	PO6, PO8,PO12
CO2	Recognize the structure, functions of Indian central government	PO6, PO8,PO12
CO3	Realize the structure and functions of State government in India	PO6, PO8,PO12
CO4	Explain the functions of local administration in rural and urban	PO6, PO8,PO12
CO5	Understand the role of state and chief election commission	PO6, PO8,PO12

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	-	-	-	-	-	3	-	3	-	-	-	3
CO2	-	-	-	-	-	3	-	3	-	-	-	3
CO3	-	-	-	-	-	3	-	3	-	-	-	3
CO4	-	-	-	-	-	3	-	3	-	-	-	3
CO5	-	-	-	-	-	3	-	3	-	-	-	3
CO*	-	-	-	-	-	3	-	3	-	-	-	3

Textbooks:

1. Introduction to the Constitution of India,Durga Das Basu, Prentice Hall of India, New De1hi.
2. Indian Po1itica1 System, R.C.Agarwa1,S.Chand and Company, New De1hi.1997

References:

1. Introduction to the Constitution of India, Sharma, Brij Kishore, Prentice Hall of India, New De1hi.
2. Indian Po1itica1 System, U.R.Gahai, New Academic Pub1ishing House, Jalandar.

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II B.Tech II Semester

		L	T	P/D	C
18SAH223	**REASONING AND APTITUDE - II**	**2**	**-**	**-**	**-**

REASONING AND APTITUDE

Time and work – Pipes and cistern – Time, distance and speed – Problems on trains – Boats and streams – Allegations / mixture – Permutations and combinations – Probability – Logarithms – Analogy – Classifications – Completion of incomplete patterns – Area, surface area and volume – Heights and distances – Calendars' based problems – Clocks – Data interpretation (tabulation- line graphs, bar graphs, pie charts) – Data sufficiency.

Text Books:

1. Quantitative Aptitude, Dr.R.S.Aggarwal, 2012, S.Chand and Company Ltd, New Delhi.
2. A Modern Approach to Verbal and Non-Verbal Reasoning, Dr.R.S.Aggarwal, 2012, S.Chand and Company Ltd, New Delhi.

Reference Books:

1. Quantitative Aptitude for Competitive Examinations, AbhijitGuha, 14/e, 2010, Tata McGraw Hill Publishers, New Delhi.
2. Course in Mental Ability and Quantitative Aptitude, Edgar Thorpe, 3/e, 2012, Tata McGraw Hill Publishers, New Delhi.
3. Fast Track Objective Arithmetic, Rajesh Verma, 2012, Arihant Publications, Meerut

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III B. TECH I-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	2	**1**	**0**	**3**

18CSE311 **OPERATING SYSTEMS**

Course Educational Objectives:
CEO1: To understand main components of OS, System structures and the operations performed by OS as a resource manager.
CEO2: To Study process concurrency and synchronization.
CEO3: To Analyze the different memory management techniques.
CEO4: To gain knowledge about concepts of input/ output systems and storage management
CEO5: To manage different file systems, protection and security to the systems

UNIT – 1 : Operating Systems Overview **(9)**

Introduction - What Operating system do - Operating system operations - Process management - Memory management - Storage management - Protection and Security - Distributed Systems - Special purpose systems.
System structures : Operating system services - user operating system interface - System calls - Types of system calls - Operating system design and implementation - Operating system structure - Operating system generation - System boot.

UNIT - 2 : Process Management and Concurrency **(9)**
Process Management: Process concepts – threads - scheduling-criteria – algorithms and their evaluation - Thread scheduling.
Concurrency : Process synchronization - the critical- section problem - Peterson's Solution - synchronization Hardware – semaphores - classic problems of synchronization - monitors.

UNIT – 3 : Memory Management **(9)**
Memory Management and Virtual Memory : Logical & physical Address Space – Swapping - Contiguous Allocation – Paging - Structure of Page Table – Segmentation - Virtual Memory - Demand Paging - Performance of Demanding Paging - Page Replacement - Page Replacement Algorithms - Allocation of Frames - Thrashing.

UNIT – 4 : Principles of deadlock AND Mass-storage structure & I/O systems **(9)**
Principles of deadlock - system model - deadlock characterization - deadlock prevention - detection and avoidance - recovery form deadlock.
Mass-storage structure - overview of Mass – storage structure - Disk structure - disk attachment - disk scheduling - swap-space management - RAID structure - stable-storage implementation - Tertiary storage structure.

UNIT - 5 : File system Interface **(9)**
File system Interface- the concept of a file - Access Methods - Directory structure - File system mounting - file sharing – protection - File System implementation - File system structure - file system implementation - directory implementation - allocation methods - free-space management - efficiency and performance.
Protection and Security - Goals of protection - Principles of protection - Access matrix - The security problem - program threats - System and network threats.

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Course Outcomes:

On successful completion of this course, student will be able to:

Course Outcomes		**POs related to COs**
CO1	Analyze operating system operations ,system design and implementation	PO1, PO2
CO2	Implement Thread scheduling , solutions to synchronize problems	PO1, PO4,
CO3	Apply memory management techniques, virtual memory concepts	PO1,PO3,PO4
CO4	Manage process execution without deadlock, mass storage structure	PO1,PO4
CO5	Understand file system interface, protection and security in System and Network	PO1, PO2, PO4

CO-PO Mapping

PO / CO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	2	-	-	3	-	-	-	-	-	-	-	-
CO3	3	-	3	3	-	-	-	-	-	-	-	-
CO4	3	-	-	3	-	-	-	-	-	-	-	-
CO5	2	3	-	3	-	-	-	-	-	-	-	-
CO*	**2.6**	**3**	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Text Books:

1. Operating System Principles, 9th Edition, Abraham Silberchatz, Peter B. Galvin, Greg Gagne, Wiley Student Edition.
2. Operating systems - Internals and Design Principles, 6th Edition,W. Stallings, Pearson.

References books:

1. Operating System Principles,8th Edition, Abraham Silberchatz, Peter B. Galvin, Greg Gagne, Wiley Student Edition
2. Modern Operating Systems, 3rd Edition ,Andrew S Tanenbaum PHI.
3. Operating Systems A concept - based Approach, 2nd Edition, D. M. Dhamdhere, TMH.
4. Principles of Operating Systems, B. L. Stuart, Cengage learning, India Edition.
5. Operating Systems, 2nd Edition,A. S. Godbole, TMH
6. An Introduction to Operating Systems, P.C.P. Bhatt, PHI.
7. Operating Systems, S, Haldar and A. A. Arvind, Pearson Education.
8. Operating Systems, R. Elmasri, A. G. Carrick and D. Levine, McGraw Hill.

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III B. TECH I-SEMESTER (CSE)

L	T	P	C
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18CSE312 COMPUTER NETWORKS

Course Educational Objectives:

CEO1: To provide knowledge on Identify the components required to build different types of networks, understand the OSI and TCP/IP architectures and different data link layer protocols.
CEO2: To be exposed to the required functionality at the Ethernet.
CEO3: To understand the different routing protocols, internet protocols and IP addressing.
CEO4: To learn the use of TCP, UDP protocols.
CEO5: To develop skills to apply the concept of application layer protocols

UNIT – 1: Fundamentals, Physical Layer and Data Link Layer (9)
Network Hardware - Network software – OSI & TCP/IP References models - Guided transmission media - Communication satellites - The public switched telephone network – Switching - Data link layer design issues - Elementary data link protocols – Stop and Wait Protocol - Sliding window protocol.

UNIT – 2: The Medium Access Control Sublayer (9)
The channel allocation problem - Multiple access protocols - Ethernet- Ethernet cabling - Manchester encoding - Ethernet MAC sub layer protocol - Switched Ethernet - Fast Ethernet - Wireless LANS - The 802.11 protocol stack - The 802.11 physical layer – The 802.11 MAC sub layer protocol - The 802.11 frame structure.

UNIT- 3: The Network Layer (9)
Network layer design issues - Routing algorithms (DSDV, RIP, OSPF, DSR) – Congestion control algorithms – Internetworking – Internet Protocols : IPv4 , IPv6 - Addresses.

UNIT-4: The Transport Layer (9)
Overview of Transport layer - Elements of transport protocols - The internet transport protocols: UDP and TCP.

UNIT– 5: The Application Layer (9)
Traditional applications: DNS- Electronic mail (SMTP, POP3, IMAP, MIME) - WWW – HTTP – FTP - Web Services – SNMP

Course Outcomes:

On successful completion of the course the student will be able to,

Course Outcomes		POs related to COs
CO1	Demonstrate knowledge on fundamentals of network components and topologies, Analyze the OSI and TCP/IP stack and the different protocols in Data Link layer.	PO1, PO2

CO2	Classify the Media Access Control Protocols and different Internetworking	PO1, PO2
CO3	Demonstrate various types of routing techniques and design the different routing protocols for wired / wireless.	PO1, PO2, PO3, PO4
CO4	Demonstrate uses of datagram delivery	PO1, PO2, PO3, PO4
CO5	Apply the different strategies Operations of DNS, FTP, HTTP, Email Protocols, SNMP	PO1, PO2, PO3, PO4

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-
CO3	2	3	3	2	-	-	-	-	-	-	-	-
CO4	2	3	3	2	-	-	-	-	-	-	-	-
CO5	2	3	3	3	-	-	-	-	-	-	-	-
CO*	**2.4**	**3**	**3**	**2.33**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Text Books :

1. Computer Networks, 5/e, Andrew S. Tanenbaum, 2016,Pearson Education, New Jersey.
2. Data Communications and Networking, 4/e, Behrouz A. Forouzan, 2006,Tata McGraw Hill, New Delhi.

Reference Books:

1. Computer Networks, 4/e, Andrew S. Tanenbaum, 2008,Pearson Education, New Jersey
2. Computer Communications and Networking Technologies,1/e, Michael A.Gallo, William M. Hancock, 2001,Cengage Learning, New Delhi.
3. Computer Networks: Principles, Technologies and Protocols for Network Design,1/e, Natalia Olifer, Victor Olifer, 2006,Wiley India, New Jersey.
4. Computer and Communication Network,1/e, Nader F. Mir, 2007,Pearson Education, New Jersey.
5. Computer Networking: A Top-Down Approach Featuring the Internet, 3/e, James F.Kurose - K.W.Ross,2005, Pearson Education, New Jersey.
6. Data and Computer Communications,1/e, G.S.Hura and M.Singhal,2001, CRC Press, Taylor and Francis Group, FL United States.

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III B. TECH I-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	3	**1**	**0**	**3**

18CSE313 SOFTWARE ENGINEERING

Course Educational Objectives:

The student should be made to:

CEO1: To provide knowledge of basic software engineering methods, practices and their appropriate application.
CEO2: To understand software requirements and the SRS documents.
CEO3: To design components based on different software architectural styles.
CEO4: To understanding of approaches to verification and validation including static analysis, and Reviews.
CEO5: To describe software measurement and software risks.

UNIT – 1: Introduction to Software Engineering and Process Models (9)

The evolving role of software - Changing nature of software - Legacy software - Introduction to Agility-Agile process-Extreme programming- XP Process.-Software myths - A generic view of process - Software engineering a layered technology - A process framework - The Capability Maturity Model Integration (CMMI) - Process patterns - Process assessment - Personal and team process models

Process Models: The waterfall model - Incremental process models - Evolutionary process models - Specialized process models - The unified process

UNIT – 2: Software Requirements (9)

Functional and non-functional requirements - User requirements - System requirements - Interface specification - The software requirements document

Requirements Engineering Process: Feasibility studies - Requirements elicitation and analysis - Requirements validation - Requirements management - System models - Context models - Behavioral models - Structured methods

UNIT - 3: Design Engineering (9)

Design process and design quality - Design concepts - The design model - Creating an architectural design - Software architecture - Data design - Architectural styles and patterns

Modeling Component-Level Design: Designing class based components - Conducting component level design - Object constraint language - Designing conventional components

UNIT - 4: Testing Strategies (9)

A strategic approach to software testing - Test strategies for conventional software - Validation testing - System testing - The art of debugging – Black box and white box testing

Product metrics: Software quality - Frame work for product metrics - Metrics for analysis model - Metrics for design model - Metrics for source code - Metrics for testing - Metrics for maintenance

UNIT – 5: Metrics for Process and Products (9)

Software measurement - Metrics for software quality - Risk management: reactive Vs proactive risk strategies - Software risks - Risk identification - Risk projection - Risk refinement - RMMM - RMMM plan- CASE TOOLS

Quality Management: Quality concepts - Software quality assurance - Software reviews - Formal technical reviews - Statistical software quality assurance - Software reliability - The ISO 9000 quality standards

Course Outcomes:

On successful completion of this course, student will be able to:

Course Outcomes		POs related to COs
CO1	Demonstrate knowledge on fundamentals of software engineering methods and software process models.	PO1, PO2
CO2	Identify software requirements and design SRS document by analyzing the data flows.	PO1, PO3, PO4
CO3	Design class based components and conduct component level design based on architectural styles and patterns.	PO1,PO2, PO3,PO4
CO4	Identify various types of testing and development metrics for various phases of software development.	PO1, PO2, PO4
CO5	Identify the software risks and analyze the quality assurance activities	PO1, PO4

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	2	-	3	3	-	-	-	-	-	-	-	-
CO3	2	2	3	2	-	-	-	-	-	-	-	-
CO4	2	2	-	3	-	-	-	-	-	-	-	-
CO5	3	-	-	2	-	-	-	-	-	-	-	-
CO*	**2.4**	**2**	**3**	**2.5**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Text Books :

1. Software Engineering, A practitioner's Approach, 8/e, Roger S Pressman,2019, Tata McGraw Hill International Edition.
2. Software Engineering, 7/e, Ian Somerville, 2004, Pearson Education.

References:

1. Software Engineering, A practitioner's Approach, 6/e, Roger S Pressman,2005, Tata McGraw Hill International Edition.
2. Fundamentals of Software Engineering, 2/e, Rajib Mall, 2005,Prentice Hall Inc.
3. Software Engineering: A Precise Approach, 1/e, Pankaj Jalote, 2010, Wiley India.
4. Software Engineering: A Primer, 1/e, Waman S Jawadekar, 2008, Tata McGraw Hill.
5. Software Engineering - Principles and Practices, 1/e, Deepak Jain, Oxford University Press.
6. Software Engineering – A Supporting Processes, 1/e, Richard H. Thayer and Merlin Dorfman, 2005, Wiley.

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III B. TECH I-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	3	**1**	**0**	**3**

18CSE314 UNIX AND SHELL PROGRAMMING

Course Educational Objectives:

CEO1: To acquire information on UNIX architecture, general purpose utilities, file handling commands, Network commands.
CEO2: To develop the basic skills of UNIX shell, standard streams, redirection, pipes, command execution, quotes, command substitution, Job control, variables,
CEO3: To develop skills to design regular expression feature with Grep, Sed and AWK.
CEO4: To inculcate skill on korn shell features for construct Korn shell programming for the given task.
CEO5: To develop skill to apply various UNIX system calls in designing different UNIX utilities.

UNIT – 1: Introduction to UNIX: (9)

The UNIX Operating System - The UNIX Architecture - Features of UNIX - Internal And External Commands - Command Structure.

General-Purpose Utilities - cal - date - echo - printf - bc - script - passwd - PATH - who - uname - tty - stty - pwd - cd - mkdir - rmdir - od.

Handling Files - The File System - cat - cp - rm - mv - more - file - ls - wc - pg - cmp–comm-diff - gzip - tar - zip - df - du - mount - umount - chmod - The vi editor - security by file Permissions.

Networking Commands - ping - telnet - ftp - finger - arp - rlogin.

UNIT- 2: Introduction to Shells (9)

Unix Session - Standard Streams - Redirection - Pipes - Tee Command - Command Execution - Command-Line Editing - Quotes - Command Substitution - Job Control - Aliases - Variables - Predefined Variables - Options - Shell Environment -Customization**.**

Filters: Introduction - Concatenating files - Display Beginning and End of files - Cut and Paste - Sorting - Translating Characters - Ordering a File - uniq.

UNIT – 3: Regular Expressions (9)

Atoms - operators GREP - Operation - grep Family - searching for File Content.SED - Scripts - Operation - Addresses - commands - applications - grep and sed.AWK - Execution - Fields and Records - Scripts - Operations - Patterns - Actions - Associative Arrays - String Functions - String Functions - Mathematical Functions - User – Defined Functions - Using System, commands in awk - Applications - awk and grep - sed and awk.

UNIT - 4: Interactive Korn Shell (9)

Korn Shell Features - Two Special Files - Variables - Output - Input - Exit Status of a Command - eval Command - Environmental Variables - Options - Startup Scripts - Command History - Command Execution Process.

Korn Shell Programming : Basic Script concepts - Expressions - Decisions: Making Selections - Repetition - special Parameters and Variables - changing Positional Parameters - Argument Validation - Debugging Scripts - Script Examples.

UNIT – 5: Interactive C Shell (9)

File Management : File Structures - System Calls for File Management – create - open - close - read - write - lseek - link - symlink - unlink - stat - fstat - lstat - chmod - chown - Directory API – opendir - readdir - closedir - mkdir - rmdir - umask.

Course Outcomes:

On successful completion of the course the student will be able to,

Course Outcomes		POs related to COs
CO1	Demonstrate knowledge on fundamentals of UNIX operating system, Analyze Unix general purpose, file handling and Networking commands and utilities.	PO1, PO2
CO2	Review and Identify various features of Unix shell	PO1, PO2
CO3	Analyse and design various regular expressions for GREP, SED and AWK.	PO1, PO2, PO3
CO4	Construct korn shell programming using korn shell features.	PO1, PO2, PO3,PO5
CO5	Understanding the concept of UNIX system calls to develop various UNIX utilities	PO1, PO2, PO3, PO4,PO5

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-
CO3	2	2	3	-	-	-	-	-	-	-	-	-
CO4	2	2	-	3	3	-	-	-	-	-	-	-
CO5	3	2	3	2	3	-	-	-	-	-	-	-
CO*	**2.6**	**2.2**	**2**	**2.5**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Text Books:

1. Unix and shell Programming,1st Edition ,Behrouz A. Forouzan - Richard F. Gilbery,2003,Cengage Learning India.
2. Unix Concepts and Applications, 4th Edition, Sumitabha Das, 2006, TMH.

References:

1. Unix for programmers and users, 3rd Edition, Graham Glass, King Ables, 2008,Pearson Education.
2. Advanced Unix programming, 2nd Edition, N.B Venkateswarlu, 2010,BS Publications.
3. Unix Shell programming, 1st Edition, YashwanthKanitkar, 2010, BPB Publisher.

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III B. TECH I-SEMESTER (CSE)

L	T	P	C
3	1	0	3

18ECE419 MICROPROCESSORS AND MICROCONTROLLERS

Course Educational Objectives:

CEO1: To provide knowledge on
- Architecture of 8086, Registers and Memory.
- Physical memory organization
- Interrupts of 8086

CEO2: To become skilled in 8086 assembly language programming..

CEO3: To understand the concepts of Programmable Interfacing devices,
- 8086 interfacing with Input output devices and ARM processor.

CEO4: Acquire the knowledge on 8051 Microcontroller architecture and its memory

CEO5: Analyze how the 8051 is interfaced with different peripheral devices.

UNIT-1: INTRODUCTION TO 8086 MICROPROCESSOR **(9)**

8085 Overview-8086 Internal Architecture- Register Organization, Memory Segmentation, Flag Register, Pin Configuration, Physical Memory Organization, General Bus Operation- Minimum and Maximum Mode Signals, Timing Diagrams - Interrupts Of 8086.

UNIT-2: INSTRUCTION SET AND ASSEMBLY LANGUAGE PROGRAMMING (9)

Instruction Formats -Addressing Modes-Instruction Set, Assembler Directives-Macros, Programs Involving Logical, Branch Instructions – Sorting and Evaluating Arithmetic Expressions – String Manipulations-Simple ALPs.

UNIT-3: PROGRAMMABLE INTERFACING DEVICES& ADVANCED RISC PROCESSORS (9)

8255 PPI- Block Diagram, Various Modes of Operation-Programmable Interval Timer 8254-Architecture,Operating Modes – Key Board/Display Controller 8279-Architecture, Modes of Operation, D/A and A/D interfacing, Programmable Communication Interface 8251 USART-Architecture, Description Of Operating Modes-Introduction to ARM Processor-ARM Cortex M3 processor.

UNIT-4: 8051 MICROCONTROLLER & ADVANCED MICROCONTROLLERS (9)

Introduction to Micro Controllers 8051, Architecture, Registers, Pin Description, Connections, I/O Ports, Memory Organization, Addressing Modes, Instruction Set.

UNIT-5: 8051 INTERFACING (9)

Assembly directives, Simple assembly software programs, interfacing with keyboards, 7 segment LEDs, LCDs, Interfacing with ADCs, Interfacing with DACs.

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Course Outcomes:

On successful completion of the course the student will be able to		POs related to COs
CO1	Understand the 8086 microprocessors internal architecture and its operation within the area of manufacturing.	PO1, PO2
CO2	Apply knowledge and design programming proficiency using the various addressing modes and data transfer instructions of the target microprocessors	PO1, PO2, PO3, PO4
CO3	Analyze and design different I/O devices and how they are interfaced with 8086 microprocessor	PO1, PO2, PO3, PO4
CO4	Understand the 8051 microcontroller internal architecture and its operation within the area of manufacturing .	PO1, PO2
CO5	Analyze and design assembly language programs, select appropriate assemble into machine a cross assembler utility of a advance microprocessors and Interfacing for 8051	PO1, PO2, PO3, PO4

CO-PO Mapping

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	2	3	2	-	-	-	-	-	-	-	-
CO3	3	2	3	2	-	-	-	-	-	-	-	-
CO4	3	3	-	-	-	-	-	-	-	-	-	-
CO5	3	2	2	2	-	-	-	-	-	-	-	-
CO*	3	2.2	2.6	2	-	-	-	-	-	-	-	-

TEXT BOOKS :

1. Advanced microprocessor and Peripherals ,A,K,Ray and K,M,Bhurchandi, 3rd edition, TMH, New Delhi,2017.
2. The 8051 Microcontroller, Kenneth j.Ayala, 3rd edition, Thomson Delmar Learning, AsiaPvt.Ltd.
3. Joseph Yiu, The Definitive Guide to the ARM Cortex-M3 & M4, Elsevier, 3rd Edition, 2013.

REFERENCE BOOKS:

1. Advanced microprocessor and Peripherals ,A,K,Ray and K,M,Bhurchandi, 2nd edition, TMH, New Delhi,2000.
2. Micro Processors &Interfacing ,Douglas U, Hall,revised 2nd edition,TMH,New Delhi,2007.
3. The 8088 and 8086 microprocessors, Walter A,Triebel, Avtar Singh, 1st edition, PHI, New Delhi,2003.
4. Microcomputer Systems the 8086/8088 Family: Architecture Programming and Design", Liu & Gibson, 2nd edition, PHI, New Delhi.
5. The 8086 microprocessor programming and interafacing, KennethJ,Ayala, 1/e, Cenange learning private limited, New Delhi, 2007.
6. Microprocessors and microcontrollers, Krishna Kanth, 2nd edition, PHI learning, New delhi, 2012.

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III B. TECH I-SEMESTER (CSE)

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18CSE315 COMPILER DESIGN

Course Educational Objectives:

CEO1: To provide knowledge on list the different stages in the process of compilation and Identify different methods of lexical analysis.
CEO2: To design top-down parsers.
CEO3: To design bottom-up parsers and Identify synthesized and inherited attributes.
CEO4: To learn the use of intermediate code generation and runtime environments and implementation intermediate code generation.
CEO5: To develop skill to apply the concept of optimization and develop algorithms to generate code for a target machine.

UNIT 1 : Introduction to Compiler and Lexical Analysis (9)

Introduction to Compiler - Phases of a compiler - Lexical Analysis : The Role of the Lexical Analyzer - Input Buffering - Specification of Tokens - The Lexical-Analyzer Generator Lex.

UNIT - 2 : Top Down Parsing (9)

Introduction: The Role of the Parser - Context free grammar - Eliminating Ambiguity - Eliminating of Left Recursion and Left Factoring.
Top-Down Parsing: Recursive descent parsing - Non-Recursive Predictive parsing - LL (1) Grammars.

UNIT - 3 : Bottom Up Parsing and Syntax Directed Translation (9)

Bottom-Up Parsing : Shift reduce parsing – Operator precedence parser - LR parsers - Simple LR parser - Canonical LR parser - LALR parser - The Parser Generator YACC .
Syntax Directed Translation : Syntax directed definition - S-attributed and L - attributed definitions - Construction of syntax trees

UNIT -4 : Intermediate Code Generator And Run Time Environments (9)

Intermediate Code Generation: Intermediate Languages - Boolean expressions - Flow-of-Control Statements - Control- Flow Translation of Boolean Expressions.
Run time Environments : Storage organization - Stack Allocation strategies - Symbol table structure - Symbol attributes and management.

UNIT - 5 : Code Optimization and Code Generation (9)

Code Optimization: Basic Blocks and Flow Graphs - Optimization of Basic Blocks - The principle sources of optimization - Introduction to data flow analysis, DAG.
Code Generation : Issues in the Design of a Code Generator - The Target Language - A Simple Code Generator - Peephole optimization - Register allocation and assignment.

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Course Outcomes:

After completion of this course student will be able to :

Course Outcomes		POs related to COs
CO1	Demonstrate knowledge on fundamentals of compiler phases, Design the Lexical Analyzer and input buffering.	PO1, PO2
CO2	Design Top-Down Parser	PO1, PO2, PO3, PO4
CO3	Design Bottom-up Parser and Develop syntax directed translation schemes.	PO1, PO2, PO3, PO4
CO4	Demonstrate the ability to write intermediate code for a given high level programming language (preferably C or FORTRAN) and be able to represent the intermediate code as Quadruples, Triples and Indirect Triples	PO1, PO2, PO3, PO4
CO5	Write three address code and identify the basic blocks, draw flow graphs and represent directed Acyclic graphs for the identified basic blocks. They will also be able to write the target optimized code (assembly code) for the given three address code.	PO1, PO2, PO3, PO4, PO5

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	3	-	-	-	-	-	-	-	-	-
CO2	3	3	3	2	-	-	-	-	-	-	-	-
CO3	2	3	3	2	-	-	-	-	-	-	-	-
CO4	2	3	3	2	-	-	-	-	-	-	-	-
CO5	2	3	3	3	2	-	-	-	-	-	-	-
CO*	**2.4**	**3**	**3**	**2.25**	**2**	-	-	-	-	-	-	-

Text Books :

1. Compilers-Principles - Techniques and Tools ,2nd edition , Alfred V. Aho - Monica S.Lam - Ravi Sethi - Jeffrey D. Ullman , 2018,Pearson Education.

Reference Books:

1. Compilers-Principles - Techniques and Tools ,2nd edition , Alfred V. Aho - Monica S.Lam - Ravi Sethi - Jeffrey D. Ullman , 2012,Pearson Education
2. Compilers-Principles Techniques and Tools - Low price edition , 2004,Alfred V. Aho - Ravi Sethi - Jeffrey D. Ullman - Pearson Education.
3. Theory of computerscience- Automata Languages and computation , 2nd edition,K.L.P Mishra and N. Chandrashekaran ,2003,PHI.

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III B. TECH I-SEMESTER (CSE)

L	T	P	C
0	0	2	1

18CSE 316 NETWORK SIMULATION LABS

Course Educational Objectives:

CEO1: To understand various network simulator tools and functionalities.
CEO2: To Learn TCL commands.
CEO3: To learn how to create new agent for Communication.
CEO4: To learn how to create new routing protocols for different networks.
CEO5: To analysis the different routing protocols using different tools.

Exercises :

1. Study of Network Simulator Tools.
2. Installation of Network Simulator (NS2).
3. Study of TCL Commands.
4. Write a TCL script to simulate a simple wired network with four nodes.
5. Create a simple TCP scenario with droptail queue mechanism on the gateway.
6. Create a New Agent using C++ and TCL.
7. Create a New protocol for ping using C++ and TCL.
8. Implement Dijkstra‘s algorithm to compute the Shortest path through a graph.
9. Implement Link state routing algorithm to find the shortest distance using link state packets.
10. Write a program for Trace file Analysis using C++ or awk.
11. Write a TCL script to LAN simulation.
12. Write a TCL script to simulate a simple wireless network with DSDV - DSR and AODV routing protocols.
13. Write a TCL script to Simulation of Black Hole Attack.
14. Comparison of different routing protocols performance using Xgraph and Gnuplot.

Mini Project: Create new routing protocols for routing protocol in MANET.

Course Outcomes:

On Successful completion of this course student will be able to:

Course Outcomes		POs related to COs
CO1	Demonstrate knowledge on various network simulator tools and functionalities.	PO1, PO2
CO2	Create different program using TCL commands	PO1, PO2, PO3, PO4
CO3	Demonstrate knowledge on various existing agent and design new agent using TCL and C++ for communication.	PO1, PO2, PO3, PO4
CO4	Demonstrate knowledge on various existing routing protocols and design new routing protocols.	PO1, PO2, PO3, PO4
CO5	Analysis the different routing protocols performance based on number of nodes and speed using different tools.	PO1, PO2, PO3, PO4,

		PO5, PO11

CO-PO Mapping

CO \ PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	2	-	-	-
CO8	-	-	-	-	-	-	-	-	-	2	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO*	**3**	**3**	**3**	**3**	3	-	-	3	2	**2**	-	**3**

Reference Books:

1. Introduction to Network Simulator NS2 , 2/e,Issariyakul, Teerawat, Hossain and Ekram,2012,Springer US.

Reference Website:

1. Network Simulator - http://www.jgyan.com/ns2
2. Network Simulator Tutorial - https://www.isi.edu/nsnam/ns/tutorial/

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III B. TECH I-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	0	**0**	**3**	**2**

18CSE317 UNIX AND SHELL PROGRAMMING LAB

Course Educational Objectives:

CEO1: To understand the concepts of UNIX environment with vi editor.
CEO2: To gain knowledge on appropriate commands to access the UNIX environment.
CEO3: To experience the shell scripting for developing the solutions for complex problems.
CEO4: To manage the file handling procedures in UNIX environment.
CEO5: To develop the UNIX programs by using system calls.

Week-1

Session-1

a)Log into the system
b)Use vi editor to create a file called myfile.txt which contains some text.
c)correct typing errors during creation.
d)Save the file
e)logout of the system

Session-2

a)Log into the system
b)open the file created in session 1
c)Add some text
d)Change some text
e)Delete some text
f)Save the Changes
g)Logout of the system

Week-2

a)Log into the system
b)Use the cat command to create a file containing the following data. Call it mytable use tabsto separate the fields.

1425 Ravi 15.65
4320 Ramu 26.27
6830 Sita 36.15
1450 Raju 21.86

c)Use the cat command to display the file, mytable.
d)Use the vi command to correct any errors in the file, mytable.
e)Use the sort command to sort the file mytable according to the first field. Call the sorted file mytable
f)Print the file mytable
g)Use the cut and paste commands to swap fields 2 and 3 of mytable. Call it mytable
h)Print the new file, mytable
i)Logout of the system.

Week-3

1) a)Login to the system

b)Use the appropriate command to determine your login shell
c)Use the /etc/passwd file to verify the result of step b.
d)Use the who command and redirect the result to a file called myfile1. Use the more command to see the contents of myfile1.
e)Use the date and who commands in sequence (in one line) such that the output of date will display on the screen and the output of who will be redirected to a file called myfile2. Use the more command to check the contents of myfile2.

2) a) Write a sed command that deletes the first character in each line in a file.
b) Write a sed command that deletes the character before the last character in each line in a file.
c) Write a sed command that swaps the first and second words in each line in a file.

Week-4

a)Pipe your /etc/passwd file to awk, and print out the home directory of each user.
b)Develop an interactive grep script that asks for a word and a file name and then tells how many lines contain that word.
c)Repeat
d)Part using awk

Week-5

a)Write a shell script that takes a command –line argument and reports on whether it is directory, a file, or something else.

b)Write a shell script that accepts one or more file name as arguments and converts all of them to uppercase, provided they exist in the current directory.

c)Write a shell script that determines the period for which a specified user is working on the system.

Week-6

a)Write a shell script that accepts a file name starting and ending line numbers as arguments and displays all the lines between the given line numbers.

b) Write a shell script that deletes all lines containing a specified word in one or more files supplied as arguments to it.

Week-7

a) Write a shell script that computes the gross salary of a employee according to the following rules:

i)If basic salary is < 1500 then HRA =10% of the basic and DA =90% of the basic.

ii)If basic salary is >=1500 then HRA =Rs500 and DA=98% of the basic

The basic salary is entered interactively through the key board.

b) Write a shell script that accepts two integers as its arguments and computers the value of first number raised to the power of the second number.

Week-8

a) Write an interactive file-handling shell program. Let it offer the user the choice of copying, removing, renaming, or linking files. Once the user has made a choice, have the program ask the user for the necessary information, such as the file name, new name and so on.

b) Write shell script that takes a login name as command – line argument and reports when that person logs in.

c) Write a shell script which receives two file names as arguments. It should check whether the two file contents are same or not. If they are same then second file should be deleted.

Week-9

a) Write a shell script that displays a list of all the files in the current directory to which the user has read, write and execute permissions.

b) Develop an interactive script that ask for a word and a file name and then tells how many times that word occurred in the file.

c) Write a shell script to perform the following string operations:

i) To extract a sub-string from a given string.

ii) To find the length of a given string.

Week-10

Write a C program that takes one or more file or directory names as command line input and reports the following information on the file:

i)File type

ii)Number of links

iii)Read, write and execute permissions

iv)Time of last access

(Note : Use stat/fstat system calls)

Week-11

Write C programs that simulate the following unix commands: (Use system calls)

a)mv

b)cp

Week-12

Write a C program that simulates ls Command

(Use system calls / directory API)

Course Outcomes:

On successful completion of this course student will be able to:

Course Outcomes		**POs related to COs**
CO1	Demonstrate knowledge on various commands in UNIX	PO1, PO2
CO2	Create different programs using Shell Scripting.	PO1, PO2, PO3, PO4
CO3	Use file handling mechanisms to access the directory and file structures.	PO1, PO2, PO3,
CO4	Develop programs for managing the file permissions	PO1, PO2, PO3,
CO5	Use system calls for simulating the different UNIX commands	PO1, PO2, PO3, PO4, PO5

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CO-PO Mapping

CO \ PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	3	-	-	-
CO8	-	-	-	-	-	-	-	-	-	2	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO*	**3**	**3**	**3**	**3**	**3**	**-**	**-**	3	3	**2**	**-**	**3**

TEXT BOOKS :

1. Introduction to UNIX & SHELL programming, M.G. Venkatesh Murthy, Pearson Education.
2. Unix concepts and applications, Fourth Edition, Sumitabha Das, TMH.
3. Unix for programmers and users, 3rd edition, Gaham Glass & K. Ables, pearson education.
4. Unix and shell Programming –A text book, B.A. Forouzan& R.F. Giberg, Thomson.
5. Beginning shell scripting, E. Foster – Johnson & other, Wile Y- India.

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III B.Tech I Semester

L	T	P	C
0	0	2	1

18SAH311 COMMUNICATION AND SOFT SKILLS LAB

Course Educational Objectives:

CEO1: To expose the students to variety of self instructional, learner friendly modes of language learning.

CEO2: To help the students cultivate the habit of reading passages from the computer monitor.

CEO3: To enable them to learn better pronunciation through Stress, Intonation and Rhythm.

CEO4: To train them to use language effectively to face interviews, group discussions, public speaking.

CEO5: To initiate them into greater use of the computer in resume preparation, report writing.,

List of Exercises:

1. Pronunciation of English words using Phonetic sounds and Symbols.
2. Describing –Objects-People-Situations
3. Stress and Intonation
4. Oral Presentations
5. Functional English
6. Reading Comprehension
7. Vocabulary Building
8. Group Discussion
9. Resume writing and Report writing
10. Interview Skills

Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to COs**
CO1	To remember and understand the different aspects of the English Language proficiency with emphasis on LSRW skills.	PO1
CO2	To analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking by group discussion.	PO2

CO5	Use of modern computing facilities and suitable software tools to improve the communication skills and elocution.	PO5
CO6	Follow the ethical principles to prepare the group tasks	PO8
CO7	Perform exercise individually and also a team to complete the task	PO9
CO8	To apply communication skills through various language learning activities.	P10
CO9	To create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.	P12

Text Books:

1. Lab manual provided by the department.

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III B. TECH II-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	3	**1**	**0**	**3**

18CSE321 DATA MINING AND DATAWAREHOUSING

Course Educational Objectives:

The student should be made to:

CEO1: Gain the knowledge about the basics of data mining and data warehousing concepts, data mining functionalities, and Preprocessing concepts.
CEO1: Understand and implement the data warehouse architecture, different data warehouse schemas
CEO1: Analyze and implement the Association Rules for analyzing the Transactional Databases
CEO1: Study and Implement the major Classification and Clustering Algorithms
CEO1: Study the advanced data mining concepts.

UNIT -1: **(9)**
Introduction: Motivation and Importance of Data Mining - Data Mining - Kind of Data to be mined - Data Mining Functionalities - Kind of patterns to be mined - Classification of Data Mining Systems - Major Issues in Data Mining.
Data Pre-processing: The need for Preprocessing - Data Cleaning - Data Integration and Transformation - Data Reduction - Data Discretization and Concept Hierarchy Generation.

UNIT -2: **(9)**
An Overview: Data Warehouse: Basic Concepts- Data Warehouse Modeling: Data Cube and OLAP- Data Warehouse Design and Usage- Data Warehouse Implementation- Data Generalization by Attribute-Oriented Induction.

UNIT -3: **(9)**
Mining Frequent Patterns, Associations, and Correlations: Basic Concepts - Frequent Itemset Mining Methods- Pattern Evaluation Methods.

UNIT -4: **(9)**
Classification: Basic Concepts- Decision Tree Induction- Bayes Classification Methods- Rule-Based Classification- Advanced Methods: Bayesian Belief Networks- Classification by Back propagation- Support Vector Machines.

Clustering: Clustering Overview - Partitioning Clustering - K-Means and K-Medoids Algorithms - Hierarchical Clustering - Agglomerative Methods and divisive methods - Outlier Detection.

UNIT -5: **(9)**
Advanced Mining: Multimedia Data Mining - Text Mining - Mining the World Wide Web -Data Mining Applications - Social Impacts of Data Mining.

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Course Outcomes:

On Successful completion of this course student will be able to :

Course Outcomes		POs related to COs
CO1	Understand the need and applications of Data Warehouse and Data Mining	PO1, PO2
CO2	Design and Implement the data warehouse by using major data warehouse schemas	PO1, PO3
CO3	Implement Association Rules for analyzing Transactional databases	PO1, PO4
CO4	Understand and Implement major Classification And Clustering Algorithms	PO1, PO4
CO5	Apply the Data mining techniques in real time problems.	PO1, PO2, PO4

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	-	2	-	-	-	-	-	-	-	-	-
CO3	3	-	-	3	-	-	-	-	-	-	-	-
CO4	3	-	-	3	-	-	-	-	-	-	-	-
CO5	3	3	-	3	-	-	-	-	-	-	-	-
CO*	3	3	2	3	-	-	-	-	-	-	-	-

Text books:

1. Data Mining – Concepts and Techniques – Jiawei Han, Micheline Kamber, Morgan Kaufmann Publishers, Elsevier, 3rd Edition, 2011.

Reference Books:

1. Data Mining – Concepts and Techniques – Jiawei Han, Micheline Kamber, Morgan Kaufmann Publishers, Elsevier, 2 Edition, 2006
2. Data Mining Techniques, Arun K Pujari, 3rd Edition, Universities Press.
3. Data Warehouse Fundamentals, PualrajPonnaiah, Wiley Student Edition.
4. Data Mining, VikaramPudi, P Radha Krishna, Oxford University Press

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III B. TECH II-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	2	**1**	**0**	**3**

18CSE322 OBJECT ORIENTED ANALYSIS AND DESIGN USING UML

Course Educational objectives:

CEO1: To study the importance and basics of Object Oriented modeling.
CEO2: To Study the notations of Unified Modeling Language.
CEO3: To identify, analyze, and model structural and behavioral concepts of the system.
CEO4: To model the event driven state of object and transform them into implementation specific layouts.
CEO5: To analyze and design solutions to problems using object oriented approach

UNIT -1: Introduction To OOM (9)

Elements of Object Model - Classes and Objects - Nature of object - Relationships among objects - Nature of a Class - Relationship among Classes - Interplay of Classes and Objects - Importance of Proper Classification - Identifying Classes and Objects - Key abstractions and Mechanisms.

UNIT -2: Introduction To Uml

(9)

Why we model - Conceptual model of UML - Architecture - Classes - Relationships - Common Mechanisms - Class diagrams - Object diagrams.

UNIT -3: Structural And Behavioral Modeling (9)

Advance Classes - Advanced Relationships - Interfaces - Types &Roles - Packages - Interactions - Usecases - Usecase diagrams.

UNIT -4: Advanced Behavioral And Architectural Modeling (9)

Activity diagrams - Events and Signals - Statechart diagrams - Components and Component diagrams - Deployment and Deployment diagrams.

UNIT -5:Case Studies (9)

Analysis and Design of Library management system - Online Railway reservation system using object oriented approach -ATM System-Hospital Management System-E-ticketing.

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Course Outcomes:

On Successful completion of this course the students will be able to:

Course Outcomes		POs related to COs
CO1	Find solutions to the complex problems using object oriented approach	PO1
CO2	Represent classes, responsibilities and states using UML notationand model structural concepts of the system.	PO1, PO3
CO3	Model behavioral concepts of the system and analyze and document the requirements through use case driven approach	PO1, PO2
CO4	Apply the concepts of architectural design for deploying the code for software.	PO1, PO4
CO5	Perform Analysis and Design of application systems	PO1, PO2, PO4

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	3	-	2	-	-	-	-	-	-	-	-	-
CO3	3	3	-	-	-	-	-	-	-	-	-	-
CO4	3	-	-	2	-	-	-	-	-	-	-	-
CO5	3	3	-	3	-	-	-	-	-	-	-	-
CO*	3	3	2	2.5	-	-	-	-	-	-	-	-

Text Books:

1. Object- Oriented Analysis and Design with Applications, 3/e, Grady Booch, 2009,Pearson Education, New Delhi, India.

2. The Unified Modeling Language User Guide, 2/e, Grady Booch, James Rumbaugh and Ivar Jacobson, 2005,Pearson Education, New Delhi, India.

Reference Books:

1. Object- Oriented Analysis and Design with Applications, 2/e, Grady Booch, 2007,Pearson Education, New Delhi, India.
2. Fundamentals of Object Oriented Design in UML, 1/e, Meilir Page, Jones, 1999,Pearson Education, India.

3. Modeling Software Systems Using UML2, 1/e, Pascal Roques, 2010,WILEYDreamtech India Pvt. Ltd.
4. Object Oriented Analysis & Design,1/e, AtulKahate, 2004,TheMcGrawHill Companies, Hyderabad, India.
5. Practical Object Oriented Design with UML, 2/e, Mark Priestley, 2005,TATA McGraw Hill, Hyderabad, India.
6. Object-Oriented Analysis and Design with Applications 3/e, Grady Booch, Robert A. Maksimchuk, Michael W. Engle, Bobbi J. Young, Jim Conallen, Kelli A. Houston,2007,Pearson Education, India.

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III B. TECH II-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	2	**1**	**0**	**3**

18CSE323 **WEB TECHNOLOGIES**

Course Educational Objectives:

CEO1: To understand how to write a valid HTML document involving a variety of element types, including hyperlinks, images, lists, tables, and forms.
CEO2: To analyze how CSS to implement a variety of presentation effects in HTML documents.
CEO3: To develop client-side scripting on web pages to provide interactivity and rapid response to user actions at client side.
CEO4: To understand basics of server side scripting language.
CEO5: To gain knowledge about sending the data from client side to server, creating sessions and interact with database.

UNIT-1: Hypertext Markup Language **(9)**

Introduction: Internet and Web - Introduction to web technologies.
HTML 5: Fundamentals of HTML - Working with text - Organizing text in HTML - Working with links and URLs - Creating Tables - Working with images, Colors and Canvas – Working with Forms - Interactive elements and Working with Multimedia.

UNIT-2: Cascading Style Sheets **(9)**

CSS: Overview of CSS - Backgrounds and Color Gradients in CSS - Fonts and Text Styles - Creating Boxes and Columns Using CSS: Exploring the Box Model - Exploring the Line Box Model - Exploring the Template Layout Model. List Styles -Table Layouts - Effects, Frames and Controls in CSS: Exploring Different Types of Effects in CSS - Creating Frames Using CSS.

UNIT-3: Javascript, JQuery and AJAX **(9)**

Javascript: Overview of JavaScript - JavaScript functions , Events, Image maps and animations - JavaScript objects : Exploring Objects in JavaScript, Exploring the Standard/Built-in JavaScript Objects - Working with browser and document objects.
JQuery: Introduction - JQuery selectors - Methods to access HTML attributes – Events - Introduction to AJAX.

UNIT-4: PHP Fundamentals **(9)**

PHP: Introduction - Data types - Variables - Constants - Expressions - String interpolation - Control structures - Functions – Arrays - Embedding PHP code in web pages - Object Oriented PHP.

UNIT-5: PHP with database **(9)**

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PHP Web forms: PHP and web forms - Sending form data to a server - Working with cookies and session

PHP with MySQL: Interacting with the database -prepared statement - Database transactions.

Course Outcomes:

After completion of this course student will be able to :

	Course Outcomes	**POs related to COs**
CO1	Create web pages using different elements of HTML	PO1,PO2,PO5
CO2	Apply various styles to the HTML elements in web pages using CSS	PO1,PO2,PO3,PO5
CO3	Use client side scripting to make the web pages responsive and interactive.	PO1,PO2,PO3,PO5
CO4	Demonstrate knowledge on basics of server side scripting language: PHP	PO1,PO2,PO3,PO5
CO5	Develop web applications with database interaction	PO1,PO2,PO4,PO5

CO-PO Mapping

PO / CO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**
CO1	3	2	-	-	3	-	-	-	-	-	-	-
CO2	2	3	3	-	3	-	-	-	-	-	-	-
CO3	2	3	3	-	3	-	-	-	-	-	-	-
CO4	2	3	3	-	3	-	-	-	-	-	-	-
CO5	3	3	-	2	3	-	-	-	-	-	-	-
CO*	**2.4**	**2.8**	**3**	**2**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Text books:

1. HTML 5 Black Book: CoversCSS3, JavaScript, XML, XHTML, AJAX, PHP and JQuery, Second Edition, 2016, DreamtechPress,Kogent Learning Solutions Inc.
2. Beginning PHP and MySQL, Fourth Edition,W. Jason Gilmore, 2011,Apress.

Reference Books:

1. The Complete Reference: HTML andCSS, Fifth Edition, Thomas A. Powell, 2010,Tata McGraw Hill.
2. PHP and MySQL, Andrea Tarr, 2012,Willy India,

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III B. TECH II-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	3	**1**	**0**	**3**

18CSE 324 SOFTWARE TESTING METHODOLOGIES

Course Educational Objectives:
CEO1: To understand different testing levels on software models.
CEO2: To Identify structured and unstructured flow graphs and representing path and regular expressions
CEO3: To create control flow graphs from programs and specifying the requirements of complicated transaction flow.
CEO4: To model logic based testing with decision tables and state graphs.
CEO5: To Analyze the testing tools like JMeter or Win Runner.

UNIT-1: Introduction: (9)

Purpose of testing – Dichotomies – Model for testing – consequences of bugs – taxonomy of bugs.

Flow graphs and Path testing: Basic concepts of path testing – predicates - path predicates and achievable paths - path sensitizing - path instrumentation.

UNIT-2: Paths, Path products and Regular expressions (9)

Path Products & Path Expression - Reduction Procedure - Applications - Regular expressions & Flow anomaly detection.

UNIT-3: (9)

Transaction Flow Testing:-transaction flows - transaction flow testing techniques. **Dataflow testing**: Basics of dataflow testing - strategies in dataflow testing.

Domain Testing:-domains and paths - Nice & ugly domains - domain testing.

UNIT-4: (9)

Logic Based Testing: overview - decision tables - path expressions - kv charts - **State, State Graphs and Transition testing:** state graphs - good & bad state graphs - state testing.

UNIT-5: Testing tools: (9)

Win runner – Load runner – Test director –Jmeter – Selenium – Bug zilla – Silk Test

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Course Outcomes:

On successful completion of the course the student will be able to,

Course Outcomes		POs related to COs
CO1	Identify the various bugs and correcting them after knowing the consequences of the bug.	PO1, PO2
CO2	Design the path expression and reduce them very well when needed.	PO1, PO2, PO3
CO3	Perform functional testing using control flow and transaction flow graphs.	PO1, PO2, PO3
CO4	Test logic or an application and identifying the nice and ugly domains.	PO1, PO2, PO3, PO4
CO5	Use appropriate software testing tools, techniques and methods for even more effective systems during both the test planning and test execution phases of a software development project.	PO1, PO2, PO3, PO5, PO9

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	2	3	3	-	-	-	-	-	-	-	-	-
CO3	2	3	3	-	-	-	-	-	-	-	-	-
CO4	2	3	3	3	-	-	-	-	-	-	-	-
CO5	2	3	3	-	3	-	-	-	3	-	-	-
CO*	**2.2**	**3**	**3**	**3**	**3**	**-**	**-**	**-**	**3**	**-**	**-**	**-**

Text Books:

1. "Software Testing Techniques", 2/e, Reprint 2009, BorisBeizer, Dreamtech, New Delhi, India.
2. "Software Testing Tools", 2/e, 2004, Dr.K.V.K.K.Prasad, Dreamtech, New Delhi, India.

Reference Books:

1. "Software Testing Techniques", 2/e, 1990, BarisBeizer, Dreamtech, New Delhi, India.
2. "The craft of software testing", 2/e, 1995, BrianMarick, Pearson Education, New Delhi, India.
3. "Software Testing Techniques", 1/e, 2008 SPD (Oreille), New Delhi, India.
4. "Software Testing in the Real World", 1/e, 2008, Edward Kit, Pearson Education, New Delhi, India.
5. "Effective methods of Software Testing", 3/e, 2000, Perry, John Wiley, India.
6. "Art of Software Testing", 3/e, 2011, Meyers, John Wiley, India.

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III B. TECH II-SEMESTER (CSE)

L	T	P	C
3	0	0	3

18CSE325 ARTIFICIAL INTELLIGENCE

Course Educational Objectives:

The student should be made to:

CEO1: To study the concepts of Artificial Intelligence.
CEO2: To Understandthesearch strategies and Problem solving using Artificial Intelligence.
CEO3: To gain insight information about Logical Agents and Reasoning patterns in propositional logic
CEO4: To analyze and implement the First Order Logic and Knowledge Representation
CEO5: To study the Uncertain Knowledge and Reasoning and Application of Robotics

UNIT -1: Introduction to Artificial Intelligence, Problems, Problem Spaces and Search (9)

The AI Problems - The underlying assumption - The AI technique - The levels of the model - Criteria of success - Some general references - One final word and beyond - Defining the problem as a State space search - Production systems - Problem characteristics - Production system characteristics - Issues in the design of search programs

UNIT -2: Problem Solving, Un-informed Search Strategies, Informed Search and Exploration (9)

Uninformed search strategies - Avoiding repeated states - Informed (Heuristic) search strategies - Heuristic functions - Local search algorithms and optimization problems - Local search in continuous spaces - Backtracking search for CSPs

UNIT -3: Knowledge and Reasoning (9)

Logical agents – Knowledge based agents - The wumpus world – Logic - Propositional logic - a very simple logic - Reasoning patterns in propositional logic - Effective propositional inference - Agents based on propositional logic

UNIT - 4: First-Order Logic, Inference in First-Order Logic, Knowledge Representation (9)

Representation revisited - Syntax and semantic of first order logic - Using first order logic - Knowledge engineering in first order logic - Propositional vs. First order inference - Ontological engineering - Categories and objects - Actions - Situations and Events - The internet shopping world - Reasoning systems for categories - Reasoning with default information - Truth maintenance systems

UNIT - 5: Uncertain Knowledge and Reasoning, Learning, and Robotics (9)

Uncertainty - Acting under uncertainty - Basic probability notation - The axioms of probability - Baye's rule and its use - Learning from observations - Forms of learning - Inductive learning - Learning decision trees. **Robotics:** Introduction-Robot hardware - Robotic perception - Planning to move-Robotic software Architectures - Application Domains

Course Outcomes:
On Successful completion of this course the students will be able to:

Course Outcomes		POs related to COs
CO1	Gain the basic Knowledge about AI technique and Production systems	PO1
CO2	Comprehend the Un informed and Informed Search Strategies.	PO1, PO3
CO3	Analyze and Implement Reasoning patterns in propositional logic	PO1, PO2
CO4	Formulate the Knowledge Representation using First Order Logic	PO1, PO4
CO5	Apply the Robotics for Solving Real world Problems	PO1, PO2, PO4

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	3	-	3	-	-	-	-	-	-	-	-	-
CO3	3	2	-	-	-	-	-	-	-	-	-	-
CO4	3	3	-	-	-	-	-	-	-	-	-	-
CO5	3	3	-	3	-	-	-	-	-	-	-	-
CO*	**3**	**2.8**	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Text Books:

1. Artificial Intelligence A Modern Approach, 3/e, Stuart Russell and Peter Norvig, 2016, Pearson Education, New Delhi, India.
2. Artificial Intelligence, 3/e, Elaine Rich, Kevin Knight and Shiva Shankar B Nair, 2004, Tata McGraw Hill, Hyderabad, India.

Reference Books:

1. Artificial Intelligence A Modern Approach, 2/e, Stuart Russell and Peter Norvig, 2003, Pearson Education, New Delhi, India.

2. Artificial Intelligence Structures and Strategies for Complex Problem Solving, 5/e, George F. Luther, 2005, Pearson Education, New Delhi, India.
3. Introduction to Artificial Intelligence, 1/e, Eugene Charniak and Drew McDermott, 1985,Pearson Education, New Delhi, India.
4. Artificial Intelligence: The Basics, 1/e, Kevin Warwick, 2012, Wearset ltd, Boldon.
5. Introduction to Artificial Intelligence, 2/e, Philip C. Jackson, 1985, Dover Publications, New York, USA.
6. Our Final Invention: Artificial Intelligence and the End of the Human Era, 1/e, James Barrat, 2013,Thomas Dunne Books, New York, USA.

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III B.Tech II Semester

L	T	P	C
3	0	0	3

18OSAH321 MATHEMATICAL MODELLING - ANALYSIS AND APPLICATIONS
(OPEN ELECTIVE-I)

Course Educational Objectives:

1. The course is designed to equip the students with the necessary mathematical skills and techniques that are essential for an engineering course.
2. To learn the need and techniques of mathematical modeling, to design mathematical models through trigonometry and calculus.
3. To understand, familiarize the knowledge of the significance of ordinary differential equations of second order based mathematical models through linear.
4. To explore the practical utility of mathematical models through linear programming including transportation and assignment models.
5. To learn the concepts of Partial differential equations and its nature. To explore the knowledge on practical utility of mathematical models through mass balance equations and momentum balance equations

UNIT – 1: INTRODUCTION (9)

The technique of mathematical modeling – Classification of mathematical models – Some characteristics of mathematical models – Mathematical modeling through trigonometry, calculus – Limitations of mathematical modeling.

UNIT – 2: MATHEMATICAL MODELLING THROUGH ORDINARY DIFFERENTIAL EQUATIONS OF SECOND ORDER (9)

Mathematical Modeling of planetary motions, circular motion and motion of satellites – Mathematical Modeling through linear differential equations of second order.

UNIT – 3: MATHEMATICAL MODELING THROUGH LINEAR PROGRAMMING (9)

Mathematical modeling through linear programming – Graphical method – Simplex method – Transportation – Assignment models.

UNIT – 4: MATHEMATICAL MODELING THROUGH DIFFERENCE EQUATIONS (9)

The need for mathematical modeling through difference equations: some simple models – Basic theory of linear difference equations with constant coefficients – Solution by Z-transformation – Mathematical modeling through difference equations in probability theory.

UNIT – 5: MATHEMATICAL MODELING THROUGH PARTIAL DIFFERENTIAL EQUATIONS (9)

Mass-Balance Equations: The first method of getting PDE models – Momentum-balance equations: The second method of obtaining PDE Models – Nature of partial differential equations.

TOTAL: 45 HOURS

Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to COs**
CO1	Acquire knowledge in necessity and techniques of mathematical modeling, to develop analytical and designing skills in mathematical models through trigonometry and calculus.	**PO1,PO2,PO3 PO4**
CO2	Demonstrate knowledge in Ordinary differential equations of second order, mathematical modeling through differential equations, and Develop analytical skills in modeling geometrical problems through Ordinary differential equations of second order	**PO1,PO2,PO3 PO4**
CO3	Demonstrate knowledge in Linear programming and various techniques including Graphical method and Simplex method. Develop analytical and designing skills in modeling and solving Transportation and assignment models	**PO1,PO2,PO3 PO4**
CO4	Acquire knowledge in difference equations, theory of difference equations with constant coefficients. Develop designing and analytical skills in modeling and solving mathematical models difference equations in probability theory.	**PO1,PO2,PO3 PO4**
CO5	Acquire knowledge in partial differential equations and develop designing and analytical skills in modeling and solving mathematical models through Mass-Balance equations and Momentum-Balance equations	**PO1,PO2,PO3 PO4**

Text Books:

1. Mathematical Modelling, J.N. Kapur, New Age International (P) Limited Publishers, New Delhi
2. Advanced Engineering Mathematics, Kreysig, , John Wiley, NewYork, 1999.

Reference Books:

1. Principles of Mathematical Modelling (2004)-Clive L. Dyne, Elsevier Publication
2. Mathematical Modelling – A case study approach , R Illner, C Sean Bohun, S McCollum, T van Roode, AMS publication, 2005
3. Mathematical Modelling , D N P Murthy, N W Page, E Y Rodin, Pergamon Press,1990
4. OR Theory & Applications, J.K. Sharma , Mac Milian India Ltd., 1998
5. Mathematical Modelling(A Comprehensive Introduction), Gerhard Dangelmayr and Michael Kirby, Prentice Hall,New Jersey

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	3	3	3	2	-	-	-	-	-	-	-	-
CO.2	3	3	3	2	-	-	-	-	-	-	-	-

CO.3	3	3	3	2	-	-	-	-	-	-	-	-
CO.4	3	3	3	2	-	-	-	-	-	-	-	-
CO.5	3	3	3	2	-	-	-	-	-	-	-	-
CO*	**3**	**3**	**3**	2	-	-	-	-	-	-	-	-

III B.Tech II Semester

L	**T**	**P**	**C**
3	**0**	**0**	**3**

18OSAH322 BUSINESS COMMUNICATION AND CAREER SKILLS
(OPEN ELECTIVE-I)

Course Educational Objectives:

1. To enhance the communication skills.
2. To enable students to understand the nuances of corporate communication
3. To develop the writing skills for business purposes
4. To develop the presentation skills for corporate situations.
5. To enable students to manage interviews successfully.

UNIT – 1: NATURE AND SCOPE OF COMMUNICATION (9)

Introduction: Functions of Communication – Roles of a Manager – Communication Basics – Communication Networks – Informal Communication – Interpersonal Communication –Communication Barriers.

UNIT – 2: CORPORATE COMMUNICATION (9)

Introduction: What is Corporate Communication? – Corporate Citizenship and Social Responsibility – Corporate Communication Strategy – Crisis Management/Communication – Cross-Cultural Communication.

UNIT – 3: WRITING BUSINESS DOCUMENTS (9)

Introduction: Importance of Written Business Communication, Types of Business Messages – Five Main Stages of Writing Business Messages – Business Letter Writing - Email writing skills – Effective Business Correspondence – Common Components of Business Letters – Strategies for Writing the Body of a Letter- Business Communication and different cultures.

UNIT – 4: CAREERS AND RESUMES (9)

Introduction – Career Building – Business Presentations and Speeches – Resume Formats – Traditional, Electronic and Video Resumes – Sending Resumes – Follow-up Letters – Online Recruitment Process.

UNIT – 5: INTERVIEWS (9)

Introduction – Fundamental Principles of Interviewing – General Preparation for an Interview – Success in an Interview – Types of Interviewing Questions – Important Non-verbal Aspects – Types of Interviews – Styles of Interviewing.

TOTAL: 45 HOURS

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Course Outcomes:

On successful completion of the course, Students will be able to		POs related to COs
CO1	Explain the concept of communication, its methods and types.	**PO10, PO12**
CO2	Demonstrate knowledge of Corporate Communication	**PO10, PO11**
CO3	Apply written and oral communication techniques in preparing and presenting various documents in technical writing.	**PO10,PO11, PO12**
CO4	Exhibit the presentation skills in business situations	**PO10,PO12**
CO5	Apply verbal and nonverbal aspects in the most appropriate way in interviews	**PO10, PO12**

Text Book:

1. Meenakshi Raman and Prakash, Singh Business Communication, Oxford University Press, New Delhi, Second Edition, 2012.

Reference Books:

1.Neera Jain and Sharma Mukherji, Effective Business Communication, Tata Mc Graw-Hill Education, Pvt. Ltd., New Delhi, 2012.
2. Courtland L.Bovee et al., Business Communication Today, Pearson, New Delhi, 2011.
3. Krizan, Effective Business Communication, Cengage Learning, New Delhi, 2010.
4. R.K. Madhukar, Business Communication, Vikas Publishing House Pvt. Ltd., New Delhi, 2005.

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	-	-	-	-	-		-			3	-	2
CO.2	-	-	-	-	-		-			3	2	-
CO.3	-	-	-	-	-		-			3	2	2
CO.4	-	-	-	-	-		-			3	-	2
CO.5	-	-	-	-	-		-			3	-	2
CO*	**-**	**-**	**-**	**-**	**-**		**-**			**3**	**2**	**2**

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L	T	P	C
3	0	0	3

18OSAH323 LASERS AND FIBER OPTICS
(OPEN ELECTIVE-I)

Course Educational Objectives:

1. To acquire knowledge on fundamentals of LASERS
2. To study the working of different types of LASERS
3. To develop knowledge on applications of LASERS in various fields
4. To gain knowledge in fundamentals of Optical fiber, construction, types and attenuations
5. To develop knowledge on applications of Optical fibers in various fields

UNIT – 1: LASER INTRODUCTION (9)

Introduction- Spontaneous and stimulated emission of radiation- Properties of lasers (monochromacity, directionality, coherence and brightness) - Conditions for laser action: population inversion- Pumping and different pumping mechanisms- Einstein coefficients and relation among the coefficients.

UNIT – 2: TYPES OF LASERS (9)

Types of Lasers: Nd-YAG laser- He:Ne laser- Semiconductor laser(GaAs)- Argon Ion Laser-CO2 Laser.

UNIT – 3: APPLICATIONS OF LASERS (9)

Lasers in Holography- Laser in fusion reaction- Lasers in Raman spectroscopy- Lasers in industry - Lasers in isotope separation- Lasers in medicine.

UNIT – 4: OPTICAL FIBERS (9)

Introduction- Construction of fiber – Working principle of optical fiber (total internal reflection)- Propagation of light through the fibers- Numerical aperture , Acceptance angle and Acceptance cone - Fiber types: Refractive index profile and ray propagation-Step and graded index fibers -Attenuation in fibers: Attenuation coefficient and different loss mechanisms.

UNIT – 5: APPLICATIONS OF FIBERS (9)

Fiber optic communication system(block diagram)- Sensing applications of fibers: Pressure sensor, Liquid level sensor, Displacement sensor, Chemical sensor – Optical fibers in medicine (endoscopes) - Optical fibers in computer networks (block diagram).

TOTAL: 45 HOURS

Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to COs**
CO1	Acquire the basic knowledge on LASERS	**PO1, PO12**
CO2	Understand different types of LASERS	**PO1, PO12**
CO3	Develop knowledge on different applications of LASERS	**PO1, PO12**
CO4	Acquire the basic knowledge on Optical Fibers	**PO1,PO12**

CO5	Develop knowledge on different applications of Optical Fibers	**PO1,PO12**

Reference Books:

1 .Lasers Theory and Applications By K.Thyagarajan and A.K.Ghatak: Macmillan India Limited, New Delhi.,
2.Lasers And non-Linear Opics, second edition, By BBLaud. NewAge International(P) limited,Publishers,New Delhi,
3. An Introduction to Fiber Optic Systems ,Second Edition,By John Powers,Richard D Irwin ,a Times Mirror Higher education,Inc Company,USA,
4. Physics for Engineers - M.R.Srinivasan , New Age International, 2009

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	-	-	-	-	-	-	-	-	-	-	1
CO.2	3	-	-	-	-	-	-	-	-	-	-	1
CO.3	3	-	-	-	-	-	-	-	-	-	-	1
CO.4	3	-	-	-	-	-	-	-	-	-	-	1
CO.5	3	-	-	-	-	-	-	-	-	-	-	1
CO*	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	1

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L	T	P	C
3	0	0	3

18OCIV321 CONSTRUCTION AND PROJECT MANAGEMENT
(OPEN ELECTIVE-I)

Course Educational Objectives:

1. To study the fundamentals of construction technology
2. To study the earth work methods
3. To study the concepts of project management and milestones
4. To study the concept of elements of network and development of network
5. To study the concept of network analysis

UNIT – 1: FUNDAMENTALS OF CONSTRUCTION TECHNOLOGY (9)

Definitions and Discussion – Construction Activities – Construction Processes - Construction Works – Construction Estimating – Construction Schedule – Productivity and Mechanized Construction – Construction Documents – Construction Records – Quality – Safety – Codes and Regulations

UNIT – 2: EARTHWORK (9)

Classification of Soils – Project Site – Development – Setting Out - Mechanized Excavation – Groundwater Control – Trenchless (No-dig) Technology – Grading – Dredging. Excavation By Blasting: Rock Excavation – Basic Mechanics of Breakage – Blasting Theory – Drillability of Rocks – Kinds of Drilling – Selection of the Drilling Method and Equipment – Explosives – Blasting Patterns and Firing Sequence – Smooth Blasting – Environmental Effect of Blasting.

UNIT – 3: PROJECT MANAGEMENT AND BAR CHARTS AND MILESTONE CHART (9)

Introduction – Project planning – Scheduling – Controlling – Role of decision in project management – Techniques for analyzing alternatives Operation research – Methods of planning and programming problems Development of bar chart – Illustrative examples – Shortcomings of bar charts and remedial measures – Milestone charts – Development of PERT network problems.

UNIT – 4: ELEMENTS AND DEVELOPMENT OF NETWORK (9)

Introduction – Event – Activity – Dummy – Network rules – Graphical guidelines for network – Common partial situations in network – Numbering the events – Cycles Problems – Planning for network construction – Modes of network construction – Steps in development of network – Work breakdown structure –Hierarchies – Illustrative examples – Problems.

UNIT – 5: NETWORK ANALYSIS (9)

CPM : process – CPM : Networks – Activity time estimate – Earliest event time – Latest allowable occurrence time – Combined tabular computations for TE and TL - Start and finish times of activity – Float – Critical activities and critical path – Illustrative examples Problems.

TOTAL: 45 HOURS

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Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to COs**
CO1	Apply theoretical and practical aspects of project management techniques to achieve project goals.	**PO1,PO3**
CO2	Exhibit organizational and leadership capabilities for effective management of construction projects.	**PO2,PO3**
CO3	Apply knowledge and skills of modern construction practices and techniques.	**PO2,PO5, P11**
CO4	Demonstrate the basic of project management	**PO2 PO4**
CO5	Develop the network for construction projects and examine the critical path	**PO2,PO3**

Text Books:

1. Construction Technology by SubirK.Sarkar and SubhajitSaraswati – Oxford Higher Education-Univ.Press, Delhi.
2. Project Planning and Control with PERT and CPM by Dr.B.C.Punmia, K.K.Khandelwal, Lakshmi Publications New Delhi.
3. Construction project management by Jha, Pearson pubilications, New Delhi

Reference Books:

1. Optimal design of water distribution networks P.R.Bhave, Narosa Publishing house 2003.
2. Total Project management, the Indian context- by: P.K.Joy- Mac Millan Publishers India Limited.

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	1	-	3	-		-	-	-	-	-	-	-
CO.2	-	2	3	-		-	-	-	-	-	-	-
CO.3	-	2	-	-	2	-	-	-	-	-	1	-
CO.4	-	2	-	2		-	-	-	-	-	-	-
CO.5	-	2	2			-	-	-	-	-	-	-
CO*	**1**	**2**	**2.6**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**1**	**-**

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L	T	P	C
3	0	0	3

18OCIV322 REMOTE SENSING AND GIS
(OPEN ELECTIVE-I)

Course Educational Objectives:

1. To know the basics, importance, analysis and applications of RS and GIS
2. To study the various types of operating systems of RS and GIS
3. To know the applications of RS and GIS

UNIT – 1: INTRODUCTION TO REMOTE SENSING (10)

Concept and scope of remote sensing: Definitions, Process and Characteristics of Remote Sensing System, Advantages and limitations. **Concept of electromagnetic radiation (EMR):** Wavelength-frequency-energy relationship of EMR, EMR Spectrum and its properties, EMR wavelength regions and their applications, Spectral signatures. **Energy interaction in the atmosphere and with earth surface features:** Scattering, absorption, transmission, atmospheric windows Spectral Reflectance Curve, Concept of signatures.

UNIT – 2: PLATFORMS AND SENSORS (12)

Introduction: Sensor materials, Sensor System - Framing and Scanning System, Whiskbroom scanners, Push-broom scanners. **Types and characteristics of sensor:** Imaging and non-imaging sensors, Active and passive sensors, Resolution of Sensors - Spectral, Spatial, Radiometric & Temporal, Scale, Mapping unit, Multi-band concepts and False Colour Composites. **Remote sensor platforms and satellite orbits:** Ground, Airborne and Space borne Platforms, Orbital Characteristics – Coverage, Passes, Pointing Accuracy, Geostationary, Sun synchronous, shuttle orbit. **Space imaging satellites:** Early history of space imaging; Multispectral and Hyperspectral sensors, Radar, Lidar; Specification of some popular satellites – IRS, Landsat and SPOT series; High resolution satellites – IKONOS, Cartosat, Quick bird, Orb View, Geo Eye, Pléiades, World View; Other latest earth resource satellites.

UNIT – 3: REMOTE SENSING APPLICATIONS (9)

Scope of Remote Sensing Applications - Potentials and Limitations. Applications in land use and land cover analysis. Resource evaluation - Soils, forest and agriculture. Water Resource Applications - Mapping, monitoring of surface water bodies, tanks, lakes/reservoirs. Environmental applications.

UNIT – 4: GEOGRAPHIC INFORMATION SYSTEM (7)

Basic Concepts: Definition of GIS, Components of GIS, Variables - points, lines, polygon, Functionality of GIS, Areas of GIS application, Advantage and Limitation of GIS

UNIT – 5: GIS DATA (9)

Spatial and Attribute Data, Information Organization and Data Structures – Raster and Vector data structures, Data file and database. **Creating GIS Database**: GIS Software's, file organization and formats, Geo-database, Database model, Rectification, Digitization and Map Composition

TOTAL: 45 HOURS

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Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to COs**
CO1	Explain the principles and applications of Remote Sensing and various types of platforms used in Remote Sensing.	**PO1, PO2, PO3,**
CO2	Understand the principles of remote sensing and digital image processing;	**PO1**
CO3	Understand the principles of geographic information systems (GIS)	**PO1, PO2, PO4,**
CO4	Demonstrate the applications of remote sensing and GIS to solving problems in the environmental and life sciences;	**PO1, PO3**
CO5	Demonstrate the use of image processing and GIS software	**PO3**

Text Books:

1. Text Book of Remote Sensing and Geographic Information System, M. Anji Reddy, BS Publication.
2. Concepts and Techniques of GIS, Lo C.P. &Yeung A.K.W., Prentice-Hall of India, New Delhi, 2004

Reference Books:

1. Remote sensing and Geographic Information System, B.Bhatta, Oxford Publications.
2. Introduction to Geographical Information System, Siddiqui, M.A., ShardaPustak , Bhavan, Allahabad, 2006
3. Principles of Remote Sensing, Curran, Paul J, Longman, London, 1985.
4. Data User Handbook, NRSA, IRS, Hyderabad

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	1	2	2	-	-	-	-	-	-	-	-	-
CO.2	3	-	-	-	-	-	-	-	-	-	-	-
CO.3	1	2	-	2	-	-	-	-	-	-	-	-
CO.4	1	-	2	-	-	-	-	-	-	-	-	-
CO.5	-	-	2	-	-	-	-	-	-	-	-	-
CO*	**1.5**	**2**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

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L	T	P	C
3	0	0	3

18OCIV323 GREEN BUILDINGS AND ENERGY CONSERVATION
(OPEN ELECTIVE-I)

Course Educational Objectives:

1. To introduces green building concepts.
2. To explain the design process of green buildings
3. To teach the thermal flow in buildings
4. To demonstrate the materials required .for green house construction
5. To analyze the costs involved in green buildings

UNIT – 1: GREEN BUILDING CONCEPTS (9)

Orientation – Introduction to bioclimatic architecture, sustainability in building science functional planning – Elements of building design and drawing, regulations and bylaws –Traditional Vs vernacular architecture – Climate zones, design charts, sun path diagram, solar angles, indices of thermal comfort, vernacular buildings in different climate zones.

UNIT – 2: CLIMATE RESPONSIVE SCIENTIFIC PROCESS OF DESIGN (9)

Introduction, various steps, site planning , plan form building envelope landform, topography, vegetation, water bodies; orientation, S/V ratio, P/A ratio, walls, fenestration, roof and floors active Vs passive, passive solar architecture.

UNIT – 3: THERMAL FLOW IN BUILDINGS (9)

Calculation of thermal conductance, heat flow through different building elements; various software ventilation and day lighting – Design and placement of openings – Water management in buildings techniques to recycle, reuse and harvest water.

UNIT – 4: GREEN BUILDING MATERIALS AND CONSTRUCTION (9)

Material properties, energy efficiency using various materials, emerging new materials construction techniques – Techniques for roof, wall and foundations.

UNIT – 5: ECONOMY OF GREEN BUILDING (9)

Cost of building, operation and maintenance – Green building rating system, evaluation criteria of LEED, TERI GRIHA case studies, and case studies in different climate zones.

TOTAL: 45 HOURS

Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to COs**
CO1	Explain the green building concepts	**PO1**
CO2	explain the design process of green buildings	**PO1**
CO3	Demonstrate the thermal flow in buildings	**PO1, PO2**
CO4	Demonstrate the materials required .for green house construction	**PO1,**
CO5	Identify the costs involved in green buildings	**PO1**

Text Books:

1. Climate Responsive Architecture, A Design Handbook For Energy Efficient Buildings, Krishnan, A., Baker, N., Yannas, S., and Szokolay, S., Eds., 2001, Tata McGraw–HillPublishing Company, New Delhi.
2. Sustainable building design manual (Vol.II), TERI & ICAEN (InstitutCataladEnergia), 2004, The Energy and Resources Institute (TERI) Press, New Delhi.

Reference Books:

1. Bureau of Indian Standards, SP:41, Handbook on Functional Requirements of Buildings (Other Than Industrial Buildings) 1/e rp,1995, Bureau of Indian Standards, New Delhi.
2. Indian Green Building Council, LEED-India, 2011, LEED 2011 for India- Green building Rating system, abridged reference guide for new construction and major renovations (LEED India NC). Hyderabad: Indian Green Building Council.
3. Manual of Tropical Housing and Building, Koenigsberger, O., ingersoll, T. G., Mayhew, A., &Skozolay, S. V., 2011, Universities Press, Hyderabad.
4. Building Design and Drawing, Prabhu, Balagopal T S, K Vincent Paul, and C Vijayan, 2008, Calicut:Spades Publishers.

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	-	-	-	-	-	-	-	-	-	-	-
CO.2	3	-	-	-	-	-	-	-	-	-	-	-
CO.3	3	2	-	-	-	-	-	-	-	-	-	-
CO.4	3	-	-	-	-	-	-	-	-	-	-	-
CO.5	3	-	-	-	-	-	-	-	-	-	-	-
CO*	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

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L	T	P	C
3	0	0	3

18OEEE321 SCADA SYSTEM AND APPLICATIONS
(OPEN ELECTIVE-I)

Course Educational Objectives

1. To understand the fundamentals of SCADA.
2. To analyze the SCADA Components, Communication, Monitoring and Control
3. To analyze the application of SCADA in power System
4. Understand the Energy efficient motors and power factor improvement.
5. Know the concept Energy Measuring Instruments.

UNIT – 1: INTRODUCTION TO SCADA (9)

Evolution of SCADA, SCADA definitions, SCADA Functional requirements and Components, SCADA Hierarchical concept, SCADA architecture, General features, SCADA Applications, Benefits.

UNIT – 2: SCADA SYSTEM COMPONENTS (9)

Remote Terminal Unit (RTU), Interface units, Human- Machine Interface Units (HMI), Display Monitors/Data Logger Systems, Intelligent Electronic Devices (IED), Communication Network, SCADA Server, SCADA Control systems and Control panels.

UNIT – 3: SCADA COMMUNICATION (10)

SCADA Communication requirements, Communication protocols: Past, Present and Future, Structure of a SCADA Communications Protocol, Comparison of various communication protocols, IEC61850 based communication architecture, Communication media like Fiber optic, PLCC etc. Interface provisions and communication extensions, synchronization with NCC, DCC.

UNIT – 4: SCADA MONITORING AND CONTROL (8)

Online monitoring the event and alarm system, trends and reports, Blocking list, Event disturbance recording. Control function: Station control, bay control, breaker control and disconnector control.

UNIT – 5: SCADA APPLICATIONS IN POWER SYSTEM
(9)

Applications in Generation, Transmission and Distribution sector, Substation SCADA system Functional description, System specification, System selection such as Substation configuration, IEC61850 ring configuration, SAS cubicle concepts, gateway interoperability list, signal naming concept. System Installation, Testing and Commissioning.

TOTAL: 45 HOURS

Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to COs**
CO1	Explain the fundamentals of SCADA.	**PO1, PO2.**
CO2	Describe the system components of SCADA	**PO1,PO2**
CO3	Elucidate the SCADA communication	**PO1,PO2**
CO4	Acquire knowledge on the monitoring and control of SCADA	**PO1,PO2**

CO5	Describe the applications of SCADA in power system.	**PO1**

Text Books:

1. Stuart A. Boyer: SCADA-Supervisory Control and Data Acquisition, Instrument Society of America Publications, USA.

Reference Books:

1. Gordon Clarke, Deon Reynders: Practical Modern SCADA Protocols: DNP3, 60870.5 and Related Systems, Newness Publications, Oxford, UK, 2004.
2. William T. Shaw, Cybersecurity for SCADA systems, PennWell Books, 2006

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	2	-	-	-	-	-	-	-	-	-	-
CO.2	2	3	-	-	-	-	-	-	-	-	-	-
CO.3	3	2	-	-	-	-	-	-	-	-	-	-
CO.4	3	3	-	-	-	-	-	-	-	-	-	-
CO.5	3	3	-	-	-	-	-	-	-	-	-	-
CO*	**2.8**	**2.6**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
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III B.Tech II Semester

L	T	P	C
3	0	0	3

18OEEE322 SERVICING OF ELECTRICAL APPLIANCES
(OPEN ELECTIVE-I)

Course Educational Objectives:

1. To learn the servicing of various Electrical appliances.
2. To understand the importance of Earthing for safe operation
3. To Know the concept of different electrical appliances
4. To understand the concept of Protection devices
5. To know the concept of Electrical Safety

UNIT – 1: INTRODUCTION (9)

Introduction to electrical appliances-Importance of electrical wiring – Principle of domestic wiring-Wiring system using casing & capping, PVC, and concealed system- wiring connections: tube light wiring, staircase wiring, house wiring.

UNIT – 2: TESTING AND FAULT IDENTIFICATION OF LOW POWER APPLIANCES (9)

Maintenance and repair of domestic equipments - electric iron box- - ceiling fan - electric kettle, Heater/immersion heater-washing machine- grinder-mixer.

UNIT – 3: SERVICING OF HIGH POWER APPLIANCES (9)

Testing of different electrical appliances-geyser-hot plates-pumps– induction stove- refrigerator etc.

UNIT – 4: PROTECTION DEVICES AND TESTING EQUIPMENTS (9)

Study of fuses- Contactors-Circuit Breakers- Relays - Measurement of voltage, current and resistance using multi meter and Clamp meter - Usage of continuity tester- line tester - test lamp.

UNIT – 5: PRACTICE ON EARTHING AND ELECTRICAL SAFETY (9)

Basic principles of earthing-different methods of earthing-importance of earthing- fundamental of safe installation of equipments – precautions & prevention of electrical shock- Types of Shocks - first Aid.

TOTAL: 45 HOURS

Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to COs**
CO1	Understand the fundamental concepts of Electrical appliances.	**PO1,PO2,PO3,PO12**
CO2	Apply the concept to trace and identify the fault in low power appliances.	**PO1,PO2,PO3,PO12**
CO3	Apply the concept to trace and identify the fault in power appliances	**PO1,PO2,PO3,PO12**
CO4	Illustrate the concept of protective devices and measuring instruments.	**PO1,PO2,PO3,PO12**
CO5	Understand the importance of earthing for safe operations and Analyze any electrical connection and rectify the fault	**PO1,PO2,PO3,PO12**

Text Books:

1. Troubleshooting and Repairing Commercial Electrical Equipment by David Herres, Mc Graw Hill Publications, 2013
2. Elements of Induction Heating design and control application by S. Zinn, S. L. Semiatin, ASM International Publications.

Reference Books:

1. Elstan A. Fernandez, Marine Electrical technology.
2. Electrical Safety, Fire Safety Engineering and Safety Management by S. Rao, R.K. Jain, H.L. Saluja

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	2	2	-	-	-	-	-	-	-	-	2
CO.2	3	2	2	-	-	-	-	-	-	-	-	2
CO.3	3	2	2	-	-	-	-	-	-	-	-	2
CO.4	3	2	2	-	-	-	-	-	-	-	-	2
CO.5	3	2	2	-	-	-	-	-	-	-	-	2
CO*	**3**	**2**	**2**	-	-	-	-	-	-	-	-	**2**

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L	T	P	C
3	0	0	3

18OEEE323 POWER SYSTEM REFORMS
(OPEN ELECTIVE-1)

Course Educational Objectives:

1. To study fundamentals of power system deregulation and restructuring.
2. To study available transfer capability.
3. To study congestion management
4. To study various electricity pricing methods.
5. To study operation of power system in deregulated environment.

UNIT – 1: OVER VIEW OF KEY ISSUES IN ELECTRIC UTILITIES (9)

Introduction – Restructuring models – Independent system operator (ISO) – Power Exchange– Market operations – Market Power – Standard cost – Transmission Pricing – Congestion Pricing – Management of Inter zonal/Intra zonal Congestion.

UNIT – 2: AVAILABLE TRANSFER CAPABILITY (ATC) (9)

Structure of OASIS – Processing of Information – Transfer capability on OASIS –Definitions Transfer Capability Issues – ATC – TTC – TRM – CBM calculations –Methodologies to calculate ATC.

UNIT – 3: CONGESTION MANAGEMENT (9)

Introduction to congestion management – Methods to relieve congestion

UNIT – 4: ELECTRICITY PRICING (9)

Introduction – Electricity price volatility electricity price indexes – Challenges to electricity pricing – Construction of forward price curves – Short–time price forecasting.

UNIT – 5: POWER SYSTEM OPERATION IN COMPETITIVE ENVIRONMENT (9)

Introduction – Operational planning activities of ISO – The ISO in pool markets – The ISO in bilateral markets – Operational planning activities of a GENCO.

TOTAL: 45 HOURS

Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to COs**
CO1	Will understand importance of power system deregulation and restructuring.	**PO1,PO2,PO3**
CO2	Able to compute Available Transfer Capability**.**	**PO1,PO2,PO3,**
CO3	Will understand transmission congestion management.	**PO1,PO2, PO3**
CO4	Able to compute electricity pricing in deregulated environment.	**PO1,PO2,PO3**
CO5	Will be able to understand power system operation in deregulated environment.	**PO1,PO2,PO3**

Text Books:

1. Kankar Bhattacharya, Math H.J. Boller, JaapE.Daalder, 'Operation of Restructured Power System' Kluver Academic Publisher – 2001.
2. Mohammad Shahidehpour, and Muwaffaqalomoush, – "Restructured electrical Power systems" Marcel Dekker, Inc. 2001

Reference Books:

1. Loi Lei Lai; "Power system Restructuring and Deregulation", Jhon Wiley & Sons Ltd., England.
2. Electrical Power Distribution Case studies from Distribution reform, upgrades and Management (DRUM) Program, by USAID/India, TMH

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	2	2	-	-	-	-	-	-	-	-	2
CO.2	3	2	2	-	-	-	-	-	-	-	-	2
CO.3	3	2	2	-	-	-	-	-	-	-	-	2
CO.4	3	2	2	-	-	-	-	-	-	-	-	2
CO.5	3	2	2	-	-	-	-	-	-	-	-	2
CO*	**3**	**2**	**2**	-	-	-	-	-	-	-	-	**2**

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L	T	P	C
3	0	0	3

18OECE321 MACHINE VISION SYSTEM
(OPEN ELECTIVE-I)

Course Educational Objectives:

1. To introduce theory, applications and techniques of machine vision to students
2. Provide the students with an understanding of the problems involved in the development of machine vision systems.
3. Introduces the "low-level" algorithms of image processing that are necessary for the "mid-level" vision or feature extraction.
4. To describe and analyze the pattern recognition, and 3D analysis and modeling of objects and scenes.
5. Tolay emphasis on the practical integration of machine vision systems, and the related applications in real time.

UNIT – 1: INTRODUCTION (9)

Human vision – Machine vision and Computer vision – Benefits of machine vision - Block diagram and function of machine vision system implementation of industrial machine vision system – Physics of Light – Interactions of light – Refraction at a spherical surface – Thin Lens Equation.

UNIT – 2: IMAGE ACQUISITION (9)

Scene constraints – Lighting parameters – Lighting sources, Selection – Lighting Techniques – Types and Selection – Machine Vision Lenses and Optical Filters, Specifications and Selection – Imaging Sensors – CCD and CMOS, Specifications – Interface Architectures – Analog and Digital Cameras – Digital Camera Interfaces – Camera Computer Interfaces, Specifications and Selection – Geometrical Image formation models – Camera Calibration, line and progressive scan.

UNIT – 3: IMAGE PROCESSING` (9)

Machine Vision Software – Fundamentals of Digital Image – Image Acquisition Modes – Image Processing in Spatial and Frequency Domain – Point Operation, Thresholding, Grayscale Stretching – Neighborhood Operations, Image Smoothing and Sharpening – Edge Detection – Binary Morphology.

UNIT – 4: IMAGE ANALYSIS (9)

Feature extraction – Region Features, Shape and Size features – Texture Analysis – Template Matching and Classification – 3D Machine Vision Techniques – Decision Making.

UNIT – 5: MACHINE VISION APPLICATIONS (9)

Machine vision applications in manufacturing, electronics, printing, pharmaceutical, textile, applications in non-visible spectrum, metrology and gauging, OCR and OCV, vision guided robotics – Field and Service Applications – Agricultural, and Bio medical field, augmented reality, surveillance, bio-metrics, automobile industries, Food packaging industry, research and aeronautics.

TOTAL: 45 HOURS

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Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to COs**
CO1	Formulate the concepts of machine vision system and its applications	**PO1, PO2**
CO2	Determine the geometrical image formation model and analyze the lighting effects for image acquisition	**PO1,PO2**
CO3	Demonstrate various the image acquisition and processing techniques in spatial and frequency domain	**PO1, PO2,PO3**
CO4	Analyze the digital image for feature extraction and 3D vision techniques for decision making.	**PO1, PO2,PO3, PO4**
CO5	Apply machine vision concepts and visual sensing technologies in real time applications	**PO1, PO2**

Text Books:

1. Handbook of Machine Vision, First Edition, Alexander Hornberg,2006, Wiley VCH.
2. Machine Vision Theory, Algorithms and Practicalities, Davis E.R., 2005, Elsevier.

Reference Books:

1. Understanding and Applying Machine Vision, NelloZuech,, 2000,Marcel Decker.
2. Introductory Techniques For 3D Computer Vision, first Edition.,EmanueleTrucco, Alessandro Verri,
3. Digital Image Processing Using MATLAB, Rafael C.Gonzales, Richard.E.Woods, 2014, Mc. Graw Hill Education.

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	3	2	-	-	-	-	-	-	-	-	-	2
CO.2	2	3	-	-	-	-	-	-	-	-	-	2
CO.3	2	3	2	-	-	-	-	-	-	-	-	2
CO.4	3	2	2	2	-	-	-	-	-	-	-	2
CO.5	3	2	-	-	-	-	-	-	-	-	-	2
CO*	**2.6**	**2.4**	**2**	**2**	-	-	-	-	-	-	-	**2**

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L	T	P	C
3	0	0	3

18OECE322 FOUNDATION OF NANO-ELECTRONICS
(OPEN ELECTIVE-I)

Course Educational Objectives:

1. To learn the basic fundamentals of Nano electronics
2. To better understand the of the Nano-micro fabrication.
3. To classify the different Nano materials depending on the properties.
4. To Understand the phenomena using the characterization techniques
5. To provide a foundation for the device fabrication and various applications in the field of sensors technology, optoelectronics, communication and nanotechnology etc.

UNIT – 1: INTRODUCTION TO TUNNELING (9)

Tunnel junction and applications of tunneling, Tunneling Through a Potential Barrier, Metal-Insulator, Metal-Semiconductor, and Metal-Insulator-Metal Junctions, Coulomb Blockade, Tunnel Junctions, Tunnel Junction Excited by a Current Source.

UNIT – 2: TUNNELING DEVICES (9)

Field Emission, Gate—Oxide Tunneling and Hot Electron Effects in nano MOSFETs, Theory of Scanning Tunneling Microscope, Double Barrier Tunneling and the Resonant Tunneling Diode.

UNIT – 3: LITHOGRAPHY TECHNIQUES (9)

Introduction to lithography- Contact, proximity printing and Projection Printing, Resolution Enhancement techniques, Positive and negative photo resists, Electron Lithography, Projection Printing. Lithography based on Surface Instabilities: Wetting, De-wetting, Adhesion, Limitations, Resolution and Achievable / line widths, Lift off process, Bulk Micro machining.

UNIT – 4: MEMS DEVICES (9)

Introduction to MEMS and NEMS, working principles, micro sensors, micro actuation- thermal actuation, piezoelectric actuation and electrostatic actuation–micro gripers, motors, valves, pumps, accelerometers, fluidics and capillary electrophoresis, active and passive micro fluidic devices, Pizoresistivity, Pizoelectricity and thermoelectricity.

UNIT – 5: NANO ELECTRONIC DEVICES (9)

Scaling of physical systems – Geometric scaling & Electrical system scaling. The Single-Electron Transistor: The Single- Electron Transistor Single-Electron Transistor Logic, Other SET and FET Structures, Carbon Nanotube Transistors (FETs and SETs), Semiconductor Nanowire FETs and SETs, Molecular SETs and Molecular Electronics. Graphenes, fullerenes- Structure and Properties.

TOTAL: 45 HOURS

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Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to COs**
CO1	To understand and analyze the fundamental physics of nano electronics	**PO1**
CO2	Discuss various Properties of electrons in nanostructures	**PO1,PO2**
CO3	Describe deep insight to fabrication and characterization techniques in Nanostructures.	**PO1,PO2**
CO4	Familiarize with concepts of electronics transportation in nanostructures, understanding the working principles of MEMS and NEMS	**PO1**
CO5	Demonstrate the working of various nano electronics devices	**PO1,PO2,PO3**

Text Books:

1. Stephen D. Senturia, "Microsystem Design, Springer Verlag", 2001.
2. Marc Madou, "Fundamentals of microfabrication & Nano Technology", Taylor and Francis, 2011.
3. T. Fukada & W.Mens, "Micro Mechanical system Principle & Technology", Elsevier, 1998.
4. Julian W.Gardnes, Vijay K. Varda, "Micro sensors MEMS & Smart Devices", 2001.

Reference Books:

1. Nano Terchnology and Nano Electronics – Materials, devices and measurement Techniques by WR Fahrner – Springer.
2. Nano: The Essentials – Understanding Nano Scinece and Nanotechnology by T.Pradeep; Tata Mc.Graw Hill.
3. Nanoelectronics and Nanosystems – From Transistor to Molecular and Quantum Devices by Karl Goser, Peter Glosekotter, Jan Dienstuhl
4. Quantum-Based Electronic Devices and Systems by M. Dutta and M.A. Stroscio, World Scientific.
5. Micro sensors MEMS& Smart Devices, Julian W.Gardnes, Vijay K. Varda, 2001

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	3	-	-	-	-	-	-	-	-	-	-	2
CO.2	3	2	-	-	-	-	-	-	-	-	-	2
CO.3	3	2	-	-	-	-	-	-	-	-	-	2
CO.4	3	-	-	-	-	-	-	-	-	-	-	2
CO.5	3	2	2	-	-	-	-	-	-	-	-	2
CO*	**3**	**2**	**2**	-	-	-	-	-	-	-	-	**2**

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L	T	P	C
3	0	0	3

18OECE323 MEDICAL ELECTRONICS
(OPEN ELECTIVE-I)

Course Educational Objectives:

1. To gain knowledge and analyze the various physiological parameters.
2. To understand the respiratory, Blood pressure, temperature measurements etc.
3. To study about the various assist devices used in the hospitals.
4. To gain knowledge about equipment used for various diagnostic and therapeutic techniques.
5. To know the recent trends in tele medicine and laser in medicine.

UNIT – 1: ELECTRO-PHYSIOLOGY AND BIO-POTENTIAL RECORDING (9)

The origin of Bio-potentials; biopotential electrodes, biological amplifiers, ECG, EEG, EMG,PCG, lead systems and recording methods, typical waveforms and signal characteristics.

UNIT – 2: BIO-CHEMICAL AND NON ELECTRICAL PARAMETER MEASUREMENT (9)

PH, PO2, PCO2, colorimeter, Auto analyzer, Blood flow meter, cardiac output, respiratory measurement, Blood pressure, temperature, pulse, and Blood cell counters.

UNIT – 3: ASSIST DEVICES (9)

Cardiac pacemakers, DC Defibrillator, Dialyzer, Heart lung machine.

UNIT – 4: PHYSICAL MEDICINE AND BIOTELEMETRY (9)

Diathermies- Shortwave, ultrasonic and microwave type and their applications, Surgical Diathermy Telemetry principles, frequency selection, biotelemetry, radio pill, electrical safety.

UNIT – 5: RECENT TRENDS IN MEDICAL INSTRUMENTATION (9)

Thermograph, endoscopy unit, Laser in medicine, cryogenic application, Introduction to telemedicine.

TOTAL: 45 HOURS

Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to COs**
CO1	Distinguish and analyze the various physiological parameters and its recording methods, signal characteristics.	**PO1,PO2**
CO2	Describe the respiratory, Blood pressure, temperature measurements etc.	**PO1,PO2,PO5**
CO3	Analyze function of various assist devices used in the hospitals.	**PO1,PO2, PO5**
CO4	Demonstrate knowledge about equipment used for physical medicine and the various recently developed diagnostic and therapeutic techniques.	**PO1,PO2, PO5**
CO5	Extend knowledge on recent trends in tele medicine and laser in medicine.	**PO1,PO2, PO5**

Text Books:

1. Leslie Cromwell, ―Biomedical instrumentation and measurement‖, Prentice Hall of India, New Delhi, 2007.

2. John G.Webster,‖ Medical Instrumentation Application and Design‖, 3rd Edition, Wiley India Edition, 2007.

Reference Books:

1. Khandpur, R.S., ―Handbook of Biomedical Instrumentation‖, TATA McGraw-Hill, New Delhi, 2003.
2. Joseph J.Carr and John M.Brown, ―Introduction to Biomedical equipment Technology‖, John Wiley and Sons, New York, 2004.

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	3	3	-	-	2	-	-	-	-	-	-	-
CO.3	3	3	-	-	2	-	-	-	-	-	-	-
CO.4	3	3	-	-	2	-	-	-	-	-	-	-
CO.5	3	3	-	-	2	-	-	-	-	-	-	-
CO*	**3**	3	-	-	2	-	-	-	-	-	-	-

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L	T	P	C
3	0	0	3

18OMEC321 INDUSTRIAL ROBOTICS (OPEN ELECTIVE-I)

Course Educational Objectives:

1. To know the robot drive systems and internal grippers and external grippers
2. To understand the image processing and analysis of image data
3. To learn Robot motion analysis and control.
4. To study the robot language structure and programming
5. To explain the various applications of robots in industry

UNIT – 1: FUNDAMENTALS OF ROBOTIC TECHNOLOGY AND DRIVE SYSTEM (9)

Introduction – Robot anatomy – Robot configuration and motions – Robot specifications – Pitch, yaw, roll, joint notations, speed of motion, pay load – Work volume. **Robot Drive System:** Pneumatic, hydraulic drives, mechanical and electrical drives – Servo motors and stepper motor. **Grippers:** Mechanical, pneumatic and hydraulic grippers, magnetic grippers and vacuum grippers – Two fingered and three fingered grippers – Internal and external grippers.

UNIT – 2: ROBOT SENSORS AND MACHINE VISION (9)

Robot Sensors: Position of sensors – Range sensors – Proximity sensors – Touch sensors – Wrist sensors – Compliance sensors – Slip sensors. **Machine Vision**: Camera – Frame grabber – Sensing and digitizing image data – Signal conversion – Image storage and lighting techniques – Image processing and analysis – Data reduction – Edge detection – Segmentation feature extraction – Object recognition.

UNIT – 3: ROBOT MOTION ANALYSIS AND CONTROL (11)

Robot Kinematics: Manipulator kinematics – Position representation – Forward and reverse transformation – Adding orientation – Homogeneous transformations – D-H notation – Forward and inverse kinematics. **Robot Dynamics:** Differential transformation – Compensating for gravity – Robot arm dynamics. **Trajectory Planning:** Trajectory planning and avoidance of obstacles – Path planning – Skew motion – Joint integrated motion – Straight line motion.

UNIT – 4: ROBOT PROGRAMMING (9)

Robot Programming: Lead through programming – Robot language structure – Motion commands of move, speed control, workplace, path, frames, end effecter operation, sensor operation and react statement – Program sequence and subroutine – Teach pendant programming – VAL II programming.

UNIT – 5: ROBOT APPLICATIONS AND IMPLEMENTATION PRINCIPLES (7)

Robot Applications: Material transfer and machine loading / unloading – Processing applications in spray coating – Assembly and inspection automation – Future applications of robot in mines, under water and space. **Implementation Principles:** Selection of robots in industry applications – Economic analysis of the robot. **TOTAL: 45 HOURS**

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Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to COs**
CO1	Understand the robot drive systems and internal grippers and external grippers.	**PO1**
CO2	Recognize the image data and analysis the image processing	**PO1, PO12**
CO3	Understand the basic concepts of robot motion and analysis	**PO1,PO2,PO3**
CO4	Know the robot language structure and robot programming.	**PO1,PO2, PO3, PO12**
CO5	Explain the applications of robots in industries and Safety considerations in workplace	**PO1,PO11, PO12**

Text Books:

1. Industrial Robotics: Technology, Programming and Applications, Mikell P Groover, Mitchell Weiss, Roger N. Nagel, Nicholas G Odrey and Ashish Dutta 2/e, 2012, Tata McGraw-Hill Education Pvt. Ltd.,
2. Robotics: Control, Sensing, Vision and Intelligence, K.S. Fu, R.C.Gonzales and C.S.G.Lee, 1/e, 2008, Tata McGraw-Hill Education Pvt. Ltd., Noida.

References:

1. Introduction to Robotics: Analysis, Control, Applications, 3/e, 2020, Saeed B.Niku, Wiley India Pvt, Ltd., New Delhi.
2. Robotics Technology and Flexible Automation, S.R.Deb and Sankha Deb, 2/e, 2010, Tata McGraw-Hill Education Pvt. Ltd., Noida.
3. Robots and Robotics - Principles, Systems, and Industrial Applications, Mark R Miller & Rex Miller 2017, McGraw-Hill Education.
4. Introduction to Robotics: Mechanics and Control, John J. Craig, 3/e, 2008, Pearson Education, New Delhi.
5. Robotics: Fundamental Concepts and Analysis, Ashitava Ghosal, 1/e, 2006, Oxford University Press, New Delhi.
6. Robotics and Industrial Automation, Rajput R.K, 2008, S.Chand Publications, New Delhi.

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	3	-	-	-	-	-	-	-	-	-	-	-
CO.2	3	-	-	-	-	-	-	-	-	-	-	1
CO.3	3	2	1	-	-	-	-	-	-	-	-	-
CO.4	3	2	1	-	-	-	-	-	-	-	-	1
CO.5	3	-	-	-	-	-	-	-	-	-	1	1
CO*	**3**	2	1	-	-	-	-	-	-	-	1	1

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III B.Tech II Semester

L	T	P	C
3	0	0	3

18OMEC322 POWER PLANT TECHNOLOGY (OPEN ELECTIVE-I)

Course Educational Objectives:

1. To understand the working principles of steam power plants and analyzes its performance.
2. To know the working principles of diesel and gas turbine power plant
3. To clarify the working of nuclear power plant and safety measures
4. To recognize the sources of renewable energies and hydroelectric power generation techniques.
5. To learn the economics, Energy management and environmental issues of power generation.

UNIT – 1: STEAM POWER PLANT (9)

Rankine cycle – Layout of modern coal power plant – Super critical boilers, FBC Boilers, turbines, condensers, steam and heat rate – Subsystems of thermal power plants – Fuel and ash handling – Draught system – Feed water treatment – Binary cycles and cogeneration systems.

UNIT – 2: DIESEL AND GAS TURBINE POWER PLANT (9)

Diesel Power Plant: Introduction – IC Engines, types, construction – Plant layout with auxiliaries – Fuel supply system, air starting equipment, lubrication and cooling system – Super charging. **Gas Turbine Power Plant**: Introduction – Classification – Construction – Layout with auxiliaries – Principles of working of closed and open cycle gas turbines – Combined cycle power plants and comparison.

UNIT – 3: NUCLEAR POWER PLANT (9)

Basics of nuclear engineering– Fuels and nuclear reactions – Layout and subsystems – Reflectors – Pressurized water reactor (PWR) – Boiling water reactor (BWR) – CANada Deuterium- Uranium reactor (CANDU) – Gas cooled and liquid metal fast breeder reactor – Heavy water reactor – Working and comparison – Safety measures for nuclear power plants.

UNIT – 4: HYDROELECTRIC POWER PLANT AND RENEWABLE ENERGY SOURCE (9)

Hydroelectric Power Plant: Water power – Hydrological cycle – Hydrographs – Storage and pondage – Classification of dams and spill ways – Hydroelectric typical plant layout and components – Pumped storage power plants – Selection of turbines. **Renewable Energy Sources:** Principle, construction and working of wind, tidal, solar photo voltaic, solar thermal, geo thermal, biogas and fuel cell systems.

UNIT – 5: ENERGY MANAGEMENT, ECONOMICS AND ENVIRONMENTAL ISSUES (9)

Energy Management: Power tariff types – Load distribution parameters – load curve – Comparison of site selection criteria, relative merits and demerits – Capital and operating cost of different power plants. **Environmental Issues:** Effluents from power plants – Impact on environment – Pollutants – Pollution standards – Methods of Pollution control – Control of waste disposal and recovery – Waste disposal options for coal and nuclear power plants.

TOTAL: 45 HOURS

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Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to COs**
CO1	Understand the working principles of steam power plants and analyze performance	**PO1,PO2,PO3, PO6, PO7, PO12**
CO2	Understand the working principles of diesel and gas turbine power plant	**PO1,PO3, PO6, PO7,PO12**
CO3	Explain the working of nuclear power plant with safety measures	**PO1,PO2,PO3, PO6, PO7, PO12**
CO4	Explain the working power generation technologies from various renewable energy sources and hydroelectric power generation system	**PO1,PO2,PO3, PO6, PO7, PO12**
CO5	Describe environmental issues of power generation.	**PO1,PO2,PO3, PO6, PO7, PO12**

Text books:

1. Power Plant Engineering, P.K.Nag, 4/e, 2014, McGraw-Hill Education Pvt. Ltd., New Delhi.
2. Power Plant Engineering, R.K Hegde, 1/e, 2015, Pearson Education, India.

Reference books:

1. Power Plant Technology, M. M. El-Wakil, 1/e, 2010, Tata McGraw-Hill, New Delhi.
2. A Course in Power Plant Engineering, Arora and S. Domkundwar, 6/e, 2012, Dhanpat Rai Publishing Company (P) Ltd., New Delhi.
3. Introduction to Power Plant Technology, G.D.Rai, 3/e, 2012, Khanna Publishers, New Delhi.
4. Power Plant Engineering, G.R. Nagpal and S.C. Sharma, 16/e, 2004, Khanna Publisher, New Delhi.
5. A Text Book of Power Plant Engineering, R.K.Rajput, 5/e, 2016, Laxmi Publications (P) Ltd., New Delhi.
6. Power Generation Handbook, Philip Kiameh, 2/e, 2013, Tata McGraw-Hill, New Delhi.

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	3	2	2	-	-	1	1	-	-	-	-	1
CO.2	3	-	2	-	-	1	1	-	-	-	-	1
CO.3	3	2	1	-	-	1	1	-	-	-	-	1
CO.4	3	2	1	-	-	1	1	-	-	-	-	1
CO.5	3	2	1	-	-	1	3	-	-	-	-	2
CO*	**3**	**2**	**1.4**	-	-	**1**	**1.2**	-	-	-	-	**1.5**

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

III B.Tech II Semester

L	T	P	C
3	0	0	3

18OMEC323 MECHATRONICS SYSTEM (OPEN ELECTIVE-I)

Course Educational Objectives:

1. To recognize the fundamentals of Mechatronics, Control Systems, Transducers and Sensors
2. To understand the functions of Mechanical, Electrical, Hydraulic, and Pneumatic Actuators.
3. To express the Basic system models and Controllers used in Mechatronic systems
4. To realize the applications of microprocessors and Programmable Peripheral Interface
5. To recognize the Elements of programmable logic controller in mechatronic system

UNIT – 1: MECHATRONICS, SENSORS AND TRANSDUCERS (9)

Introduction: Integrated design issues in mechatronics – Mechatronics key elements – Applications in mechatronics – Introduction to mechatronics systems and measurement systems. **Control Systems:** Open loop, closed loop, automatic control, block diagram, pneumatic control and hydraulic control systems. **Transducers:** Actuating mechanisms – Electro-mechanical, resistance, variable inductance, capacitive, piezoelectric, photoelectric, thermo electric and Hall Effect transducers – Strain gauge. **Sensors:** Proximity, pneumatic, light, tactile and smart sensors – Load cells – Digital encoders – Selection of sensors.

UNIT – 2: ACTUATIORS (9)

Mechanical Actuator: Gear drive, belt drive, chain drive and bearings. **Electrical Actuator:** Mechanical and solid state switches – Construction and working principle of stepper motor and servo motor. **Hydraulic Actuators:** Hydraulic systems – Pumps, regulator, compressors and valves – Linear and rotary actuator. **Pneumatic Actuators:** Pneumatic systems – Valves – Linear and rotary actuator.

UNIT – 3: SYSTEM MODELS AND CONTROLLERS (9)

System Models: Basic system models – Mechanical system buildings – Electrical system buildings – Fluid system buildings – Thermal system buildings – Rotational-translational systems – Electro mechanical systems – Hydraulic mechanical systems. **Controller:** Control, two step, proportional and derivative mode – Combination of PD, PI and PID – PID and igital controllers – Concepts in adaptive control systems.

UNIT – 4: MICROPROCESSORS AND PROGRAMMABLE PERIPHERAL INTERFACE (9)

Microprocessors: Architecture of 8085 – Pin Configuration – Addressing Modes –Instruction set, Timing diagram of 8085 – Concepts of 8051 microcontroller with block diagram. **Programmable Peripheral Interface:** Architecture of 8255 – Keyboard interfacing – LED display – Interfacing – ADC and DAC interface – Temperature control – Stepper motor control – Traffic control interface.

UNIT– 5: PROGRAMMABLE LOGIC CONTROLLER & MECHATRONIC SYSTEMS (9)

Programmable Logic Controller: Introduction – Basic structure – Input and output processing – Programming – Mnemonics – Timers, counters and internal relays – Data handling – Selection of PLC. **Mechatronic Systems:** Design process of engine management system, automatic camera, automatic washing machine, pick and place robot, automatic car park barrier, wireless surveillance balloon, uninterruptible power supply, coin counter and electrically controlled robotic arm.

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TOTAL: 45 HOURS

Course Outcomes:

On successful completion of the course, Students will be able to		POs related to COs
CO1	Understand the fundamentals of Mechatronics, Control Systems, Transducers and Sensors	**PO1, PO2**
CO2	Illustrate the functions of Mechanical, Electrical, Hydraulic, Pneumatic Actuators in mechatronics systems	**PO1, PO2, PO3**
CO3	demonstrate the Basic system models and Controller used in Mechatronic systems	**PO1, PO2**
CO4	Understand the applications of microprocessors and and Programmable Peripheral Interface	**PO1, PO2**
CO5	Know the Elements of programmable logic controller in mechatronic system	**PO1, PO2, PO3**

Text Books:

1. Mechatronics: Electronic control systems in mechanical and electrical engineering, William Bolton, 6/e, 2019, Pearson Education, India.
2. A Textbook of Mechatronics, R.K.Rajput, 4/e, 2007, S. Chand & Co.

Reference Books:

1. Mechatronics Systems Design, Devdas Shetty and Richard A. Kolk, 2/e, 2011, Cengage Learning.
2. Mechatronics, Principles and Applications, Godfrey Onwubolu, 1/e, 2005, Elsevier Butterworth-Heinemann.
3. Introduction to Mechatronics and Measurement Systems, David G. Alciatore and Michael B. Histand, 4/e, 2014, Tata McGraw Hill Education.
4. Mechatronics: A Foundation Course, Clarence W. de Silva, 1/e, 2010, CRC Press, Taylor & Francis Group
5. Mechatronics with Experiments, Sabri Cetinkunt, 2/e, 2015, John Wiley & Sons Ltd
6. Mechatronics : Principles, Concepts and Applications, Nitaigour Premchand Mahalik, 1/e, 2003, Tata McGraw Hill Education.

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	2	-	-	-	-	-	-	-	-	-	-
CO.2	3	2	1	-	-	-	-	-	-	-	-	-
CO.3	3	2	-	-	-	-	-	-	-	-	-	-
CO.4	3	2	-	-	-	-	-	-	-	-	-	-
CO.5	3	2	1	-	-	-	-	-	-	-	-	-
CO*	**3**	**2**	**1**	-	-	-	-	-	-	-	-	-

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
(AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

III B. TECH II-SEMESTER (CSE)

L	T	P	C
0	0	2	1

18CSE326 **WEB TECHNOLOGIES LAB**

Course Educational Objectives:

The Students should be made to

CEO1: To design web pages consisting of hyperlinks, tables, images, multimedia content and input forms.
CEO2: To develop web pages with different styles to the HTML elements using CSS.
CEO3: To make use of java scripts to make the web pages responsive and validate the user input.
CEO4: To gain knowledge on PHP scripts using the concepts of functions, arrays and OOP.
CEO5: To develop PHP scripts that can interact with MYSQL databases.

Exercise 1:

Design web pages using html5 which includes the following:

a) Describing your Department use paragraph and list tags, apply various colors, header tags, font styling like italics, underline.
b) Create links on the words e.g. HTML and Java to link them to Wikipedia pages and image as a link such that clicking on image takes user to other page
c) Create a table to show your class time table

Exercise 2:

Design web pagesthat provide information about your College using html5 which includes the following:

a) Images
b) Borders and Colors

Exercise 3:

Create a "registration form" in html5 with the following fields: Name (Text field), Password (Password field), E-mail id (Text field), Phone number (text field), Sex (radio button), Date of birth (3 select boxes), Languages known (check boxes – English, Telugu, Hindi, Tamil) and Address (text area).

Exercise 4:

Create a web page embedding audio and video files using html 5.

Exercise 5:

Design a web page using CSS which includes the following:

a) Backgrounds and Colors
b) Fonts and Text
c) Creating Boxes and Columns

d) List Styles and Table Layouts

Exercise 6:

Write a Java script to validate the appropriate fields in the registration form of Exercise 3 which includes the following validation : Name (Name should contains alphabets and the length should not be less than 6 characters), Password (Password should not be less than 6 characters length), E-mail id (should not contain any invalid and must follow the standard pattern name@domain.com), Phone number (Phone number should contain 10 digits only and accepted digits only). If any one of the field is empty then display the error message.

Exercise 7:

Write Java script to work with the following:

a) Window Object
b) Navigator Object
c) Document Object

Exercise 8:

Write JQuery to work with the following:

a) Selectors
b) HTML Attributes
c) Events

Exercise 9:

Write PHP scripts covering the following:

a) Functions
b) Arrays
c) Object Oriented Concepts

Exercise 10:

a) Write a PHP program to read user name and favorite color from the HTML form. Display the name of the user in green color and set user's favorite color as a background for the web page.
b) Write a PHP code to read the username and password entered in the Login form and authenticate with the values available in cookies. If user enters a valid username and password, welcome the user by username otherwise display a message stating that, entered details are invalid.

Exercise 11:

Write a PHP code to read the user details entered through the registration form like Name , Password , E-mail id , Phone number , Address and store these details in the MySQL database.

Exercise 12:

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A user validation web application, where the user submits the login name and password to the server. The name and password are checked against the data already available in Database and if the data matches, a successful login page is returned. Otherwise a failure message is displayed to the user.

Course Outcomes		**POs related to COs**
CO1	Demonstrate knowledge on web page design elements	PO1, PO3
CO2	Demonstrate knowledge on client side scripting and server side scripting	PO1, PO2, PO3
CO3	Analyze user requirements to develop web applications.	PO1, PO2, PO3, PO5
CO4	Design client-server applications using web technologies.	PO1, PO2, PO3, PO5
CO5	Demonstrate problem solving skills to develop enterprise web applications.	PO1, PO2, PO3, PO5
CO6	Follow the ethical principles in implementing the programs	PO8
CO7	Do experiments effectively as an individual and as a team member in a group	PO9
CO8	Communicate verbally and in written form, the understanding about the experiments	PO10
CO9	Continue updating their skills realted to design the web pages and implementing programs in future	PO12

CO-PO Mapping

PO / CO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	2	-	-	-
CO8	-	-	-	-	-	-	-	-	-	2	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO*	**3**	**3**	**3**	**3**	**3**	**-**	**-**	**3**	**2**	**2**	**-**	**3**

Reference Books:

1. Kogent Learning Solutions Inc, HTML 5 Black Book: Covers CSS3, JavaScript, XML, XHTML, AJAX, PHP and JQuery, Dreamtech Press, Second Edition, 2016.

2. W. Jason Gilmore, Beginning PHP and MySQL, APress, Fourth Edition, 2011.
3. SnigBahumik, Bootstrap Essentials, PACKT Publishing, 2015. (e-book).

III B. TECH II-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	0	**0**	**2**	**1**

18CSE327 UNIFIED MODELING LANGUAGE & DATA MINING LAB

Course Educational Objectives:

The student should be made to:

CEO1: Understand various UML Concepts using Rationalrose Software
CEO2: To develop a mini-project by applying the UML Concepts
CEO3: Understand the data sets and data pre-processing, Association Rules, Classification and Clustering.
CEO4: Build a data warehouse and query it using open source tools like Pentaho Data Integration and Pentaho Business Analytics
CEO5: Learn data mining tasks using a data mining toolkit

Case Tools:

Suggested domains for Mini-project:

1. ATM System
2. Library Management System
3. Passport automation system.
4. Hospital Management System
5. College Management System
6. On-line Examination System
7. E-ticketing
8. Recruitment system
9. Conference Management System
10. BPO Management System

Suggested Software Tools:

ArgoUML, Eclipse IDE, Visual Paradigm, Visual case and Rational Suite

Data Mining Task 1: Credit Risk Assessment Description: The business of banks is making loans. Assessing the credit worthiness of an applicant is of crucial importance. You have to develop a system to help a loan officer decide whether the credit of a customer is good, or bad. A bank's business rules regarding loans must consider two opposing factors. On the one hand, a bank wants to make as many loans as possible. Interest on these loans is the banks profit source. On the other hand, a bank cannot afford to make too many bad loans. Too many bad loans could lead to the collapse of the bank. The bank's loan policy must involve a compromise: not too strict, and not too lenient. To do the assignment, you first and foremost need some knowledge about the world of credit. You can acquire such knowledge in a number of ways.

1. **Knowledge Engineering:** Find a loan officer who is willing to talk. Interview her and try to represent her knowledge in the form of production rules.

2. **Books:** Find some training manuals for loan officers or perhaps a suitable textbook on finance. Translate this knowledge from text form to production rule form.

3. **Common sense:** Imagine yourself as a loan officer and make up reasonable rules which can be used to judge the credit worthiness of a loan applicant.

4. **Case histories:** Find records of actual cases where competent loan officers correctly judged when, and when not to, approve a loan application.

The German Credit Data:
Actual historical credit data is not always easy to come by because of confidentiality rules. Here is one such dataset, consisting of 1000 actual cases collected in Germany. credit dataset (original) Excel spreadsheet version of the German credit data. In spite of the fact that the data is German, you should probably make use of it for this assignment. (Unless you really can consult a real loan officer !) A few notes on the German dataset

• DM stands for Deutsche Mark, the unit of currency, worth about 90 cents Canadian (but looks and acts like a quarter).

• Owns_telephone. German phone rates are much higher than in Canada so fewer people own telephones.

• foreign_worker. There are millions of these in Germany (many from Turkey). It is very hard to get German citizenship if you were not born of German parents.

• There are 20 attributes used in judging a loan applicant. The goal is the classify the applicant into one of two categories, good or bad.

Subtasks: (Turn in your answers to the following tasks)
1. List all the categorical (or nominal) attributes and the real-valued attributes separately.

2. What attributes do you think might be crucial in making the credit assessment ? Come up with some simple rules in plain English using your selected attributes.

3. One type of model that you can create is a Decision Tree - train a Decision Tree using the complete dataset as the training data. Report the model obtained after training.

4. Suppose you use your above model trained on the complete dataset, and classify credit good/bad for each of the examples in the dataset. What % of examples can you classify correctly? (This is also called testing on the training set) Why do you think you cannot get 100 % training accuracy?

5. Is testing on the training set as you did above a good idea? Why or Why not ?

6. One approach for solving the problem encountered in the previous question is using cross-validation? Describe what is cross-validation briefly. Train a Decision Tree again using cross-validation and report your results. Does your accuracy increase/decrease? Why?

7. Check to see if the data shows a bias against "foreign workers" (attribute 20), or "personal-status" (attribute 9). One way to do this (perhaps rather simple minded) is to remove these attributes from the dataset and see if the decision tree created in those cases is significantly different from the full dataset

case which you have already done. To remove an attribute you can use the preprocess tab in Weka's GUI Explorer. Did removing these attributes have any significant effect? Discuss.

8. Another question might be, do you really need to input so many attributes to get good results? Maybe only a few would do. For example, you could try just having attributes 2, 3, 5, 7, 10, 17 (and 21, the class attribute (naturally)). Try out some combinations. (You had removed two attributes in problem 7. Remember to reload the arff data file to get all the attributes initially before you start selecting the ones you want.)

9. sometimes, the cost of rejecting an applicant who actually has a good credit (case 1) might be higher than accepting an applicant who has bad credit (case 2). Instead of counting the misclassifications equally in both cases, give a higher cost to the first case (say cost 5) and lower cost to the second case. You can do this by using a cost matrix in Weka. Train your Decision Tree again and report the Decision Tree and cross-validation results. Are they significantly different from results obtained in problem 6 (using equal cost)?

10. Do you think it is a good idea to prefer simple decision trees instead of having long complex decision trees? How does the complexity of a Decision Tree relate to the bias of the model?

11. You can make your Decision Trees simpler by pruning the nodes. One approach is to use Reduced Error Pruning - Explain this idea briefly. Try reduced error pruning for training your Decision Trees using cross-validation (you can do this in Weka) and report the Decision Tree you obtain? Also, report your accuracy using the pruned model. Does your accuracy increase?

12. How can you convert a Decision Trees into "if-then-else rules". Make up your own small Decision Tree consisting of 2-3 levels and convert it into a set of rules. There also exist different classifiers that output the model in the form of rules - one such classifier in Weka is rules. PART, train this model and report the set of rules obtained. Sometimes just one attribute can be good enough in making the decision, yes, just one ! Can you predict what attribute that might be in this dataset? OneR classifier uses a single attribute to make decisions (it chooses the attribute based on minimum error). Report the rule obtained by training a one R classifier. Rank the performance of j48, PART and oneR.

Task Resources:

- Andrew Moore's Data Mining Tutorials (See tutorials on Decision Trees and Cross Validation)
- Decision Trees (Source: Tan, MSU)
- Tom Mitchell's book slides (See slides on Concept Learning and Decision Trees)
- Weka resources:
- Introduction to Weka (html version) (download ppt version)
- Download Weka
- Weka Tutorial
- ARFF format
- Using Weka from command line (or) Using R Programming(or)Using Rapid Miner Tool

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Course Outcomes:
On Successful Completion of this Course the Students will be able to

Course Outcomes		POs related to COs
CO1	Design different models for solving the problems	PO1, PO3,PO5
CO2	Develop the mini projects using CASE Tools	PO1, PO2, PO5
CO3	Analyze the data sets by using Association Rules, Classification and Clustering Techniques.	PO1, PO2, PO5
CO4	Create a Data Warehouse and perform data accessing	PO1, PO4, PO5
CO5	Perform Data Preprocessing such as data cleaning, Transformation and Reduction	PO1, PO2, PO5, PO11
CO6	Follow the ethical principles in implementing the programs	PO8
CO7	Do experiments effectively as an individual and as a team member in a group	PO9
CO8	Communicate verbally and in written form, the understanding about the experiments	PO10
CO9	Continue update skill related to CASE Tools, WEKA Tool and implementing programs in future	PO12

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	2	-	-	-
CO8	-	-	-	-	-	-	-	-	-	3	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO*	**3**	**3**	**3**	**3**	3	-	-	3	2	**3**	**-**	**3**

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
(AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

III B.Tech II Semester

L	T	P	C
0	0	2	1

18CSE328 **PROJECT SKILLS LAB**

Course Educational Objectives:

CEO1: Objective is to give an opportunity to the student to get hands on training in design and innovation.
CEO2: Comparing and contrast the several existing solutions for the problem identified.
CEO3: Formulating and propose a plan for creating a solution for the research plan identified.
CEO4: Conducting the experiments as a team and interpret the results.
CEO5: Reporting and presenting the findings of the work conducted.

The aim of the project skill lab is to deepen comprehension of principles by applying them to a new problem which may be the device / system / component / working mode to be created / fabricated may be decided in consultation with the supervisor and if possible with an industry. A project topic must be selected by the students in consultation with their supervisor. The students may be grouped into 3 to 5 and work under a project supervisor.

A project report to be submitted by the group and along with the model / system, which will be reviewed and evaluated for internal assessment by a Committee constituted by the Head of the Department. At the end of the semester examination the project work is evaluated based on oral presentation and the project report along with device / system / component / working model jointly by external and internal examiners constituted by the Head of the Department.

Course Outcomes:

On successful completion of course, the student will be able to		POs related to COs
CO1	Demonstrate in-depth knowledge on the project topic	**PO1**
CO2	Identify, analyze and formulate complex problem chosen for project work to attain substantiated conclusions.	**PO2**
CO3	Design solutions to the chosen project problem.	**PO3**
CO4	Undertake investigation of project problem to provide valid conclusions	**PO4**
CO5	Use the appropriate techniques, resources and modern engineering tools necessary for project work	**PO5**
CO6	Apply project results for sustainable development of the society.	**PO6**
CO7	Understand the impact of project results in the context of environmental sustainability.	**PO7**
CO8	Understand professional and ethical responsibilities while executing the project work.	**PO8**
CO9	Function effectively as individual and a member in the project team	**PO9**
CO10	Develop communication skills, both oral and written for preparing and presenting project report.	**PO10**

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CO11	Demonstrate knowledge and understanding of cost and time analysis required for carrying out the project.	**PO11**
CO12	Engage in lifelong learning to improve knowledge and competence in the chosen area of the project.	**PO12**

III B. TECH II-SEMESTER (CSE)

L	**T**	**P**	**C**
2	**0**	**0**	**1**

18CSE329 **ONLINE COMPREHENSIVE EXAM-II**

Course Educational Objectives:

CEO1: To assess the comprehensive knowledge gained in basic courses relevant to the branch of study.

CEO2: To comprehend the questions asked and answer them with confidence.

On-line Comprehensive Test:

On-line comprehensive test will be conducted at the end of the II year II semester with 100 objective questions (multiple choice questions) for 100 marks on the courses studied in the respective semesters (II year I semester and II year II semester).

Course Outcomes:

On successful completion of the course, students will be able to

Course Outcomes		**POs related to Cos**
CO1	Understand and comprehend any given problem related to computer science and engineering field.	PO1,PO2,PO3,PO4, PO5,PO6, PO7, PO8, PO9,PO10,PO11,PO12
CO2	The students will be confident in discussing the fundamental aspects of any engineering problem/situation and give answers in dealing with them.	PO1,PO2,PO3,PO4, PO5,PO6, PO7, PO8, PO9,PO10,PO11,PO12

CO-PO Mapping

PO / CO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**
CO1	3	3	3	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3	3	3	3	3	3
CO*	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

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IV B. TECH I-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	2	**1**	**0**	**3**

18CSE411 CRYPTOGRAPHY AND NETWORK SECURITY

Course Educational Objectives:

CEO1: To understand basics of Cryptography and Network Security. Identify computer and network security threats, classify the threats and develop a security model to prevent, detect and recover from the attacks.
CEO2: Encrypt and decrypt messages using block ciphers, sign and verify messages using well known signature generation and verification algorithms.
CEO3: Analyze existing authentication and key agreement protocols; identify the weaknesses of these protocols.
CEO4: Download and install an e-mail and file security software, PGP, and efficiently use the code to encrypt and sign messages.
CEO5: Develop SSL or Firewall based solutions against security threats, employ access control techniques.

UNIT - 1: Classical Encryption Techniques (9)
Security attacks - Security services and mechanisms - A model for Network Security - Classical encryption techniques - Symmetric cipher model - Substitution techniques - Caesar Cipher - Mono alphabetic Cipher - Play fair Cipher - Hill Cipher - Transposition techniques.

UNIT - 2: Block Ciphers- Data Encryption Standards and Public Key Cryptography (9)
Simplified DES - Block Cipher Principles - DES – AES - Block Cipher Design Principles - Block Cipher modes of Operation - Public Key Cryptography - Principles of Public Key Cryptosystems - The RSA Algorithm -Diffie Hellman Key Exchange.

UNIT - 3: Message Authentication Codes - Hash Functions And Digital Signatures (9)
Message Authentication Requirements - Message Authentication Functions - Message Authentication Codes - Hash Functions - Security of Hash Functions and MACs - Hash algorithms – SHA – HMAC - Digital Signatures -Digital Signature Standard(DSS) - Authentication applications – Kerberos - X.509 Authentication Service

UNIT - 4: Electronic Mail and IP Security (9)
Pretty good privacy - S/MIME - IPsec overview – architecture - Authentication Header and Encapsulating security pay load - combining security associates.

UNIT - 5: Web Security-Intruders-Firewalls (9)
Web security considerations - Secure socket layer and transport layer security - Secure electronic transaction - Intruders - Intrusion detection - Password management - Firewall design and principles - Trusted systems.

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Course Outcomes:

On successful completion of this course the students should be able to:

Course Outcomes		POs related to Cos
CO1	Understand basics of Cryptography and Network Security.	PO1, PO2
CO2	Encrypt and decrypt messages, sign and verify messages using well known signature generation and verification algorithms.	PO1, PO2
CO3	Analyze existing authentication and key agreement protocols.	PO1, PO2, PO3, PO4
CO4	Use e-mail and file security software's.	PO1, PO2, PO3, PO5
CO5	Develop SSL/Firewall.	PO1, PO2, PO3, PO4

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	2	3	3	2	-	-	-	-	-	-	-	-
CO2	3	3	3	3	-	-	-	-	-	-	-	-
CO3	3	3	2	3	-	-	-	-	-	-	-	-
CO4	2	3	2	-	1	-	-	-	-	-	-	-
CO5	2	3	3	2	2	-	-	-	-	-	-	-
CO*	**2.4**	**3**	**2.6**	**2.5**	**1.5**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Text Books:

1. Cryptography and Network Security: Principles and Practices,7/e, William Stallings Low Price Edition, 2017, Pearson Education.
2. Network Security and Cryptography, 1/e, Bernard Menezes, 2010,Thomson Press Ltd,USA.

Reference Books:

1. Cryptography and Network Security: Principles and Practices,4/e, William Stallings Low Price Edition, 2008, Pearson Education.
2. Principles and Practices of Information Security,4/e, Michal E. Whitman and Herbert J. Mattord, 2012,CengageLearning, New Delhi.
3. Network Security Essentials (Applications and Standards), 4/e, William Stallings Pearson Education.
4. Hack Proofing your network , 2/e ,Ryan Russell, Dan Kaminsky, Rain Forest Puppy, Joe Grand, David Ahmad, Hal Flynn IdoDubrawsky, Steve W.Manzuik and Ryan Permeh,wileyDreamtech, 2002.
5. Fundamentals of Network Security, 1/e, Eric Maiwald (Dreamtech press) ,2008.
6. Network Security - Private Communication in a Public World,2/e, Charlie Kaufman, Radia Perlman and Mike Speciner,2002, Pearson/PHI.

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IV B. TECH I-SEMESTER (CSE)

L	T	P	C
3	1	0	3

18CSE412 BIG DATA ANALYTICS

Course Educational Objectives:
CEO1: To make familiar with the basics of Big Data Analytics platform.
CEO2: To apply the skills to manage Hadoop and HDFS.
CEO3: To gain knowledge on developing the Map Reduce application.
CEO4: To know how to work with Pig and Hive.
CEO5: To understand the concepts of HBASE, Zookeeper and Sqoop

UNIT I : INTRODUCTION TO BIG DATA ANALYTICS (9)

Types of Digital Data- Introduction to Big Data: Characteristics of Data- Evolution of Big Data-Challenges of Big Data -Big data Characteristics: Volume, Velocity, Variety-Traditional Business Intelligence (BI) versus Big Data- A Typical Data Warehouse Environment-A Typical Hadoop Environment-What is New Today? Big Data Analytics: What is Big Data Analytics? Classification of Analytics- Greatest Challenges that Prevent Business from Capitalizing on Big Data-Top Challenges Facing Big Data-What is Big Data Analytics Important?Data Science-Data scientist-Terminologies using in Big Data Environment- Top Analytics Tool.

UNIT - 2: HADOOP (9)

Introduction to Hadoop-Data Storage and Analysis- Comparison with Other Systems - A brief history of Hadoop - Apache Hadoop and The Hadoop Ecosystem - The Hadoop Distributed File System - The Design of HDFS-HDFS concepts - The Command Line Interface- Hadoop File systems- The Java Interface - Data Flow - parallel copying with distcp-Hadoop Archives - Hadoop I/O - Data Integrity-Compression-Serialization- File Based Data Structures.

UNIT – 3: MAP REDUCE PROGRAMMING (9)

Developing a Map Reduce Application - How Map Reduce Works - Anatomy of a Map Reduce Job run-Failures-Job Scheduling-Shuffle and Sort - Map Reduce Types and Formats - Map Reduce Features.

UNIT – 4: WORKING WITH PIG AND HIVE (9)
Installing and running pig- An Example- Comparison with Databases- Pig Latinscripts-User defined functions-Data processing Operators-Pig in Practice.
Installing Hive-Running Hive-Comparison with Traditional Databases – HiveQL – Tables-Querying Data.

UNIT – 5: HBASE- ZOOKEEPER – SQOOP (9)
HBasics – Concepts – Example-HBase Versus RDBMS-Praxis – Zookeeper-Installing and Running Zookeeper – Example-Zookeeper Services-Building applications with Zookeeper - Introduction to Sqoop-Database Imports-Working with Imported data-Importing large objects-performing exports.
Case Study: Apache Spark, Apache Oozie and Apache Flume.

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Course Outcomes:

On successful completion of this course the students should be able to:

Course Outcomes		POs related to Cos
CO1	Understand the basics of Big data Analytics	PO1, PO2
CO2	Manage Hadoop data storage and file system.	PO1, PO2, PO4
CO3	Design the application using Map Reduce programming	PO1, PO2, PO3
CO4	Perform operations on Pig and Hive	PO1, PO2, PO3, PO5
CO5	Analyze the Hadoop Eco systems like HBASE, Zookeeper and Sqoop	PO1, PO2, PO3, PO4, PO5

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	3	-	-	-	-	-	-	-	-
CO3	3	3	3	-	-	-	-	-	-	-	-	-
CO4	3	3	3	-	3	-	-	-	-	-	-	-
CO5	3	3	3	3	3	-	-	-	-	-	-	-
CO*	**3**	**3**	**3**	**3**	**3**	-	-	-	-	-	-	-

Text Books:

1. Hadoop- the definitive guide, Tom White,O'Relly 4th Edition, Media, 2015.
2. Big Data Analytics, SeemaAcharya, SubhasiniChellappan, Wiley, 2015.
3. Big Data for Dummies, Hurwitz, Alan Nugent, Dr. Fern Halper, Marcia Kaufman, John Wiley & Sons, 2012.

Reference Books:

1. Hadoop- the definitive guide, Tom White,O'Relly Media, 2010
2. Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics, Bill Franks, John Wiley &Sons, 2012.
3. Big Data Analytics: Turning big Data in to Big Money, Frank J Ohlhorst, Wiley and SAS Business series, 2012
4. ArshdeepBahga, Vijay Madisetti, "Big Data Science & Analytics: A HandsOnApproach",VPT,2016
5. Bart Baesens "Analytics in a Big Data World: The Essential Guide to Data ScienceanditsApplications(WILEYBigDataSeries)",JohnWiley&Sons,2014

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IV B. TECH I-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	2	**1**	**0**	**3**

18CSE413 MOBILE APPLICATION DEVELOPMENT

Course Educational Objectives:

CEO1: To learn the characteristics of mobile applications.
CEO2: To gain knowledge about the intricacies of UI required by mobile applications.
CEO3: To study about the design aspects of mobile application.
CEO4: To identify the different options in designing the mobile application
CEO5: To evaluate the techniques for the installation of mobile applications and delivery via various channels.

UNIT- 1: Java Review & Introduction and Installation of Android Tools (9)

Java Review - OOPs Concepts - Method Overriding - Android Overview - History - Android Versions - Android Flavors -Android Stack – Linux - Native Layer -Dalvik Virtual Machine - Application Framework – Applications - Installation and Use of Android Tools - Installing JDK - Installing the Android SDK - Anatomy of an Android Project - Drawable Resources - Steps in Building Projects in Android - Android Emulator

UNIT– 2: User Interface Android Building Blocksand User Interface (9)

XML Introduction - Need of XML for Android User Interface – Creating user interface using XML – Drag and Drop methods - Overview of Android Building Blocks: Activities - Activity Life Cycle – Methods in Activity Life Cycle. Services - Services Life Cycle –Intents - Types – Creation - Content Providers - Application Context - Android User Interface - Types and creation - Views and Layout - Logging Messages in Android - Threading in Android – Examples using Threading

UNIT– 3: Application Design Fragments- Intents- Action Bar- Services and Content Providers (9)

Fragments: Definition – Types - Fragment Life cycle – Creating a Fragment in android - Dynamically Adding Fragments - Example. Intents: Definition – Usage of Intends – Creation of Indents with example program - Action Bar - Preferences and Action Bar - Android File systems - Content Providers - Overview – Role of Content Providers - Databases on Android - SQLite - Status Contract Class.

UNIT– 4: Lists- Adapters and Broadcast Receivers (9)

Lists and Adapters – Types of Adapters – Example using Adapters - Loading the Data - Custom Logic via View Binder - Details View.

Menus: Types and Creation - Broadcast Receivers: About Broadcast Receivers –Broadcasting Intends and their related API - Boot Receiver - Alarms and system services – Examples on alarms and services.

UNIT– 5: Applications Widgets- Networking- Web Overview- Interaction and Sensors (9)

App Widgets: Content Providers through Widgets - Networking and Web Overview: HTTP API - Apache HTTP Client - Http URL Connection.

Interaction and Animation: Live Wallpaper and Handlers - Sensors: Sensor API in Android - Motion Sensor - Position Sensor- Environmental Sensor- Sensor Values- Sensor Manager Class - Sensor Class -

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Sensor Event class - Sensor Event Listener interface - Compass Accelerometer and orientation Sensors - Sensor Examples

Course Outcomes:

On successful completion of this course the students should be able to:

Course Outcomes		POs related to Cos
CO1	Recollect the essential concepts of java and get familiar with android basics and installation.	PO1, PO2
CO2	Create User Interfaces with various Layouts and views using android building blocks.	PO1, PO2, PO4
CO3	Write programs on fragments - intents	PO1, PO2, PO3
CO4	Use the applicability of lists based on adapters and broadcast receivers.	PO1, PO2, PO3, PO5
CO5	Develop widgets - wall paper and sensor programs for android application development	PO1, PO2, PO3,

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	3	-	-	-	-	-	-	-	-
CO3	3	3	3	-	-	-	-	-	-	-	-	-
CO4	3	3	3	-	3	-	-	-	-	-	-	-
CO5	3	3	3	-	-	-	-	-	-	-	-	-
CO*	**3**	**3**	**3**	**3**	**3**	-	-	-	-	-	-	-

Text books:

1. Learning Android: Develop Mobile Apps Using Java and Eclipse, Marko Gargenta& Masumi Nakamura, O'Reilly - II Edition
2. Android Programming for Beginners, John Horton, PACKT publishers

Reference Books:

1. Android application Development, Black Book,PradeepKothari,Dreamtech
2. Head First Android Development: A Brain-Friendly Guide, 2/e, Dawn Griffiths and David Griffiths, O'Reilly.
3. Android System Programming, Roger Ye, PACKT publishers
4. Programming Android, ZigurdMednieks,LairdDornin,G.BlakeMeike& Masumi Nakamura, O'Reilly

5. Android Application Development All in One for Dummies,2nd Edition, Barry Burd, Wiley.

IV B. TECH I-SEMESTER (CSE)

L	T	P	C
3	0	0	3

18CSE414A COMPUTER GRAPHICS AND MULTIMEDIA (CORE ELECTIVE-I)

Course Educational Objectives:

The student should be made to:

CEO1: To acquire knowledge about graphics hardware devices and software used and Design algorithms to generate points, lines, and polygons.
CEO2: To analyze Transformations for 2-D & 3D Objects.
CEO3: To understand Viewing transformations in 2D & 3D Objects and Clipping algorithms for 2-D & 3D Objects
CEO4: To gain insight information about appropriate techniques and tools for surface detection and rendering methods.
CEO5: To gain Knowledge in Multimedia applications and their compression methods

Unit-1: Introduction and Output Primitives (9)

Overview of graphics systems - Video display devices - Raster scan systems - Random scan systems - Input devices - Points and lines - Line drawing algorithms - Mid point circle and ellipse algorithms - Scan line polygon fill algorithm - Boundary fill and flood fill algorithms

Unit-2: 2-D and 3-D Geometrical Transforms (9)

2D Translation - Rotation - Scaling - Matrix representations and homogeneous coordinates - Composite transforms - Reflection and shear transformations - Transformations between coordinate systems - 3D Translation - Rotation – Scaling - Reflection and shear transformations - Composite transformations

Unit-3: 2-Dimensional Viewing (9)

The viewing pipeline - Viewing coordinate reference frame - Window to view-port coordinate transformation - 2-D viewing functions - Cohen Sutherland - Liang - Polygon Clipping-Sutherland Hodgeman polygon clipping algorithm, Weiler - Atherton Polygon Clipping Algorithm - Curve Clipping - Text Clipping - Exterior Clipping

Unit-4: Visible Surface Detection Methods & Introduction to Multimedia (9)

Classification of visible surface detection algorithms - Back face detection - Depth buffer method - A buffer method - Scan line method - Depth sorting method - BSP-tree method - Area sub-division and Octree methods - Ray Casting Method - Introduction to Multimedia - Graphics and Image Data Representations - Color Models in Image and Vide

Unit-5: Multimedia Compression Algorithms (9)

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Multimedia Data Compression –Lossless Compression Algorithms-Run Length coding-VLC-Shanno – fano Algorithm- Huffman Coding-Adaptive Huffman Coding-Dictionary Based Coding-Image Compression Standards- JPEG Standard- MPEG Video Coding I MPEG-1. CASE STUDY: BLENDER GRAPHICS Blender Fundamentals – Drawing Basic Shapes – Modelling – Shading & Textures

Course Outcomes:
On successful completion of the course the student will be able to,

Course Outcomes		POs related to COs
CO1	Apply design algorithms to generate different objects.	PO1, PO2
CO2	Develop two dimensional transformations and design three dimensional graphics	PO1, PO2, PO4
CO3	Use viewing and clipping techniques to graphics	PO1, PO2, PO3, PO5
CO4	Perform Illumination , color models and visible detection methods to graphics	PO1, PO2, PO4
CO5	Design animation sequences and implementing various compression techniques in multimedia	PO1, PO2

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	3	-	-	-	-	-	-	-	-
CO3	3	3	3	-	3	-	-	-	-	-	-	-
CO4	3	3	-	3	-	-	-	-	-	-	-	-
CO5	3	3	-	-	-	-	-	-	-	-	-	-
CO*	**3**	**3**	**3**	**3**	**3**	-	-	-	-	-	-	-

Text Books:

1. Computer Graphics *C version*, 2/e, Donald Hearn and M.Pauline Baker, 2013, Pearson Education, New Delhi, India.
2. Fundamentals of Multimedia, 5/e, Ze-NIan Li, Mark S. Drew, 2009, Pearson Education, New Delhi, India.

Reference Books:

1. Computer Graphics *C version*, 2/e, Donald Hearn and M.Pauline Baker, 1997,Pearson Education, New Delhi, India.
2. Computer Graphics, 2/e, Donald Hearn and M.Pauline Baker, 1994,PHI/Pearson Education, New Delhi, India.
3. Computer Graphics Principles & Practice in C, 2/e, Foley, VanDam, Feiner and Hughes, 1995,Pearson Education, New Delhi, India.
4. Computer Graphics, 2/e, Zhigand Xiang, Roy Plastock, Schaum's outlines, 1998,Tata McGraw Hill, Hyderabad, India.
5. Computer Graphics, 3/e, Steven Harrington, 1987,TMH, New Delhi, India.
6. Interactive Computer Graphics: A Top-Down Approach with Shader-Based OpenGL 1/e, Edward Angel, Addison Wesley Longman, 2011,New York, USA.
7. Fundamentals of Computer Graphics, 3/e, Peter Shirley, Michael Ashikhmin and Steve Marschner, 2009,New York, USA.

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IV B. TECH I-SEMESTER	**L**	**T**	**P**	**C**
	2	**1**	**0**	**3**

18CSE414B PRINCIPLES OF PROGRAMMING LANGUAGES (CORE ELECTIVE-I)

Course Educational objectives:

CEO1: To gain knowledge about programming paradigms, principles and techniques involved in design and implementation of modern programming languages.
CEO2: To describe syntax and semantics of programming languages.
CEO3: To analyze and explain behavior of simple programs in imperative languages using concepts such as binding, scope, control structures, subprograms and parameter passing mechanisms.
CEO4: To analyze the concepts of ADT and object oriented programming for large scale software development.
CEO5: To understand the concurrency control and exception handling mechanisms.

UNIT - 1: Preliminaries (9)

Reasons for studying concepts of programming languages - Programming domains - Language evaluation criteria - Influences on language design - Language categories - Language design tradeoffs - Implementation methods - Programming environments

UNIT - 2: Describing Syntax and Semantics, Names, Bindings, Type Checking, and Scopes (9)

Introduction - General problem of describing syntax - Formal methods of describing syntax - Attribute grammars - Describing the meanings of programs - Names - Variables - The concept of binding - Type checking - Strong typing - Type compatibility - Scope - Scope and life time -Referencing environments - Named constants

UNIT - 3: Data Types, Expressions, Assignment Statements, Control Structures (9)

Introduction - Primitive data types - Character string types - User defined ordinal types - Array types - Arithmetic expressions - Overloaded operators - Type conversions - Relational and boolean expressions - Short circuit evaluation - Assignment statements - Mixed mode assignment - Selection statements - Iterative statements - Unconditional branching - Guarded commands

UNIT - 4: Subprograms, Abstract Data Types and Encapsulation Constructs (9)

Introduction - Fundamentals of subprograms - Design issues for subprograms - Local referencing environments - Parameter passing methods - Parameters that are subprogram names - Overloaded subprograms - Generic subprograms - Design issues for functions - User defined overloaded operators - Coroutines - The concept of abstraction - Introduction to data abstraction - Design issues for abstract data types - Language examples - Parameterized abstract data types - Encapsulation constructs - Naming encapsulations

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UNIT -5: Concurrency, Case Study:Java (9)

Why concurrency - Programs and processes - Problems with concurrency - Process interactions - Concurency primitives - Concurrent control abstractions - Object oriented programing - Key concepts - Pragmatics - Case study: Java

Course Outcomes:

On successful completion of the course the student will be able to,

Course Outcomes		POs related to COs
CO1	Identify the various programming language and its syntax.	PO1, PO2
CO2	Design the context free grammars using parse trees, recursive descent parsing, printing, and interpretation.	PO1, PO2, PO4
CO3	Develop programing using Data Types, Expressions, Assignment Statements, and Control Structures.	PO1, PO2, PO3, PO5
CO4	Analyze semantic issues associated with function implementations, Including variable binding, scoping rules, parameter passing, and exception handling.	PO1, PO2, PO4
CO5	Familiar with language abstraction of classes, interfaces, packages, implementation of object oriented languages and procedures.	PO1, PO2

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	2	3		3	-	-	-	-	-	-	-	-
CO3	3	3	3		2	-	-	-	-	-	-	-
CO4	3	3	-	3	-	-	-	-	-	-	-	-
CO5	2	3		-	-	-	-	-	-	-	-	-
CO*	**2.6**	**3**	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Text Books:

1. Concepts of Programming Languages, 11/e , Robert W. Sebesta, Pearson Education, 2016.

2. Programming Language Design Concepts, 1/e, D. A. Watt, Wiley Dreamtech, rp - 2007.

Reference Books:

1. Programming Languages, 2/e, A.B. Tucker, R.E. Noonan, Tata McGraw Hill,2002.
2. Programming Languages, 2/e , K. C.Louden, Thomson, 2003.
3. LISP, 3/e, Patric Henry Winston and Paul Horn, Pearson Education, 2000.
4. Programming in Prolog, 5/e , W.F. Clocksin and C.S.Mellish, Springer,2001.
5. Programming Python, 3/e ,M.Lutz and O'reilly, SPD, rp - 2007.
6. Core Python Programming, 3/e , Chun, Pearson Education, 2007.
7. Guide to Programming with Python, 2/e, Michael Dawson, Thomson, 2008.

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IV B. TECH I-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	3	**0**	**0**	**3**

18CSE414C DESIGN PATTERNS (CORE ELECTIVE-I)

Course Educational Objectives:

CEO1: To understand the concepts of Design patterns to solve the design problems.
CEO2: To analyze and Apply the Knowledge of Design Patterns to develop a Document Editor.
CEO3: To study the creational patterns for developing the model.
CEO4: To Evaluate the structural patterns.
CEO5: To Manage the operational and extension patterns.

UNIT 1: Introduction (9)

What is a design pattern - Design patterns in small talk MVC - Describing design patterns - Catalog of design patterns - Organizing the catalog – How design patterns solve design problems – How to select a design pattern – How to use a design pattern

UNIT 2: A Case Study: Designing a Document Editor (9)

Design problems - Document structure - Formatting - Embellishing the user interface - Supporting multiple look and feel standards - Supporting multiple window systems - User operations - Spelling checking and hyphenation

UNIT 3: Creational Patterns (9)

Abstract factory - Builder – Factory method - Prototype - Singleton

UNIT 4: Structural Patterns (9)

Adapter - Bridge - Composite - Decorator - Façade – Flyweight - Proxy

UNIT 5: Operational and Extension Patterns (9)

Introducing operations - Template method - State - Strategy - Command – Interpreter - Iterator - Visitor - Mediator - Memento – Observer – Business Delegate Pattern – Composite Entity Pattern – Data Access Object Pattern – Front Controller Pattern – Intercepting Filter Pattern – Service Locator Pattern – Transfer Object Pattern

Course Outcomes:

On successful completion of this course, the students should be able to:

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Course Outcomes		POs related to Cos
CO1	Describe solutions to programming problems using design patterns.	PO1, PO2
CO2	Develop and maintain programs using common design patterns and Frameworks.	PO1, PO2
CO3	Identify and implement appropriate solutions to recurring programming problems by consulting technical documentation and specifications, including design pattern catalogs and existing source code.	PO1, PO2, PO3, PO4
CO4	Evaluate the advantages and disadvantages of using design pattern variants.	PO1, PO2, PO3, PO4
CO5	Implement the design patterns such as Creational patterns (Singleton, Factory, Abstract Factory), Structural patterns (Adapter, Composite, Façade), Behavioral patterns (Iterator, Observer), etc.	PO1, PO2, PO3, PO4

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-
CO3	3	3	2	2	-	-	-	-	-	-	-	-
CO4	3	2	2	2	-	-	-	-	-	-	-	-
CO5	3	3	2	2	-	-	-	-	-	-	-	-
CO*	**3**	**2.4**	**2**	**2**	-	-	-	-	-	-	-	-

Text Books:

1. Design Patterns: Elements of Reusable Object Oriented Software, 1/e, Gamma, Belm, Johnson, 2012, Pearson Education, New Delhi, India.
2. Design patterns in java: Software Patterns Series, 1/e, Steven John Metsker, William C. Wake, 2006, Pearson Education, New Delhi.

References Books:

1. Design Patterns: Elements of Reusable Object Oriented Software, 1/e, Gamma, Belm, Johnson, 2008, Pearson Education, New Delhi, India.
2. Object Oriented Design and Patterns, 2/e, Horstmann, Wiley, 2012, Wiley India Pvt Ltd India.

3. Object Oriented Systems Development, 1/e, Ali Bahrami, 1999, McGrawHill, Hyderabad, India.
4. Applying UML Patterns, 3/e, Larman, 2008, Pearson Education, New Delhi, India.
5. Programming in the Large with Design Patterns, 3/e, Eddie Burris, 2012, Pretty Print Press, Leawood Kansas, Usa.
6. Head First Design Patterns, 3/e, Eric Freeman, Oreilly, 2004,SPD, Motilal UK Books, New Delhi, India.
7. Java Design Patterns, 1/e, Cooper, 2000, Pearson Education, New Delhi, India

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IV B. TECH I-SEMESTER (CSE)	**L**	**T**	**P**	**C**
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18CSE414D FUZZY LOGIC AND NEURAL NETWORKS (CORE ELECTIVE-I)

Course Educational Objectives:

CEO1: To understand the concepts of fuzzy sets, knowledge representation using fuzzy rules, approximate reasoning, fuzzy inference systems.
CEO2: To learn fuzzy logic control and other machine intelligence applications of fuzzy logic.
CEO3: To understand the fundamental theory and concepts of neural networks, neuro modeling, several neural network paradigms and its applications.
CEO4: To learn various ANN architectures and its real-time applications.
CEO5: To understand the basics of an evolutionary computing paradigm known as genetic algorithms and its application to engineering optimization problems.

UNIT-1: INTRODUCTION TO FUZZY LOGIC PRINCIPLES (9)
Introduction to classical sets – properties - operations and relations; fuzzy sets - member ship - uncertainty - operations - properties - fuzzy relations - cardinalities - membership functions.
Fuzzification- member ship value assignment - development of rule base and decision making system - Defuzzification to crisp sets - Defuzzification methods.

UNIT-2: ADVANCED FUZZY LOGIC APPLICATIONS (9)
Fuzzy logic controllers – principles – review of control systems theory – various industrial applications of FLC adaptive fuzzy systems – fuzzy decision making – Multiobjective decision making – fuzzy classification – means clustering – fuzzy pattern recognition – image processing applications – systactic recognition – fuzzy optimization.

UNIT-3: INTRODUCTION TO ARTIFICIAL NEURAL NETWORKS (9)
Fundamentals of neural networks – model of an artificial neuron – neural network architectures – Learning methods – Taxonomy of Neural network architectures – Standard back propagation algorithms – selection of various parameters – variations Applications of back propagation algorithms.

UNIT-4: OTHER ANN ARCHITECTURES (9)
Associative memory – exponential BAM – Associative memory for real coded pattern pairs – Applications adaptive reasonance theory – introduction – ART 1 – ART2 – Applications – neural networks based on competition – kohenenself organizing maps – learning vector quantization – counter propagation networks – industrial applications.

UNIT-5: RECENT OPTIMIZATION TECHNIQUES (9)
Fundamentals of genetic algorithms – genetic modeling – hybrid systems – integration of fuzzy logic, neural networks and genetic algorithms – non traditional optimization techniques like ant colony optimization – Particle swarm optimization and artificial immune systems – applications in design and manufacturing.

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Course Outcomes:

On successful Completion of this course, students will be able to:

Course Outcomes		POs related to COs
CO1	Know the concepts of Fuzzy Logic.	PO1, PO2
CO2	Understand the concepts of Fuzzy Logic Implementation	PO1, PO2, PO3, PO4
CO3	Understand importance of soft computing.	PO1, PO5
CO4	Understand different soft computing techniques like, Fuzzy Logic, Neural Networks and their combination.	PO1, PO2, PO3, PO4
CO5	Implement recent optimization algorithms based on soft computing.	PO1, PO2, PO3, PO5

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	2	3	2	-	-	-	-	-	-	-	-
CO3	3	-	-	-	3	-	-	-	-	-	-	-
CO4	3	2	3	2	-	-	-	-	-	-	-	-
CO5	3	3	3	-	3	-	-	-	-	-	-	-
CO*	**3**	**2**	**3**	**2**	**3**	-	-	-	-	-	-	-

TEXT BOOKS:

1. Rajasekaran. S..VijayalakshmiPai. G.A. "Neural Networks, Fuzzy Logic and Genetic Algorithms", Prentice Hall of India Private Limited, 2003
2. Timothy J.Ross, "Fuzzy logic with Engineering Applications", McGraw Hill, 1995
3. Zurada J.M. "Introduction to Artificial Neural Systems", Jaico publishing house, 1994.

REFERENCE BOOKS:

1. Principles of- soft computing,2/e, S. N. Sivanandam and S.N.Deepa - Wiley indiapvt ltd-new Delhi.
2. Neural Networks and Learning Machines ,3/e,2009, Simon Haykin Phi Learning ,New delhi.
3. Soft Computing & Intelligent Systems ,1/e,Madan M Gupta ,Naresh K Sinha ,2007, Elsevier India Pvt Ltd, New delhi.

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IV B. TECH I-SEMESTER (CSE)	**L**	**T**	**P**	**C**
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18CSE414E NETWORK MANAGEMENTSYSTEMS (CORE ELECTIVE-I)

Course Educational Objectives:

CEO1: To understand the principles of network management, different standards and protocols used in managing complex networks.
CEO2: To understand the Network Management concepts and practical issues related To SNMPv1.
CEO3: To analyze the Remote network monitoring by using new mechanisms.
CEO4: To demonstrate the working procedure of SNMPv2 for protocol operations.
CEO5: To study about the telecommunication management network

UNIT – 1: Data Communications and Network Management Overview (9)

Analogy of telephone network management – Data and telecommunication network – Distributed computing environments – TCP/ IP based networks - Communications protocols and standards - Case histories of networking and management - Network management: Goals – Organization - Functions - Network and system management

UNIT – 2: SNMPv1 (9)

SNMP network management concepts – Background – Basic concepts - SNMP management information – Structure of management information – Practical issues – Standard MIBs – MIB II – Ethernet interface MIB

UNIT – 3: RMON (9)

Remote network monitoring: statistics collection – Basic concepts – Statistics group – History group – Host group – Host TopN group – Matrix group – Token ring extensions to RMON – Remote network monitoring: alarms and filters – Alarm group – Filter group – Packet capture group – Event group – RMON2 – Overview – Protocol directory group – Protocol distribution group – Address map group – RMON2 host groups – RMON2 matrix groups – User history collection group – Probe configuration group – Extensions to RMON1 for RMON2 devices

UNIT – 4: SNMPv2 (9)

Management Information – Background – Structure of management information – Protocol – Protocol operations – Transport mappings – Coexistence with SNMPv1 – MIBS and conformance – SNMPv2 management information base – Conformance statements – Evolution of the interfaces group of MIB II

UNIT – 5: Telecommunications Management Network (9)

Why TMN? - Operations System - TMN Conceptual Model - TMN Standards - TMN Architecture - TMN Management Service Architecture - An Integrated View of TMN -Implementation Issues.

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Course Outcomes:

On successful completion of this course, the students should be able to:

Course Outcomes		POs related to COs
CO1	Acquire the knowledge about network management standards (OSI and TCP/IP)	PO1, PO2
CO2	Manage various network management protocols and the skills to use them in monitoring a network	PO1, PO2
CO3	Analyze the challenges faced by Network managers in remote network monitoring.	PO1, PO4
CO4	Evaluate various commercial network management systems and open network management systems.	PO1, PO2, PO4
CO5	Obtain knowledge about the telecommunication management network	PO1, PO2, PO12

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-
CO3	3	-	-	3	-	-	-	-	-	-	-	-
CO4	3	3	-	3	-	-	-	-	-	-	-	-
CO5	3	3	-	-	-	-	-	-	-	-	-	3
CO*	**3**	**3**	**-**	**3**	**-**	-	-	-	-	-	-	**3**

Text Books:

1. Network Management Principles and Practice, 2/e, Mani Subramanian, Addison Wesley, December, 2010, New York, USA.
2. SNMP SNMPv2 SNMPv3 and RMON 1 and 2, 3/e,William Stallings, Addison Wesley, 2006 New York, USA.

References Books:

1. Network Management Principles and Practice, 1/e, Mani Subramanian, Addison Wesley, December, 1999, New York, USA.

2. Practical Guide to SNMPv3 and Network Management, 1/e, David Zeltserman, May 1999 Prentice Hall, New Delhi, India.
3. Network Security and Management, 3/e, Brijendra Singh, 2012, PHI, New Delhi, India.
4. Network management, 1/e, Morris–2010, Pearson Education, New Delhi, India.
5. Principles of Network System Administration, 2/e, Mark Burges, Wiley Dreamtech, December 2003, India.
6. Distributed Network Management, 1/e,Paul, John Wiley Dreamtech ,September 1994, India.

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IV B. TECH I-SEMESTER (CSE)

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18CSE415A SOFTWARE PROJECT MANAGEMENT (CORE ELECTIVE-II)

Course Educational Objectives:

CEO1: To Understand the fundamental principles of Software Project management & will also have good knowledge of responsibilities of project manager and how to handle these.
CEO2: To plan and manage projects at each stage of the software development life cycle (SDLC).
CEO3: To identify the steps of project planning, management, quality assurance and their relationships.
CEO4: To develop their skills for tracking, controlling software deliverables with in schedule and budget.
CEO5: To identify and develop the good knowledge of the issues and challenges faced while doing the software project.

UNIT 1: Understand the Basics (9)
Manage your people – Managing project culture – Managing good people – Making good people- better – Leading good people – Implement your process – Putting a process in place – implementing a process – Adopting an agile process – Assessing a process – Leverage your tools – Choosing tools –Training to use tools – Leveraging tools – Use your measurements – Selecting measurements –Planning measurement – Leveraging measurement.

UNIT 2: Project Life Cycle And Effort Estimation (9)
Software process and Process Models – Choice of Process models - Rapid Application development – Agile methods – Dynamic System Development Method – Extreme Programming– Managing interactive processes – Basics of Software estimation – Effort and Cost estimation techniques – COSMIC Full function points - COCOMO II - a Parametric Productivity Model.

UNIT 3: Artifacts of the Process and Model based Software Architectures (9)
The artifact sets - Management artifacts - Engineering artifacts - Programmatic artifacts – Model based software architectures - A management perspective and technical perspective - Workflows of the process - Software process workflows - Iteration workflows - Checkpoints of the process – Major milestones - Minor milestones - Periodic status assessments.

UNIT 4: **Iterative process planning- Project Organizations and Responsibilities (9)**
Work break down structures - Planning guidelines – The cost and schedule estimating process – The iteration planning process - Pragmatic planning -Line of business organizations - Project organizations - Evolution of organizations – Process automation - Automation building blocks - The project environment.

UNIT 5: Project Control and Process Instrumentation (9)
The seven core metrics - Management indicators - Quality indicators - Life cycle expectations -pragmatic software metrics - Metrics automation - Tailoring the process - Process discriminates-Example.

Course Outcomes:

On successful completion of this course, the students should be able to:

Course Outcomes	POs related to COs

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CO1	Implement a project to manage project schedule, expenses and resources of application.	PO1, PO2,PO3,PO4
CO2	Obtain adequate knowledge about software process models and software effort estimation techniques.	PO1, PO2
CO3	Design and develop project plans to address real-world management challenges.	PO1, PO2, PO3
CO4	Aware of project management theories, tools, techniques and methods to manage the software projects at each stage of software development life cycle.	PO1, PO2,PO3 PO4, PO5
CO5	Understand modern software project management principles as a member and leader in a team to manage the projects.	PO1, PO2

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	3	3	-	-	-	-	-	-	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-
CO3	3	3	3	-	-	-	-	-	-	-	-	-
CO4	3	3	3	3	2	-	-	-	-	-	-	-
CO5	2	2	-	-	-	-	-	-	-	-	-	-
CO*	**2.8**	**2.8**	**3**	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Text Books:

1. Software Project Management, 1/e, Walker Rayce, 1998, PEA, New Delhi.
2. Software Project Management, 2/e, Henrey, 2009, Pearson Education, New Delhi.

Reference Books:

1. Software Engineering Project Management, 2/e, Richard H. Thayer, 1997, IEEE Computer Society, US.
2. Software Engineering and Management, 2/e, Shere K. D 1998, PHI, New Delhi.
3. Software Project Management: A Concise Study, 2/e, S. A. Kelkar ,2009 , PHI, New Delhi.
4. Software Project Management, 5/e, Hughes Cotterell, 2011, TMH, India.
5. Software Project Management, 1/e, Mohapatra S 2011, Penguin Books Ltd, London, UK.
6. Bob Hughes, Mike Cotterell and Rajib Mall: Software Project Management – Fifth Edition, Tata McGraw Hill, New Delhi, 2012.
7. Robert K. Wysocki ―Effective Software Project Management‖ – Wiley Publication, 2011.

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IV B. TECH I-SEMESTER (CSE)	**L**	**T**	**P**	**C**
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18CSE415B ADVANCED COMPUTER ARCHITECTURE (Core Elective-II)

Course Educational Objectives:

CEO1: To gain knowledge on different types of modern and high performance computers.
CEO2: To describe the types of Memory and the Processor Performance Principles.
CEO3: To understand the designs of Multiprocessor and Multi computer Architectures.
CEO4: To know the principles of Vector Processors and Multi-threading concepts.
CEO5: To analyze Instruction Level Parallelism in Parallel computers.

UNIT – 1: Parallel Computer Models - Program and Networks Properties (9)

The state of computing - Multiprocessors and multi computers- Multi vector and SIMD computers - PRAM and VLSI models - Architectural development tracks - Conditions of parallelism - Program partitioning and scheduling - Program flow mechanisms - System interconnect architectures

UNIT – 2: Principles of Scalable Performance- Processors and Memory Hierarchy (9)

Performance metrics and measures - Parallel processing applications - Speedup performance laws - Scalability analysis and approaches - Advanced processor technology - Superscalar and vector processors - Memory hierarchy technology

UNIT – 3: Bus- Cache - Shared Memory - Multiprocessors and Multicomputer (9)

Bus systems - Cache memory organizations - Shared memory organizations - Pipelining and super scalar techniques - Linear pipeline processors - Nonlinear pipeline processors - Instruction pipeline design - Arithmetic pipeline design - Multiprocessor system interconnects - cache coherence and synchronization mechanisms - Message passing mechanisms

UNIT – 4: Multi Vector and SIMD Computers (9)

Vector processing principles - Multi vector multiprocessors - Compound vector processing - SIMD Computer organizations - Scalable multithreaded and dataflow architectures - Latency hiding techniques - Principles of multithreading - Fine grain multi computers - Scalable and multithreaded architectures - Dataflow and hybrid architectures

UNIT – 5: Instruction Level Parallelism and its Dynamic Exploitation (9)

Concepts and challenges – Overcoming data hazards with dynamic scheduling - Dynamic scheduling – Reducing branch costs with dynamic hardware prediction – Advantages and Limitations of ILP – CPU GPU Integration.

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Course Outcomes:

On successful completion of this course, the students should be able to:

Course Outcomes		POs related to COs
CO1	Have knowledge on different types of Parallel computers.	PO1, PO2
CO2	Understand the Basic Concepts Used in Advanced Computers.	PO1, PO2, PO4
CO3	Understand the designs of Super Computer Architectures.	PO1, PO2, PO3
CO4	Analyze how computer performance can increase using Vector Processors and Multi-threading concepts.	PO1, PO2, PO3
CO5	Analyze the Instruction Level Parallelism in Parallel computers to increase speed.	PO1, PO2, PO3

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	3	-	-	-	-	-	-	-	-
CO3	3	3	3	-	-	-	-	-	-	-	-	-
CO4	3	3	3	-	-	-	-	-	-	-	-	-
CO5	3	3	3	-	-	-	-	-	-	-	-	-
CO*	**3**	**3**	**3**	**3**	-	-	-	-	-	-	-	-

Text Books:

1. Advanced Computer Architecture, 3/e, Kai Hwang and Jotwani, 2016, McGraw-Hill Publications,India.
2. Computer Architecture A quantitative approach, 5/e, JohnL.Hennessy and David A. Patterson, Morgan Kufmann Publication, 2012 (An Imprint of Elsevier).

Reference Books:

1. Advanced Computer Architecture, 2/e, Kai Hwang and Jotwani, 2010, McGraw-Hill Publications,India.
2. Advanced Computer Architecture, 1/e,D.Sima, T.Fountain, P.Kacsuk, 2010, Pearson Education, New Delhi.
3. Advanced Computer Architecture, 1/e, R.C.Dubey, 2010, Chand& Co Ltd,New Delhi, India.
3. Computer Architecture and Parallel Processing, 1/e,Hwang and Briggs, 1986, TMH, India.
4. Advanced Computer Architecture, 1/e, Amith Kumar Mishra, S K Kataria and Sons, 2012, New Delhi, India.

5. Advanced Computer Architectures. 1/e, Sajjan G. Shiva , 2005, CRC Press , US.

IV B. TECH I-SEMESTER (CSE)

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3	0	0	3

18CSE415C SOFT COMPUTING (CORE ELECTIVE-II)

Course Educational Objectives:

CEO 1: To learn the Basics of Artificial Neural Networks and Learning Algorithms.
CEO 2: To Understand appropriate learning rules for each of the architectures and learn several neural network paradigms.
CEO 3: To introduce the fuzzy logic concepts, fuzzy principles and relations.
CEO 4: To learn the Genetic Algorithm and its applications in soft computing.
CEO 5:.To study the Techniques of Hybrid Soft Computing and its Applications

UNIT - 1: Introduction to Artificial Neural Networks (ANN) (9)

Introduction - Fundamental concept - Basic models of ANN - Terminologies of ANN – MCCullochpitts neuron - Linear separability - Hebb network - Supervised learning network - Perception networks - Adaptive linear neuron - Back propagation network

UNIT - 2: Associative Memory Networks (9)

Training algorithms for pattern association - Auto associative memory network – BAM - Hopfield networks - Unsupervised learning network - Fixed weight competitive nets - Kohonenself organizing feature maps - Learning vector quantization - Counter propagation network - Adaptive Resonance theory network

UNIT – 3: Introduction to Fuzzy Logic (9)

Fuzzy sets - Classical relations and fuzzy relations - Cartesian product of relations - Classical relation - Fuzzy relations - Tolerance and equivalence relations - Membership functions - Features of the membership function – Fuzzification - Methods of membership value assignments - Defuzzification methods - Fuzzy arithmetic and fuzzy measures -Fuzzy rule base and approximate reasoning.

UNIT – 4: Genetic Algorithm and Applications (9)

Introduction - Biological background - Traditional optimization and search techniques - Genetic algorithm and search space - Terminologies in genetic algorithm - General genetic algorithm - Operators in genetic algorithm - Problem solving using genetic algorithm.

Advanced applications: Printed character recognization - Inverse kinematics problems - Automobile MPG prediction - Genetic algorithms in game playing

UNIT - 5: Hybrid Soft Computing Techniques & Applications (9)

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Neuro-fuzzy hybrid systems – genetic neuro hybrid systems – genetic fuzzy hybrid and fuzzy genetic hybrid systems – simplified fuzzy ARTMAP
Applications: A fusion approach of multispectral images with SAR, optimization of traveling salesman problem using genetic algorithm approach, soft computing based hybrid fuzzy controllers.

Course Outcomes:

On successful completion of the course the student will be able to,

Course Outcomes		**POs related to COs**
CO1	To understand the fundamental theory and concepts of neural networks, Identify different neural network architectures, algorithms, applications and their limitations	PO1, PO2
CO2	Understand appropriate learning rules for each of the architectures and learn several neural network paradigms and its applications	PO1, PO2, PO3, PO4
CO3	Comprehend the fuzzy logic and the concept of fuzziness involved in various systems and fuzzy set theory	PO1, PO2
CO4	List the facts and outline the different process carried out in Genetic Algorithms and their applications	PO1, PO3, PO5
CO5	Understand the concepts of Hybrid Soft Computing Techniques and its Applications	PO1, PO2, PO4, PO5

CO-PO Mapping

PO / CO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	3	3	-	-	-	-	-	-	-	-
CO3	3	3	-	-	-	-	-	-	-	-	-	-
CO4	3	3	-	-	3	-	-	-	-	-	-	-
CO5	3	3	-	3	3	-	-	-	-	-	-	-
CO*	**3**	**3**	**3**	**3**	**3**	-	-	-	-	-	-	-

Text Books:

1. Principles of Soft Computing, 3/e , S.N. Sivanandam and S.N. Deepa, 2018 Wiley India Ltd, First Indian Edition, India.

2. Neuro-Fuzzy and Soft Computing, 1/e, Jyh-Shing Roger Jang, Chuen, Tsai Sun, EijiMizutani,2003, Prentice-Hall of India,India.

Reference Books:

1. Principles of Soft Computing, 1/e , S.N. Sivanandam and S.N. Deepa, 2007 Wiley India Ltd, First Indian Edition, India.
2. Neural Networks Algorithms Applications, and Programming Techniques, James A. Freeman and David M. Skapura, 2003, PearsonEdition, India.
3. Fuzzy Sets and Fuzzy Logic-Theory and Applications, George J. Klir and Bo Yuan, 1995, Prentice Hall, India.
4. Artificial Intelligence and Soft Computing, AmitKonar, 2000, CRC Press, First Edition, India.
5. Neural Networks: A Comprehensive Foundation, 2/e, Simon Haykin, 2008, Pearson Education, New Delhi, India.
6. Soft Computing and Intelligent System Design, 1/e,Fakhreddine O. Karry Clarence de Silva2009, Pearson Education, New Delhi, India.

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IV B. TECH I-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	2	**1**	**0**	**3**

18CSE415D SYSTEM MODELING AND SIMULATION (CORE ELECTIVE-II)

Course Educational Outcomes:

CEO1: To gain knowledge about the system and principles used for modeling.
CEO2: To understand different random number generation techniques for evaluating the system.
CEO3: To analyze numerical computation techniques for continuous and discrete models.
CEO4: To study System Dynamics and Probability Concepts in Simulation.
CEO5: To perform Discrete System Simulation for real time scenarios

UNIT – 1: Introduction to Simulation and System Models (9)

The concepts of a system - System environment - Stochastic activities - Continuous and discrete systems - System modeling - Types of models - Static and dynamic physical models - Static and dynamic mathematical models - Principles used in modeling - Advantages and disadvantages of simulation - Areas of application - Systems and system environment - Discrete event system simulation - Steps in a simulation study

UNIT – 2: Random Numbers (9)

Random number generation - Properties of random numbers - Generation of pseudo random numbers - Techniques of generating random numbers - Linear congruential method - Tests for random numbers - Random variate generation - Inverse transform technique - Exponential distribution - Uniform distribution - Weibull distribution - Empirical continuous distribution – Direct transformation for normal distribution – Convolution method - Erlang distribution - Acceptance-rejection technique

UNIT – 3: System Simulation and Continuous System Simulation (9)

Types of system simulation - Monte carlo method - Comparison of simulation and analytical methods - Numerical computation techniques for continuous and discrete models - Distributed lag models - Cobweb model - Continuous system models - Analog and hybrid computers - Digital analog simulators - Continuous system simulation languages - Hybrid simulation - Real time simulations

UNIT – 4: System Dynamics and Probability Concepts in Simulation (9)

Exponential growth and decay models - Logistic curves - Generalization of growth models - System dynamics diagrams - Multi segment models - Representation of time delays - Discrete and continuous probability functions - Continuous uniformly distributed random numbers

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UNIT – 5: Arrival Patterns and Discrete System Simulation (9)

Poisson arrival patterns - Exponential distribution - Hyper exponential distribution - Service times – The normal distribution - Queuing disciplines – Measures of queues – Discrete events – Representation of time – Generation of arrival patterns – Simulation of a telephone system – Delayed calls – Simulation programming tasks – Gathering statistics – Counters and summary statistics – Measuring utilization and occupancy – Recording distribution and transit times – Discrete simulation languages

Course Outcomes:
On successful completion of this course, the students should be able to:

Course Outcomes		POs related to COs
CO1	Acquire the knowledge about system and principles used for modeling.	PO1, PO2
CO2	Use random number generation techniques to solve the issues in system.	PO1, PO2, PO5
CO3	Analyze the hybrid and real time simulations using continuous system simulation.	PO1, PO2
CO4	Understand the System Dynamics and Probability Concepts in Simulation.	PO1, PO2, PO4
CO5	Develop the simulation for real time scenarios	PO1, PO2, PO3, PO4, PO5

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	-	3	-	-	-	-	-	-	-
CO3	3	3	-	-	-	-	-	-	-	-	-	-
CO4	3	3	-	3	-	-	-	-	-	-	-	-
CO5	3	3	3	3	3	-	-	-	-	-	-	-
CO*	**3**	**3**	**3**	**3**	**3**	-	-	-	-	-	-	-

Text Books:

1. System simulation, 2/e, GeoffreyGorden, 2006,Prentice Hall of India, New Delhi,India.
2. Discrete Event System Simulation, 2/e, Jerry Banks,John Carson, Barry L.Nelson and David Nicol -2000, Prentice Hall Inc, New Delhi , India.

Reference Books:

1. Simulation Modeling, 1/e,Seila ,Cengage Learning,2003, New Delhi, India.

2. Simulation Modeling and Analysis, 3/e, Law, 2000 McGraw-Hill, Hyderabad, India.
3. System Simulation with Digital Computer, 2/e, Deo, 1983 PHI, NewDelhi, India.
4. Simulation Modeling Methods, 1/e, Harrington, 2000,McGraw-Hill, Hyderabad, India.
5. System Modeling and Simulation, 1/e, Severance,2001,WileyPublications,New Delhi, India

IV B. TECH I-SEMESTER (CSE)

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3	0	0	3

18CSE415E IMAGE PROCESSING (CORE ELECTIVE-II)

Course Educational Objectives:

CEO1 : To understand the fundamentals of Digital imaging
CEO2 : To understand the Image Processing techniques
CEO3 : To understand the image enhancement techniques
CEO4 : To be familiar with image compression
CEO5 : To be familiar with image segmentation

Unit – I **(9)**

Introduction: Fundamentals of Image Processing, Applications of Image Processing, Human Visual Perception, Introduction to Image Formation, Sampling and Quantization, Binary Image, Three-Dimensional Imaging, Image file formats. Color and Color Imagery: Perception of Colors.

Unit – II **(9)**

Image Transformation: Fourier Transforms, Discrete Cosine Transform, Walsh-adamard Transform, Karhaunen-Loeve Transform or PCA. Discrete Wavelet Transform: Wavelet Transform, Extension to 2D Signals, Lifting Implementation of the Discrete Wave Transforms.

Unit – III **(9)**

Image Enhancement and Restoration : Introduction, Distinction between image enhancement and restoration, Histrogram-based Contrast Enhancement, Frequency Domain Methods of Image Enhancement, Noise Modeling, Image Restoration, Image Reconstruction, Image Segmentation.

Unit – IV **(9)**

Recognition of Image Patterns : Introduction, Decision Theoretic Pattern Classification, Baesian Decision Theory, Nonparametric Classification, Linear Discriminant Analysis, Unsupervised Classification Strategies-clustering, K-means clustering algorithm, Syntactic Pattern Classification, Syntactic Inference, Symbolic Projection method. Texture and Shape Analysis.

Unit – V **(9)**

Fuzzy Set Theory in Image Processing : Introduction, Use of Fuzzy Image, Preliminaries and Background, Image as a Fuzzy Set, Fuzzy Methods of Contrast Enhancement, Image Segmentation using Fuzzy Methods, Fuzzy Approaches to Pixel Classification, Fuzzy c-Means Algorithm, Fusion of Fuzzy logic with neural network. Image mining and Content-Based Retrieval.

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Course Outcomes:

	Course Outcomes	POs related to COs
CO1	Understand the design and apply image enhancement and restoration techniques	PO1,PO2
CO2	Ability to design and develop image processing techniques for assisting digital forensics	PO1,PO2,PO7
CO3	Understand the different image restoration techniques	PO5,PO7
CO4	Ability to apply image compression Techniques	PO2,PO3,PO4
CO5	Ability to apply segmentation Techniques	PO2,PO3,PO4

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	-	-	-	3	-	-	-	-	-
CO3	-	-	-	-	3	-	3	-	-	-	-	-
CO4	-	3	3	3	-	-	-	-	-	-	-	-
CO5	-	3	3	3	-	-	-	-	-	-	-	-
CO*	**3**	**3**	**3**	**3**	**3**	-	**3**	-	-	-	-	-

Text Book

1. Maria Petrou and Costas Petrou , “Image Processing the Fundamentals”, John-Wiley and Sons Publishers, 2nd edition, 2010
2. Rafael C. Gonzalez , Richard E. Woods, Steven L. Eddins, "Digital Image Processing Using MATLAB", 2nd edition, Gatesmark Publishing, 2009
3. TinkuAcharya and Ajoy K. Ray, “Image Processing Principles and Applications”, John Wiley & Sons publishers, 2005

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IV B.Tech I Semester

L	T	P	C
3	0	0	3

18OSAH411 GRAPH THEORY WITH APPLICATIONS
(OPEN ELECTIVE-II)

Course Educational Objectives:

1. The course is designed to equip the students with the necessary mathematical skills and techniques that are essential for an engineering course.
2. To learn the representation of graphs and understanding the Graph Isomorphism, Sub graph-Vertex degrees, Walk, Paths, Cycles-graph connection, Bipartite graphs.
3. To understand the Trees concepts, digraphs, binary relations, Shortest path algorithms and to familiarize the knowledge of graph theory
4. To understand the matrix representation of graphs, designing incidence matrix, Adjacency matrix and circuit matrix
5. To explore the use of graphs in various applications in Switching and Coding Theory. Also, to identify the important graph based real time applications of electrical networks such as RLC Networks with Independent sources, LOOP circuits

UNIT – 1: GRAPH THEORY INTRODUCTION (9)

Graph and simple graphs (Complete graphs, Complement of graph) - Graph isomorphism–Sub graph-Vertex degrees, walk, paths, cycles-graph connection and components-Bipartite graphs.

UNIT – 2: DIRECTED GRAPHS AND SHORTEST PATH ALGORITHMS (9)

Trees – Cut edges- Cut vertices-Blocks , Directed graphs types of directed graphs - digraphs and binary relations – directed paths and connectedness - Dijkstra's shortest path algorithm, Floyd-Warshall shortest path algorithm

UNIT – 3: MATRIX REPRESENTATION OF GRAPHS (9)

Introduction - Adjacency matrix -Applications of Adjacency matrix-sufficient condition for isomorphism of graphs-power of an adjacency matrix-Adjacency matrix of a digraph-incidence matrix-circuit matrix-cut set matrix.

UNIT – 4: GRAPHS IN SWITCHING AND CODING THEORY (9)

Contact Networks – Analysis of Contact Networks – Synthesis of Contact Networks – Sequential Switching Networks – Unit Cube and its Graph – Graphs in Coding Theory.

UNIT – 5: ELECTRICAL NETWORK ANALYSIS BY GRAPH THEORY (9)

Introduction - Kirchhoff's current and Voltage laws-Loop currents and Node Voltages- RLC Networks with Independent sources: Nodal analysis, Loop analysis.

TOTAL: 45 HOURS

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Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to COs**
CO1	Demonstrate knowledge in reading and writing rigorous mathematical proofs involving introductory aspects of graphs and develop analytical skills in solving graph theoretic problems	**PO1,PO2,PO3 PO4**
CO2	Demonstrate knowledge in Trees concepts, digraphs, binary relations, and Develop analytical skills in solving problems involving directed graphs and shortest path algorithm	**PO1,PO2,PO3 PO4**
CO3	Demonstrate knowledge in matrix representation of graphs, designing incidencematrix, Adjacency matrix and circuit matrix and explore analytical skills in solving problems involving adjacency matrix and incidence matrix	**PO1,PO2,PO3 PO4**
CO4	Demonstrate knowledge in significant practical applications of graphs in Switching and Coding Theory; explore analytical skills in solving practical problems using graph theory concepts and Develop skills in designing Mathematical models for real time applications in coding theory.	**PO1,PO2,PO3 PO4**
CO5	Demonstrate knowledge in significant real time applications of electrical networks such as RLC Networks Independent sources; explore analytical skills in solving practical problems involving using graph theory concepts and Develop skills in designing Mathematical models for real time electrical networks.	**PO1,PO2,PO3 PO4**

Text Books:

1. Discrete mathematical structures with applications to computer science. J.P.Trimblay and R.Manohar , 27/e, Tata Mc Graw Hill Publications , 2006, New Delhi.
2. Graph Theory with applications to engineering and computer Science, NarasinghDeo, 25/e, Printice – Hall of India Private Limited, 2003, New Delhi

Reference Books:

1. Clark J. And Holton D.A., " A first look at Graph theory", Allied Publishers, 1990.
2. R.B.Bapat , Graphs and Matrices, Springer, London Dordrecht Heidelberg, New York, 2010
3. Gary Haggard John Schlipf, Sue Whitesides, Discrete Mathematics for Computer Science, 4/e, 2007, Thomson Publication, 2008, New Delhi.
4. S.D Sharma ,KedarNath Ram Nath Operation Research & Co, Meerut . 2007.
5. J.A.Bonday and U.S.R. Murty, Graph Theory with application (2nd Edition), North Holland, 1976 .

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	3	3	3	2	-	-	-	-	-	-	-	-
CO.2	3	3	3	2	-	-	-	-	-	-	-	-
CO.3	3	3	3	2	-	-	-	-	-	-	-	-
CO.4	3	3	3	2	-	-	-	-	-	-	-	-

CO.5	3	3	3	2	-	-	-	-	-	-	-	-
CO*	**3**	**3**	**3**	2	-	-	-	-	-	-	-	-

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IV B.Tech I Semester

L	T	P	C
3	0	0	3

18OSAH412 BANKING AND INSURANCE
(OPEN ELECTIVE-II)

Course Educational Objectives:

1. To introduce students to the banking sector and its operations.
2. To provide elaborate knowledge on functions of banking
3. To enable students to understand the digital technology in banking
4. To provide an understanding of insurance and risk management
5. To enable students to gain knowledge on various insurance organizations.

UNIT – 1: INTRODUCTION TO BANKING (9)

Meaning and functions of banking, importance of banking, Reserve Bank of India- Functions.

UNIT – 2: BANK-CUSTOMER RELATIONSHIP (9)

Debtor-creditor relationship, deposit products or services, payment and collection of cheques. Accounts – Types of accounts, procedure for opening and closing an account. Loans and Advances- Principles of lending, Types of loans.

UNIT – 3: BUSINESS MODELS & ELECTRONIC PAYMENT SYSTEM (9)

Features, types of e-payment system, e-cash, NEFT, RTGS, Credit cards, Electronic Wallet and Debit cards. Business models- B2B, B2C, C2C, and B2G.

UNIT – 4: INTRODUCTION TO RISK AND INSURANCE (9)

Concept of risk, risk Vs uncertainty. Insurance definition, Insurance as risk mitigation mechanism, elements of insurance.

UNIT – 5: INSURANCE OVERVIEW (9)

Principles of insurance, insurance types, LIC & GIC, insurance - functions, IRDA, Insurance Players in India.

TOTAL: 45 HOURS

Course Outcomes:

On successful completion of the course, Students will be able to		POs related to COs
CO1	Demonstrate Knowledge in Tools and concepts of Banking.	**PO11, PO12**
CO2	Explain the operations and functions of banking towards customers	**PO7, PO11**
CO3	Apply skills in providing solutions for Online banking and e payment	**PO7,PO11, PO12**
CO4	Employ the risk management practices especially the insurance mechanism.	**PO9,PO11**
CO5	Classify the various types of Insurance and understand the principles behind insurance	**PO7, PO11**

Text Book:

1. A.V. Ranganadha Chary, R.R. Paul, Banking and Financial System, Kalyani Publisher, New Delhi, 2nd Edition.
2. P.K.Gupta, Insurance and Risk Management, Himalaya Publishing House, New Delhi.

Reference Books:

1. Diwan, Praq and Sunil Sharma, Electronic Commerce- A Manager's Guide to E-Business, Vanity Books International, Delhi, 2002.
2. Kalakota Ravi and Whinston Andrew B, Frontiers of Electronic Commerce, Pearson Education India, 1996 New Delhi.
3. Schneider, Gr ey P, Ele ctron ic Com merce , Cou rse Technology, Cengage Learning, 8th Edition, New Delhi, 2008.

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	-	-	-	-	-	-	-	-	-	-	2	2
CO.2	-	-	-	-	-	-	2	-	-	-	3	-
CO.3	-	-	-	-	-	-	3	-	-	-	3	2
CO.4	-	-	-	-	-	-	-	-	2	-	3	-
CO.5	-	-	-	-	-	-	2	-	-	-	3	-
CO*	**-**	**-**	**-**	**-**	**-**	**-**	**2.33**	**-**	**2**	**-**	**2.8**	**2**

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L	T	P	C
3	0	0	3

18OSAH413 MANAGING INNOVATION AND ENTREPRENEURSHIP
(OPEN ELECTIVE-II)

Course Educational Objectives:

1. To enable students understand the importance of innovation in business practices
2. To enable students to innovate new methods and practices in business using innovation approaches
3. To provide knowledge on raising finance for starting new business
4. To enable students to protect their innovation through patent and copyright
5. To motivate students to become successful entrepreneurs through constant innovation

UNIT – 1: CREATIVITY AND INNOVATION (9)

Introduction, Levels of Innovation, the Sources of Innovative Opportunity, The Innovation Process, Innovative Strategies, Creativity – Inbound, Outbound; Context and Process of New Product Development.

UNIT – 2: PARADIGMS OF INNOVATION (9)

Innovation in the Context of Developed Economies and Emerging Economies, Performance gap, Infrastructure gap, Sustainability gap, Regulatory gap, Preference gap.

UNIT – 3: INTELLECTUAL PROPERTY INNOVATION AND ENTREPRENEURSHIP (9)

Introduction to Entrepreneurship, Managerial and Entrepreneurial Competencies, Entrepreneurial Growth and Development, Intellectual Property – Forms of IP, Patents, Trademarks, Design Registration, Copy Rights, and Patent Process in India.

UNIT – 4: OPEN INNOVATION FRAMEWORK & PROBLEM SOLVING (9)

Concept of Open Innovation Approach, Limitations and Opportunities of Open Innovation Framework, Global Context of Strategic Alliance, Problem Identification and Problem Solving, Innovation and Diversification.

UNIT – 5: SOURCES OF FINANCE AND VENTURE CAPITAL (9)

Importance of Finance, Strategies of Venture Funding, Investment Process, Advantages and Disadvantages of Venture Capital, Venture Capital Developments in India.

TOTAL: 45 HOURS

Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to COs**
CO1	Demonstrate the principles of business innovation and entrepreneurship for establishing industrial ventures..	**PO9,PO11**
CO2	Apply the approaches to innovation for developing successful ventures	**PO9, PO11**
CO3	Develop a comprehensive and well planned acquisition of finance for a	**PO9,PO10,PO11**

	new venture	
CO4	Exhibit entrepreneurial competencies and protect the innovations	**PO9,PO11**
CO5	Apply ethics in constructive innovation framework.	**PO8, PO11,PO12**

Text Books:

1. Vi nn ie Ja uha ri , S ud han sh u B hu sha n, I nn ov at ionManagement, Oxford University Press, 1st Edition, 2014.
2. Drucker, P. F., Innovation and Entrepreneurship, Taylor & Francis, 2nd Edition, 2007.

Reference Books:

1. Robert D Hisrich, Claudine Kearney, Managing Innovation and Entrepreneurship, Sage Publications, 1st Edition, 2014.
2. V.K.Narayanan, Managing Technology and Innovation for Competitive Advantage, Pearson India, 1st Edition, 2002.

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	-	-	-	-	-	-	-	-	-	-	1
CO.2	3	-	-	-	-	-	-	-	-	-	-	1
CO.3	3	-	-	-	-	-	-	-	-	-	-	1
CO.4	3	-	-	-	-	-	-	-	-	-	-	1
CO.5	3	-	-	-	-	-	-	-	-	-	-	1
CO*	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	1

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L	T	P	C
3	0	0	3

18OCIV411 TRANSPORT AND ENVIRONMENT
(OPEN ELECTIVE-II)

Course Educational Objectives:

1. The objective of this course is to create an awareness / overview of the impact of Transportation Projects on the environment and society.
2. To improve the environmental impact predictions
3. To study the water, air, land and noise assessment
4. To study the environmental mitigation.
5. To study the environmental case studies

UNIT – 1: INTRODUCTION (9)

Environmental inventory, environmental assessment, environmental impact assessment (EIA), environmental impact of transportation projects, need for EIA, EIA guidelines fortransportation project, historical development.

UNIT – 2: METHODOLOGIES (9)

Elements of EIA – Screening and scoping – Methods of impact analysis – Applications –appropriate methodology.

UNIT – 3: ENVIRONMENTAL IMPACT, PREDICTION AND ASSESSMENT (9)

Prediction and assessment of impact of transportation project at various stages on water, air, noise, land acquisition and resettlement, socio economic impact, indigenous people, aesthetics, health and safety, energy studies, IRC guidelines.

UNIT – 4: ENVIRONMENTAL MITIGATION AND MANAGEMENT PLAN (9)

Mitigation of the impact on natural and man-made environment, health, water, land, noise, air, public participation, environmental management plan, energy conservation, methods to reduce global warming.

UNIT – 5: NETWORK INTRUSION DETECTION AND PREVENTION SYSTEMS (9)

EIA case studies on highway, railway, airways and waterways projects.

TOTAL: 45 HOURS

Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to COs**
CO1	Explain the impact of transportation projects on the environment	**PO1, PO2**
CO2	Demonstrate the impact of environmental laws on transportation projects	**PO1, PO2 ,**
CO3	Demonstrate the impact of transportation project on the water, air, land and noise	**PO1, PO2**
CO4	Explain the environmental mitigation	**PO1**
CO5	Analyses the environmental case studies	**PO1, PO2 ,**

Text Books:

1. Environmental Impact Assessment, Canter, L.R., 1996, McGraw Hill, New Delhi.
2. Indian Road Congress (IRC), Environmental Impact of Highway Projects, IRC, 1998, Delhi.
3. Elements of Environmental Science and Engineering, P. Meenakshi, 2006, Prentice Hall of India, New Delhi.
4. Introduction to Environmental Science and Management, Thirumurthy A.M., 2005, Shroff Publishers, Bombay.

Reference Books:

1. John G.Rau and David, C.Hooten, Environmental Impact Analysis Handbook, McGraw Hill Book Company, 1995.
2. James H.Banks, Introduction to Transportation Engineering, McGraw Hill Book Company, 2000.
3. A Handbook on Roads and Environment, World Bank, Vol.I and II, 1997, Washington DC.
4. International Encyclopedia of Ecology and Environment – EIA, Indian Institute of Ecology and Environment, Priya Ranjan Trivedi, 1998, New Delhi, Hyderabad: Indian Green Building Council.

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	2	3	-	-	-	-	-	-	-	-	-	-
CO.2	1	2	-	-	-	-	-	-	-	-	-	-
CO.3	2	2	-	-	-	-	-	-	-	-	-	-
CO.4	3	-	-	-	-	-	-	-	-	-	-	-
CO.5	2	3	-	-	-	-	-	-	-	-	-	-
CO*	**2**	**2**	-	-	-	-	-	-	-	-	-	-

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IV B.Tech I Semester

L	T	P	C
3	0	0	3

18OCIV412 DISASTER MANAGEMENT
(OPEN ELECTIVE-II)

Course Educational Objectives:

1. To explain disasters, their significance and types.
2. To demonstrate the disaster prevention and risk reduction methods.
3. To gain a preliminary understanding of approaches of Disaster Risk Reduction (DRR).
4. To enhance awareness of institutional processes in the country.
5. To explain the disaster management case studies

UNIT – 1: INTRODUCTION TO DISASTERS (9)

Definition: Disaster, hazard, vulnerability, resilience, risks – Disasters: types of disasters –Earthquake, landslide, flood, drought, fire etc – Classification, causes, impacts including social, economic, political, environmental, health, psychosocial, etc. – Differential impacts in terms of caste, class, gender, age, location, disability – Global trends in disasters: urban disasters, pandemics, complex emergencies, climate change – Dos and don'ts during various types of disasters.

UNIT – 2: APPROACHES TO DISASTER RISK REDUCTION (DRR) (9)

Disaster cycle – Phases, culture of safety, prevention, mitigation and preparedness communitybased DRR, structural – Nonstructural measures, roles and responsibilities of community,panchayat raj institutions/urban local bodies (PRIs/ULBs), states, centre, and other stakeholders – Institutional processes and framework at state and central level – State disaster management authority (SDMA) – Early warning system – Advisories from appropriate agencies.

UNIT – 3: INTER-RELATIONSHIP BETWEEN DISASTERS AND DEVELOPMENT (9)

Factors affecting vulnerabilities, differential impacts, impact of development projects such as dams, embankments, changes in land use etc. – Climate change adaptation – IPCC scenario and scenarios in the context of India – Relevance of indigenous knowledge, appropriate technology and local resources.

UNIT – 4: DISASTER RISK MANAGEMENT IN INDIA (9)

Hazard and vulnerability profile of India, components of disaster relief: water, food, sanitation, shelter, health, waste management, institutional arrangements (mitigation, response and preparedness, disaster management act and policy – Other related policies, plans, programs and legislation – Role of GIS and information technology components in preparedness, risk assessment, response and recovery phases of disaster – Disaster damage assessment.

UNIT – 5: DISASTER MANAGEMENT: APPLICATIONS, CASE STUDIES &FIELD WORK (9)

Landslide hazard zonation: case studies, earthquake vulnerability assessment of buildings and infrastructure: case studies, drought assessment: case studies, coastal flooding: storm surge assessment, floods: fluvial and pluvial flooding: case studies; forest fire: case studies, man-made disasters: case studies, space based inputs for disaster mitigation and management and field works related to disaster management.

TOTAL: 45 HOURS

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Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to COs**
CO1	Differentiate the types of disasters, causes and their impact on environment and society	**PO1, PO2**
CO2	Assess vulnerability and various methods of risk reduction measures as well as mitigation	**PO1, PO2**
CO3	Draw the hazard and vulnerability profile of India, Scenarious in the Indian context, Disaster damage assessment and management	**PO1, PO2**
CO4	To analyse the disaster management techniques	**PO1, PO2 ,PO3**
CO5	To describe the situations of disaster management case studies	**PO1, PO2 ,**

Text Books:

1. Disaster Management, Singhal J.P. 2010, Laxmi Publications, ISBN-10: 9380386427; ISBN-13: 978-9380386423
2. Disaster Science and Management, Tushar Bhattacharya, 2012, McGraw Hill India Education Pvt. Ltd., ISBN-10: 1259007367, ISBN-13: 978-1259007361

Reference Books:

1. Govt. of India: Disaster Management Act, Government of India, 2005, New Delhi.
2. Government of India, National Disaster Management Policy, 2009.
3. Environmental Knowledge for Disaster Risk Management, NIDM, Gupta Anil K, Sreeja S. Nair. 2011, New Delhi.
4. Vulnerable India: A Geographical Study of Disasters, KapurAnu 2010, IIAS and Sage Publishers, New Delhi.

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	2	2	-	-	-	-	-	-	-	-	-	-
CO.2	1	3	-	-	-	-	-	-	-	-	-	-
CO.3	2	2	-	-	-	-	-	-	-	-	-	-
CO.4	1	1	3	3	-	-	-	-	-	-	-	-
CO.5	2	3	-	-	-	-	-	-	-	-	-	-
CO*	**1.6**	**2.6**	**3**	**3**	-	-	-	-	-	-	-	-

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IV B.Tech I Semester

L	T	P	C
3	0	0	3

18OCIV413 AIR POLLUTION AND CONTROL
(OPEN ELECTIVE-II)

Course Educational Objectives:

1. To impart knowledge on the principle and design of control of indoor.
2. To study about meteorology.
3. To learn about particulate/ gaseous air pollutant and its emerging trends.
4. An understanding of the nature and characteristics of air pollutants, noise pollution and basic concepts of air quality management
5. Ability to identify, formulate and solve air and noise pollution problems

UNIT – 1: INTRODUCTION (9)

Structure and composition of atmosphere – Definition, scope and scales of air pollution –Sources and classification of air pollutants and their effect on human health, vegetation, animals, property, aesthetic value and visibility – Ambient air quality and emission standards – Ambient and stack sampling and analysis of particulate and gaseous pollutants.

UNIT – 2: METEOROLOGY (9)

Effects of meteorology on air pollution – Fundamentals, atmospheric stability, inversion, wind profiles and stack plume patterns – Atmospheric diffusion theories – Dispersion models, plume rise.

UNIT – 3: CONTROL OF PARTICULATE CONTAMINANTS (9)

Factors affecting selection of control equipment – Gas particle interaction – Working principle, design and performance equations of gravity separators, centrifugal separators fabric filters, particulate scrubbers, electrostatic precipitators – Operational considerations.

UNIT – 4: CONTROL OF GASEOUS CONTAMINANTS (9)

Factors affecting selection of control equipment – Working principle, design and performance equations of absorption, adsorption, condensation, incineration, bio scrubbers, bio filters – Process control and monitoring – Operational considerations.

UNIT – 5: INDOOR AIR QUALITY MANAGEMENT (9)

Sources types and control of indoor air pollutants, sick building syndrome types – Radon pollution and its control – Sources and effects of noise pollution – Measurement – Standards– Control and preventive measures

TOTAL: 45 HOURS

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Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to COs**
CO1	To impart knowledge on the principle and design of control of indoor.	**PO1, PO2**
CO2	To study about meteorology.	**PO1, PO2**
CO3	To learn about particulate/ gaseous air pollutant and its emerging trends.	**PO1, PO2**
CO4	An understanding of the nature and characteristics of air pollutants, noise pollution and basic concepts of air quality management	**PO1, PO2 ,PO3,PO4**
CO5	Ability to identify, formulate and solve air and noise pollution problems	**PO1, PO2 ,**

Text Books:

1. Air Pollution Control Engineering, Lawrence K. Wang, Norman C. Pareira, Yung Tse Hung, 2004, Tokyo.
2. Air Pollution and Control Technologies, Anjaneyulu. Y, 2002, Allied Publishers (P) Ltd., India.

Reference Books:

1. Air Pollution, David H.F. Liu, Bela G. Liptak, 2000, Lweis Publishers.
2. Air Pollution (Vol.I – Vol.VIII), Arthur C.Stern, 2006, Academic Press.
3. Air Pollution Engineering Manual, Wayne T.Davis, 2000, John Wiley & Sons, Inc.
4. Air Pollution Control Engineering, Noel de Nevers, 1995, McGraw Hill, New York.

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	2	3	-	-	-	-	-	-	-	-	-	-
CO.2	1	3	-	-	-	-	-	-	-	-	-	-
CO.3	2	3	-	-	-	-	-	-	-	-	-	-
CO.4	1	1	3	3	-	-	-	-	-	-	-	-
CO.5	2	3	-	-	-	-	-	-	-	-	-	-
CO*	**1.6**	**2.6**	**3**	**3**	-	-	-	-	-	-	-	-

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IV B.Tech I Semester

L	T	P	C
3	0	0	3

18OEEE411 WIND ENERGY CONVERSION SYSTEMS
(OPEN ELECTIVE-II)

Course Educational Objectives:

1. To make the student know various methods of measuring wind speed and facilities available for storage of such data.
2. To train the students to design the blade of a wind turbines.
3. To make the student understand methods for sitting a wind farm.
4. To make the student understand economics of establishing wind system.
5. To make the student know the applications of wind turbine.

UNIT – 1: INTRODUCTION (9)

Modern wind turbines, wind resources, wind vs. traditional electricity generation, technology advancements, material Usage. Applications: grid connected power, industrial applications, stand-alone system, water pumping, offshore prospects Introduction of Wind Resource Assessment , spatial variation, time variations, seasonal and monthly variability, diurnal variations. Characteristics of steady wind: turbulence, types of turbulence models, turbulence intensity.

UNIT – 2: WIND MEASUREMENT (9)

Vertical profiles of the steady wind. Wind speed measurement parameters, Monitoring station instrumentation, cup anemometer, propeller anemometer, Ultrasound anemometer, wind vane, data loggers, remote wind speed sensing techniques- Sodar, Lidar, SAR, LWS, Satellite remote sensing, Aerofoil, two dimensional airfoil theory, relative wind velocity. Wind flow models, wind flow pattern. Axial momentum theory, Momentum theory, blade element theory. Wind machine characteristics.

UNIT – 3: WIND TURBINES (9)

Historical development. Classification of wind turbines. Turbine components. Wind turbine design of Wind turbine, rotor torque and power, Power control, braking systems. Turbine blade design. Blade material, SERI blade sections. Transmission and generation efficiency, Energy production and capacity factor, Torque at constant speeds, Drive train oscillations.

UNIT – 4: ELECTRICAL AND CONTROL SYSTEMS (9)

Introduction to electricity and magnetism. Classification of generators, AC circuits, Synchronous generators, Induction generators, Variable speed generators. Control systems. Power Collection system. Power quality, wind farm and generation protection, interface protection, losses in generation. Asynchronous Load: Piston water pumps, Centrifugal pumps, Paddle wheel heaters, Batteries.

UNIT – 5: WIND FARM DESIGN (9)

Introduction, wind flow modeling, use of capacity factor for wind farm design, planning of wind farm. Siting of wind turbines, ecological indicators, layout of wind farm, initial site selection, micrositing, wake model. Economics of Wind Systems: Cost calculation, annual energy output, time value of money, capital recovery factor, depreciation. Cost of wind energy, present value of annual costs, value of wind generated electricity.

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TOTAL: 45 HOURS

Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to COs**
CO1	Choose a method for measuring wind speed.	**PO1,PO2,,PO3**
CO2	Identify ideal wind site for wind farm	**PO1,PO2,PO3,PO4**
CO3	Understand the Design the wind turbine	**PO1,PO2,PO3**
CO4	Use the turbine for a particular application,	**PO1,PO2,PO3**
CO5	Capable to Start a wind turbine farm.	**PO1,PO3,PO4**

Text Books:

1. SirajAhmed:"Wind Energy-Theory and Practice" Second Edition, PHI Learning Pvt. Ltd, New Delhi, 2011.

Reference Books:

1. Garg L Johnson: "Wind Energy Systems" Prentice Hall. Inc, New Jersey, 1985

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	3	2	2	-	-	-	-	-	-	-	-	-
CO.2	3	2	2	1	-	-	-	-	-	-	-	-
CO.3	3	2	2	-	-	-	-	-	-	-	-	-
CO.4	3	2	2	-	-	-	-	-	-	-	-	-
CO.5	3	2	-	1	-	-	-	-	-	-	-	-
CO*	**3**	**2**	**2**	**1**	-	-	-	-	-	-	-	-

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IV B.Tech I Semester

L	T	P	C
3	0	0	3

18OEEE412 FUNDAMENTALS OF ENERGY AUDITING
(OPEN ELECTIVE-II)

Course Educational Objectives:

1. Learn about energy scenario
2. Learn about fundaments of Energy Auditing.
3. Learn about concept Energy Consumption.
4. Understand the Energy efficient motors and power factor improvement.
5. Know the concept Energy Measuring Instruments.

UNIT – 1: ENERGY SCENARIO (9)

Primary and Secondary Energy, Conventional and non-conventional energy, Energy Security, Energy Conservation and its importance, Energy conservation Act., Thermal Energy basics, Energy Audit its definition & methodology.

UNIT – 2: FUNDAMENTALS OF ENERGY AUDIT (9)

Energy Situation – World and India, Energy Audit Instruments, Benchmarking for energy performance, Energy Action Planning, Duties and responsibilities of Energy Manager; Energy financial management, Project Management, Energy monitoring and targeting, pinch technology.

UNIT – 3: ENERGY CONSUMPTION (9)

Energy Consumption, Conservation, Codes, Standards and Legislation. Energy Audit- Definitions, Concept, Types of Audit, Energy Index, Cost Index, Pie Charts, Sankey Diagrams, Load Profiles, Energy Conservation Schemes. Measurements in Energy Audits, Presentation of Energy Audit Results.

UNIT – 4: ENERGY EFFICIENT MOTORS AND POWER FACTOR IMPROVEMENT (9)

Energy Efficient Motors , Factors Affecting Efficiency, Loss Distribution , Constructional Details , Characteristics - Variable Speed , Variable Duty Cycle Systems, RMS Hp-Voltage Variation-Voltage Unbalance- Over Motoring- Motor Energy Audit. Power Factor– Methods of Improvement, Power factor With Non Linear Loads

UNIT – 5: LIGHTING AND ENERGY INSTRUMENTS FOR AUDIT (9)

Good Lighting System Design and Practice, Lighting Control, Lighting Energy Audit -Energy Instruments- Watt Meter, Data Loggers, Thermocouples, Pyrometers, Lux Meters, Tong Testers, Application of PLCs.

TOTAL: 45 HOURS

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Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to COs**
CO1	Understand the concept basic energy scenario.	**PO1, PO2.**
CO2	Demonstrate knowledge on energy auditing and evaluate energy audit results.	**PO1,PO2**
CO3	Analyze demand side management concepts through case study	**PO1,PO2**
CO4	Acquire knowledge on motor energy audit.	**PO1,PO2**
CO5	Acquire knowledge on energy instruments.	**PO1,PO2**

Text Books:

1. Industrial Energy Management Systems, Arry C. White, Philip S. Schmidt, David R. Brown, Hemisphere Publishing Corporation, New York, 1994.
2. Fundamentals of Energy Engineering - Albert Thumann, Prentice Hall Inc,Englewood Cliffs, New Jersey, 1984.

Reference Books:

1. Economic Analysis of Demand Side Programs and Projects – California Standard Practice Manual, June 2002 – Free download available online http://www.calmac.org/events/spm_9_20_02.pdf
2. Energy management by W.R. Murphy & G. Mckay Butter worth, Heinemann Publications, 2007.
3. Energy management by Paul o‟ Callaghan, Mc-graw Hill Book company-1st edition, 1998
4. Energy efficient electric motors by John .C. Andreas, Marcel Dekker Inc Ltd- 2nd edition, 1995.

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	3	2	-	-	-	-	-	-	-	-	-	-
CO.2	2	3	-	-	-	-	-	-	-	-	-	-
CO.3	3	2	-	-	-	-	-	-	-	-	-	-
CO.4	3	3	-	-	-	-	-	-	-	-	-	-
CO.5	3	3	-	-	-	-	-	-	-	-	-	-
CO*	**2.8**	**2.6**	-	-	-	-	-	-	-	-	-	-

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IV B.Tech I Semester

L	T	P	C
3	0	0	3

18OEEE413 INTRODUCTION TO POWER QUALITY
(OPEN ELECTIVE-II)

Course Educational Objectives:

1. To introduce the fundamental of electric power quality phenomena.
2. To make students learn the voltage variations.
3. To provide detailed analysis of Transients.
4. To make students learn about Harmonics.
5. To learn the power quality conditioners.

UNIT – 1: INTRODUCTION (9)

What is power quality? Power quality – voltage quality - why are we concerned about power quality? - the power quality Evaluation procedure - Terms and Definitions - Transients - Long-duration voltage variations - short-voltage variations - voltage imbalance - wave form distortion - voltage fluctuation - power frequency variations - power quality terms CBEMA and ITI curves.

UNIT – 2: VOLTAGE SAGS AND INTERRUPTIONS (9)

Sources of sags and interruptions - Estimating voltage sag performance - fundamental principles of protection - solutions at the end-use level - Motor-starting sags - utility system fault-clearing issues.

UNIT – 3: TRANSIENT OVER VOLTAGES (9)

Sources of over voltages - principles of over voltage protection - devices for over voltage protection - utility capacitor-switching transients - utility system lightning protection.

UNIT – 4: FUNDAMENTALS OF HARMONICS& APPLIED HARMONICS (9)

Harmonic Distortion - Voltage versus current distortion - Harmonics versus Transients - power system qualities under non sinusoidal conditions - Harmonic indices - Harmonic sources from commercial loads - Harmonic sources from Industrial loads Effects of Harmonics - Harmonic distortion evaluations – Principles of Controlling Harmonics - Devices for Controlling Harmonic Distortion.

UNIT – 5: POWER QUALITY BENCH MARKING AND MONITORING (9)

Benchmarking process, Power Quality Contracts. Monitoring considerations - power quality measurement equipment, assessment of power quality measurement data, application of intelligent systems, - Power quality Monitoring standards.

TOTAL: 45 HOURS

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(AUTONOMOUS)
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Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to Cos**
CO1	Able to understand voltage sag, swell, long and short duration voltage variations.	**PO1,PO2,,PO4,PO12**
CO2	Able to understand the sources, principle of protection of voltage sag and interruption.	**PO1,PO2,PO3,PO4,,PO12**
CO3	Able to understand the concept of capacitor switching and lightning.	**PO1,PO2,PO4,PO12**
CO4	Able to understand the controlling of harmonic distortion.	**PO1,PO2,PO3,PO4, ,PO12**
CO5	Able to understand various power quality monitoring equipment and benchmarking process.	**PO1,PO3,PO4,PO12**

Text Books:

1. Electrical Power Systems Quality - Roger C. Dugan - Mark F. McGranaghan - Surya Santoso - H.Wayne Beaty - 2nd Edition - TMH Education Pvt. Ptd.

Reference Books:

1. Electrical systems quality Assessment by J. Arrillaga - N.R. Watson - S. Chen - John Wiley & Sons
2. Understanding Power quality problems by Math H. J. Bollen IEEE Press

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	2	2	-	3	-	-	-	-	-	-	-	3
CO.2	2	2	3	3	-	-	-	-	-	-	-	3
CO.3	2	2	-	3	-	-	-	-	-	-	-	3
CO.4	2	2	3	3	-	-	-	-	-	-	-	3
CO.5	2	-	3	3	-	-	-	-	-	-	-	3
CO*	**2**	**2**	**3**	**3**								**3**

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IV B.Tech I Semester

L	T	P	C
3	0	0	3

18OECE411 FUNDAMENTALS OF ARTIFICIAL INTELLIGENCE
(OPEN ELECTIVE-II)

Course Educational Objectives:

1. To study the concepts of Artificial Intelligence.
2. To understand the search strategies and Problem solving using Artificial Intelligence.
3. To gain insight information about Logical Agents and Reasoning patterns in propositional logic
4. To study the Uncertain Knowledge and Reasoning
5. To study the Application of Robotics and predictive analytics using Rapid Miner

UNIT – 1: INTRODUCTION TO ARTIFICIAL INTELLIGENCE, PROBLEMS, PROBLEM SPACES AND SEARCH (9)

The AI Problems - The underlying assumption - The AI technique - The levels of the model - Criteria of success - Some general references - One final word and beyond - Defining the problem as a State space search - Production systems - Problem characteristics - Production system characteristics - Issues in the design of search programs.

UNIT – 2: PROBLEM SOLVING, UN-INFORMED SEARCH STRATEGIES, INFORMED SEARCH AND EXPLORATION (9)

Uninformed search strategies - Avoiding repeated states - Informed (Heuristic) search strategies - Heuristic functions - Local search algorithms and optimization problems - Local search in continuous spaces - Backtracking search for CSPs.

UNIT – 3: KNOWLEDGE AND REASONING (9)

Logical agents – Knowledge based agents - The wumpus world – Logic - Propositional logic - a very simple logic - Reasoning patterns in propositional logic - Effective propositional inference - Agents based on propositional logic.

UNIT – 4: UNCERTAIN KNOWLEDGE AND REASONING, LEARNING (9)

Uncertainty - Acting under uncertainty - Baye's rule and its use - Learning from observations - Forms of learning - Inductive learning - Learning decision trees.

UNIT – 5: ROBOTICS AND PREDICTIVE ANALYTICS (9)

Robotics: Introduction-Robot hardware - Robotic perception - Planning to move-Robotic software Architectures - Application Domains.
Case Study1: Medical Data Analysis using Rapid Miner Tool
Case Study2: Agriculture Data Analysis using Rapid Miner Tool

TOTAL: 45 HOURS

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
(AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to COs**
CO1	Gain the basic Knowledge about AI technique and Production systems	**PO1**
CO2	Comprehend the Un informed and Informed Search Strategies.	**PO1, PO3**
CO3	Analyze and Implement Reasoning patterns in propositional logic	**PO1, PO2**
CO4	Formulate the Knowledge and Reasoning techniques in solving problems	**PO1, PO4**
CO5	Apply Robotics to Solve Real world Problems and use rapid miner applications	**PO1, PO2, PO4, PO9**

Text Books:

1. Artificial Intelligence A Modern Approach, 2/e, Stuart Russell and Peter Norvig, 2003, Pearson Education, New Delhi, India.
2. Artificial Intelligence, 3/e, Elaine Rich, Kevin Knight and Shiva Shankar B Nair, 2004, Tata McGraw Hill, Hyderabad, India.

Reference Books:

1. Artificial Intelligence Structures and Strategies for Complex Problem Solving, 5/e, George F. Luther, 2005, Pearson Education, New Delhi, India.
2. Introduction to Artificial Intelligence, 1/e, Eugene Charniak and Drew McDermott, 1985, Pearson Education, New Delhi, India.
3. Artificial Intelligence: The Basics, 1/e, Kevin Warwick, 2012, Wearset ltd, Boldon.
4. Introduction to Artificial Intelligence, 2/e, Philip C. Jackson, 1985, Dover Publications, New York, USA.
5. Our Final Invention: Artificial Intelligence and the End of the Human Era, 1/e, James Barrat, 2013, Thomas Dunne Books, New York, USA.

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	2	-	-	-	-	-	-	-	-	-	-	-
CO.2	2	-	3	-	-	-	-	-	-	-	-	-
CO.3	2	2	-	-	-	-	-	-	-	-	-	-
CO.4	2	-	-	2	-	-	-	-	-	-	-	-
CO.5	2	2	-	2	-	-	-	-	1	-	-	-
CO*	**2**	**2**	**3**	**2**	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**-**

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IV B.Tech I Semester

L	T	P	C
3	0	0	3

18OECE412 FUNDAMENTALS OF EMBEDDED SYSTEMS
(OPEN ELECTIVE-II)

Course Educational Objectives:

1. To provide a basic knowledge like characteristics, classification and Application areas of Embedded Systems.
2. Students learn the Architecture, Memory Interfacing and Interrupt Structures of 8051.
3. By learning instruction sets we can write the Assembly Language Programs and get knowledge in interfacing techniques.
4. Students will learn the Real time operating systems.
5. To learn Communication and Interfacing Techniques and its buses.

UNIT – 1: INTRODUCTION (9)

History of Embedded Systems-Classification of Embedded systems-Purpose of Embedded system-Characteristics of Embedded systems- Major Application Areas of Embedded Systems- Core of the Embedded System- Sensors and Actuators- Embedded Firmware, Applications- Washing Machine.

UNIT – 2: THE 8051 ARCHITECTURE (9)

Introduction- 8051 Micro controller Hardware- Register set of 8051-Input/Output Ports and Circuits-External Memory- memory and I/O interfacing of 8051Counter and Timers- Serial data Input/Output-Interrupt structure of 8051.

UNIT – 3: BASIC ASSEMBLY LANGUAGE PROGRAMMING CONCEPTS (9)

The Assembly Language Programming Process- Programming Tools and Techniques- Programming the 8051. Data Transfer and Logical Instructions. Arithmetic Operations- Decimal Arithmetic. Jump and Call Instructions. Applications: Interfacing with Keyboards- Displays- D/A and A/D Conversions- Multiple Interrupts

UNIT – 4: REAL-TIME OPERATING SYSTEMS (RTOS) (9)

Operating System Basics- Types of Operating Systems- Tasks- Process and Threads-Multiprocessing and Multitasking- Task Scheduling- Threads- Processes and Scheduling: Putting them Altogether- Task Communication- Task Synchronization- Device Drivers- How to Choose an RTOS.

UNIT – 5: COMMUNICATION INTERFACE AND COMMUNICATION BUSES (9)

Communication interface- (Board level communication interfaces- Product level communication interfaces)- Timing -and Counting Devices- Watchdog Timer- Real Time Clock- Networked Embedded Systems- Serial Bus Communication Protocols- Parallel Bus Device Protocols- Parallel Communication Network Using ISA- PCI- PCI-X and Advanced Buses.

TOTAL: 45 HOURS

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Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to COs**
CO1	Understanding and designing of embedded systems	**P01, P02, P03, P04,P06**
CO2	Learning the Architecture and its functions	**PO1,P02,P03,P06**
CO3	Knowledge to write the programs in Assembly Language Programs	**P01, P02, P03, P04**
CO4	Knowledge in real time operating systems	**P01, P03,P04,P05,P06**
CO5	Understanding the transmissions through different types of buses	**P01, PO2,P03,P04,P05,P06**

Text Books:

1. Introduction to Embedded System-2nd edition- 2003-Shibu KV- Mc-Graw Hill -New Delhi.
2. The 8051 Microcontroller-3rd Edition-2007- Kenneth J.Ayala- Thomson Delmar Learning-New Delhi.
3. Embedded system architecture- programming and design-sixthreprint- 2005- Rajkamal-TMH- New Delhi.

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	3	3	3	2	-	2	-	-	-	-	--	-
CO.2	3	2	2	-	-	3	-	-	-	-	--	-
CO.3	3	3	3	2	-	-	-	-	-	-	--	-
CO.4	3	-	3	3	2	2	-	-	-	-	--	-
CO.5	3	3	3	3	2	2	-	-	-	-	--	-
CO*	**3**	**2.75**	**2.8**	**2.5**	**2**	**2.25**	-	-	-	-	--	-

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L	T	P	C
3	0	0	3

18OECE413 DATA COMMUNICATION AND NETWORKS
(OPEN ELECTIVE-II)

Course Educational Objectives:

1. Build an understanding of the fundamental concepts of computer networking.
2. Familiarize the student with the basic taxonomy and terminology of the computer networking area.
3. Introduce the student to advanced networking concepts.
4. Preparing the student for entry Advanced courses in computer networking.
5. Allow the student to gain expertise in some specific areas of networking.

UNIT – 1: INTRODUCTION TO DATA COMMUNICATION (9)

Introduction: Network Topologies, Protocols & Standards, Layered Architecture LAN, WAN, MAN. OSI Reference Model, TCP/IP Reference Model, Guided and Unguided Media.

UNIT – 2: DATA LINK LAYER (9)

Data Link Layer: Design Issues, Framing – Error Control – Flow Control, Error Detection and Correction, Elementary Data Link Protocols, Sliding Window Protocols, ARQ schemes, HDLC. PPP. Ethernet- IEEE 802.3,4,5 Protocols, Wireless LAN- the 802.11 Architecture and Protocol Stack-The 802.11 Physical Layer- The802.11 MAC Sub layer Protocol-The 805.11 Frame Structure-Services.

UNIT – 3: MAC LAYER AND ROUTING ALGORITHM (9)

The Medium Access Control Sub layer-The Channel Allocation Problem-Static Channel Allocation-Assumptions for Dynamic Channel Allocation, Multiple Access Protocols-Aloha-CSMA Protocols-Collision-Free Protocols, Need for Internetworking, Design Issues, Addressing, Internet Protocol (IPv4/IPv6), Virtual Circuit and Datagram Networks, Routing Algorithms, Congestion Control Algorithms.

UNIT – 4: TRANSPORT LAYER (9)

Transport layer: UDP, TCP, Congestion Control mechanisms, QOS, Techniques to improve QOS.

UNIT – 5: COMMUNICATION INTERFACE AND COMMUNICATION BUSES (9)

Application Layer: Cryptography and network security, DNS, Electronic Mail, FTP, HTTP, SNMP, DHCP.

TOTAL: 45 HOURS

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Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to COs**
CO1	Independently understand basic computer network technology	**PO1, PO2,PO3**
CO2	Understand and explain Data Communications System and its components.	**PO1, PO2, PO3,PO4**
CO3	Analysis the different types of network topologies and protocols. And Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer	**PO1, PO2,PO3,**
CO4	Identify the different types of network devices and their functions within a network.	**PO1, PO2,PO4**
CO5	Familiarity with the basic protocols of computer networks, and how they can be used to assist in network design and implementation.	**PO1,PO2,PO4**

Text Books:

1. Computer Networks, Tanenbaum and David J Wetherall, 5th Edition, Pearson Edu, 2010
2. Computer Networks: A Top Down Approach, Behrouz A. Forouzan, FirouzMosharraf, McGraw Hill Education.

Reference Books:

1. Larry L. Peterson and Bruce S. Davie, “Computer Networks - A Systems Approach” (5th ed), Morgan Kaufmann/ Elsevier, 2011
2. William Stallings, “Data & Computer Communication”, Pearson Education India, 10th Edition, 2014.
3. James F. Kurose, Keith W. Ross, “Computer Networking: A Top–Down Approach Featuring the Internet”, Pearson Education, 6th Edition, 2013.

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	3	3	3	-	-	-	-	-	-	-	-	-
CO.2	2	3	2	3	-	-	-	-	-	-	-	-
CO.3	3	3	2	-	-	-	-	-	-	-	-	-
CO.4	3	2	-	3	-	-	-	-	-	-	-	-
CO.5	3	2	-	3	-	-	-	-	-	-	-	-
CO*	**2.8**	**2.6**	**2.3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

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IV B.Tech I Semester

L	T	P	C
3	0	0	3

18OMEC411 QUALITY CONTROL AND RELIABILITY ENGINEERING
(OPEN ELECTIVE-II)

Course Educational Objectives:

1. To understand the concepts of quality, TQM, and statistical process control
2. To learn TQM principles and impact in continuous process improvement.
3. To study the online quality control system in an organization
4. To learn the concepts of offline quality control systems in an organization.
5. To study concepts of Reliability and Estimation

UNIT – 1: QUALITY CONCEPTS AND STATISTICAL PROCESS CONTROL (9)

Quality Concepts: Need for quality – Evolution of quality – Definition of quality – Dimensions of quality – Basic concepts and definition of TQM – Contributions of Deming, Juran and Crosby. **Statistical Process Control:** Inspection – Quality Control – Quality assurance – Customer orientation – Internal & External Customer – Life cycle Quality cost – The seven traditional tools of quality – New management tools

UNIT – 2: QUALITY PRINCIPLES AND TOOLS (9)

Leadership – Strategic quality planning – Quality statements – Customer focus, customer orientation, customer satisfaction, customer complaints and customer retention – Employee involvement – Motivation – Empowerment – Team and teamwork – Recognition and reward – Performance appraisal – Continuous process improvement – PDSA cycle, 5s, Kaizen – Supplier partnership – Partnering, supplier selection and supplier rating – Six-sigma concepts – Bench marking – TPM concepts.

UNIT – 3: ONLINE QUALITY CONTROL (9)

Control chart for attributes – Control chart for non-conforming – *p* chart and *np* chart – Control chart for nonconformities: C and U charts – Control chart for variables: X chart, R chart and σ chart – State of control and process out of control identification in charts – Pattern study – Process capability studies.

UNIT – 4: OFFLINE QUALITY CONTROL (9)

Lot by lot sampling – Types – Probability of acceptance in single, double, multiple sampling techniques – O.C. curves – Producers risk and consumers risk – AQL – LTPD – AOQL concepts – Standard sampling plans for AQL and LTPD – Uses of standard sampling plans.

UNIT – 5: RELIABLITY CONCEPTS AND ESTIMATION (9)

Reliability Concepts: Reliability engineering – Fundamentals – Failure data analysis – Mean failure rate, Mortality curves concept of burn in period – Useful life and wear out phase of a system – Mean time to failure – Meantime between failure – Hazard rate – Failure density and conditional reliability – Maintainability and availability – simple problems. **Reliability Estimation:** Series, parallel and mixed configurations – Reliability improvement techniques – Use of pareto analysis – Design for reliability – redundancy unit and standby redundancy – Fault tree analysis – Optimization in reliability.

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TOTAL: 45 HOURS

Course Outcomes:

On successful completion of the course, Students will be able to		POs related to COs
CO1	Illustrate the quality concepts of statistical process control, and contributions TQM Gurus in quality management	**PO1,PO11, PO12**
CO2	Recognize the quality principles and impact of 5s, Kaizen, PDSA cycles in continuous process improvement.	**PO1,PO11, PO12**
CO3	Demonstrate the basic need of online quality control and process control in an organization	**PO1,PO2, PO3, PO11, PO12**
CO4	Explain the basic need of offline quality control and process control in an organization	**PO1,PO2, PO3, PO11, PO12**
CO5	Realize the concepts of Reliability and Estimation	**PO1, PO2,PO11, PO12**

Text Books:

1. Quality Control, Besterfield D.H., 8/e, 2009, Pearson Education, India.
2. Reliability Engineering, E Balagurusamy, 2017, McGraw Hill India

Reference Books:

1. Introduction to Statistical Quality Control, Douglas.C. Montgomery, 7/e, 2013, John Wiley.
2. Statistical Methods for Quality, Reliability and Maintainability, K.Muralidharan and A Syamsundar, 2012, PHI Learning.
3. Statistical Quality Control, Monohar Mahajan, 2001, Dhanpat Rai &and Sons.
4. Reliability, Maintainability and Risk, David J Smith, 8/e, 2011, Butterworth-Heinemann, Elsevier Ltd.
5. Fundamentals of Quality Control and Improvement, Amitava Mitra, 4/e, 2016, JohnWiley&Sons,Inc.
6. Reliability Engineering, Kailash C. Kapur and Michael Pecht, 2014, John Wiley & Sons, Inc.

Codes/Tables: Use of approved statistical table permitted in the examination.

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	-	-	-	-	-	-	-	-	-	1	2
CO.2	3	-	-	-	-	-	-	-	-	-	1	2
CO.3	3	2	1	-	-	-	-	-	-	-	1	2
CO.4	3	2	1	-	-	-	-	-	-	-	1	2
CO.5	3	2	-	-	-	-	-	-	-	-	1	2
CO*	**3**	**2**	**1**	-	-	-	-	-	-	-	**1**	**2**

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
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IV B.Tech I Semester

L	T	P	C
3	0	0	3

18OMEC412 INDUSTRIAL ENGINEERING AND PSYCHOLOGY (OPEN ELECTIVE-II)

Course Educational Objectives:

1. To learn the concepts of management and characteristics of personnel management and organization
2. To understand the organizational structures and plant layout for productivity improvements
3. To know the productivity, planning and control of a product
4. To discover the material handling techniques and Inventory control of manufacturing a product
5. To learn the industrial psychology and work study in an industry

UNIT – 1: CONCEPTS OF MANAGEMENT (9)

Management: Importance of administration and organization – Managerial skills, policies, goals and objectives – Scientific management – Contribution of FW Taylor, Henry Foyal and Gilberth – Principles, types, process, levels and functions of management – Management chart – Basic concepts in project management and MIS – Industrial ownership – Responsibilities of supervisor/foreman – Leadership concepts. **Personnel Management:** Recruitment, selection, training, job evaluation and merit rating – Wage plans and incentives – Welfare measures – Promotion, lay-off, transfer and discharge.

UNIT – 2: ORGANIZATIONAL STRUCTURES AND PLANT LAYOUT (9)

Organization: Concept, importance, characteristics, elements, and process of organization – Organization theory, principle, structure, chart and committees – Project, matrix and informal organization – Departmentation – Authority and delegation – Group dynamics – Organizational change, development and conflict – Managerial leadership and communication system. **Plant Layout:** Types – Flow pattern – Work station – Storage space – Layout procedure – Consideration in factory design.

UNIT – 3: PRODUCTION PLANNING AND CONTROL (9)

Productivity: Input output model – Factors affecting the productivity – Productivity resources and measures. **Production Planning:** Continuous and intermittent production – Job, open and closed job shop – One time large projects – Forecasting – Process planning – Economical batch quantity – Tool control – Control of production – Loading, scheduling, dispatching and routing – Progress and flow control.

UNIT – 4: MATERIALS MANAGEMENT AND INVENTORY CONTROL (9)

Materials Management: Concepts – Procurement – Purchase and order – Buying techniques. **Inventory Control:** Classification – Objectives – Functions – Economic order quantity (EOQ) – Inventory models – ABC analysis – Material requirements planning (MRP) – Manufacturing resource planning (MRP-II).

UNIT – 5: WORK STUDY AND INDUSTRIAL PSYCHOLOGY (9)

Work study: Ergonomics principles – Method study – Process chart symbols – Flow process and multiple activity chart – Flow and string diagram – Operation analysis – Analysis of motion – Design of work place – Therbligs – SIMO chart – Time study – Standard data – Analytical estimating – Performance rating – Allowances – PMTS. **Industrial Psychology:** Concept – Individual and group – Motivation theories – Hawthorne experiment – Morale and motivation – Working and environmental condition – Industrial fatigue.

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TOTAL: 45 HOURS

Course Outcomes:

On successful completion of the course, Students will be able to		POs related to COs
CO1	Understand the concepts of management and characteristics of personnel management and organization	**PO1, PO11, PO12**
CO2	Explain the organizational structures and plant layout for productivity improvements	**PO1,PO2, PO11, PO12**
CO3	Describe the productivity, planning and control of a product	**PO1,PO2, PO11, PO12**
CO4	Explain the material handling techniques and Inventory control of manufacturing a product	**PO1,PO2, PO11, PO12**
CO5	Demonstrate the industrial psychology and work study in an industry	**PO1,PO2, PO11, PO12**

Text books:

1. Industrial Engineering and Management, 17/e, 2010, O.P. Khanna, Dhanpat Rai Publishing Company (P) Ltd., New Delhi.
2. Industrial Engineering and Management, Pravin Kumar, 1/e, 2015, Pearson Education, New Delhi.

Reference books:

1. Production and Operations Management, S. N. Chary, 6/e, 2019, Tata McGraw-Hill Education Pvt. Ltd., Noida.
2. Operations Management, William J Stevenson, 12/e, 2018, Tata McGraw-Hill Education Pvt. Ltd., Noida.
3. Production and Operations Management, Shailendra Kale, 1/e, 2013, Tata McGraw-Hill Education Pvt. Ltd., Noida.
4. Production and Operations Management, Kanishka Bedi, 3/e, 2013, Oxford University Press, India.
5. Manufacturing Organization and Management, 6/e, 2004, Harold T Amrine, John A Ritchey, Colin L Moodie and Joseph F Kmec, Pearson Education, New Delhi.
6. Industrial Engineering and Production Management, Martand T Telsang, 3/e, 2018, S.Chand Publications, New Delhi.

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	2	-	-	-	-	-	-	-	-	-	1	1
CO.2	2	2	-	-	-	-	-	-	-	-	1	1
CO.3	2	2	-	-	-	-	-	-	-	-	1	1
CO.4	2	2	-	-	-	-	-	-	-	-	1	1
CO.5	2	2	-	-	-	-	-	-	-	-	1	1
CO*	**2**	2	-	-	-	-	-	-	-	-	1	1

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

IV B.Tech I Semester

L	T	P	C
3	0	0	3

18OMEC413 3D PRINTING AND DESIGN (OPEN ELECTIVE-II)

Course Educational Objectives:

1. To know the need and development of additive manufacturing technology.
2. To study the design for additive manufacturing and tool design
3. To recognize the parameters of photo polymerization and LOP
4. To explain powder bed fusion processes, binder and material jetting process
5. To know the post processes technique and applications of additive manufacturing process

UNIT – 1: OVERVIEW OF ADDITIVE MANUFACTURING (AM) (7)

Overview – Fundaments of Rapid Prototyping (RPT) – Additive V/s Conventional Manufacturing – Generic AM process – Development of AM technology – Use of layers – Classification of AM process – AM process chain – Basic steps for AM process – Differentiation between photopolymer system, powder based system, molten material system, solid sheets and metal system.

UNIT – 2: CAD MODELING AND DESIGN FOR ADDITIVE MANUFACTURING (11)

CAD Modeling: Preparation of CAD models – Data processing – STL format – Model slicing – Tool path generation – Data translation and loss – Customized design and fabrication for medical applications. **DFAM:** AM unique capabilities – DFAM concepts for complex geometry, integrated assemblies, customized geometry, multifunctional design and constraints – Part consolidation, redesign, structures and industrial applications – Light weight structure, optimization methods and topology. **Printing Processes:** Droplet formation technologies – Continuous mode – Drop on demand mode – Bioplotter.

UNIT – 3: LIQUID AND SOLID BASED ADDITIVE MANUFACTURING PROCESS (9)

Stereo lithography (SLA): Polymerization materials – Process – Patterns – Vat photo polymerization process – Benefits – Applications. **Fused Deposition Modeling (FDM**): Principle – Materials – Limitations – Benefits – Applications. **Laminated Object Manufacturing (LOM):** Bonding process – Adhesive bonding and thermal bonding – Materials – Limitation – Application.

UNIT – 4: POWDER BASED ADDITIVE MANUFACTURING PROCESS (9)

Selective Laser Sintering (SLS): Process – Materials – Powder fusion mechanism – Powder handling – Applications. **Selective Laser Melting (SLM) and Electron Beam Melting (EBM):** Principle – Materials – Process – Benefits – Applications. **Laser Engineered Net Shaping (LENS):** Materials – Material delivery – Process parameters – Benefits – Applications. **Binder Jetting:** Materials – Process – Benefits. **Material Jetting:** Materials – Process – Multijet modeling – Benefits.

UNIT – 5: POST PROCESSINGTECHNIQUES AND APPLICATIONS (9)

Product Quality: Material removal – Surface texture improvements – Accuracy improvements – Aesthetic improvements – Preparation for use of pattern – Property enhancement using thermal and non thermal techniques – Inspection and testing – Defects and their causes. **Applications:** Additive Manufacturing application of aerospace, electronics, healthcare, defense, automotive, construction, food processing, machine tool – Business opportunities and future directions of AM.

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TOTAL: 45 HOURS

Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to COs**
CO1	Understand the need and development of additive manufacturing technology	**PO1, PO2, PO3**
CO2	Explain the design for additive manufacturing and tool design	**PO1, PO2, PO3**
CO3	Illustrate the parameters of photo polymerization and Laminated Object Manufacturing	**PO1, PO2, PO3, PO5**
CO4	Explain powder bed fusion processes, binder and material jetting process	**PO1, PO2, PO3, PO5**
CO5	Summarize the post processes technique and applications of additive manufacturing process	**PO1, PO2, PO3, PO5**

Text Books:

1. Additive Manufacturing Technologies: 3D Printing, Rapid Prototyping and Direct Digital Manufacturing, Ian Gibson, David W.Rosen and Brent Stucker, 2/e, 2015, Springer.
2. Rapid Prototyping: Principles and Applications, Chee Kai Chua, Kah Fai Leong and Chu Sing Lim 3/e, 2010, World Scientific Publishers.

Reference Books:

1. Additive manufacturing: Innovations, Advances, and Applications, T.S. Srivatsan and T.S. Sudarshan, Taylor & Francis Group, LLC.
2. Additive Manufacturing of Emerging Materials, Bandar AlMangour, 2018, Springer.
3. 3D Printing and Additive Manufacturing Technologies, L. Jyothish Kumar, Pulak M. Pandey and David Ian Wimpenny, 2019, Springer Nature Singapore Pte Ltd.
4. 3D Printing: Technology, Applications, and Selection, Rafiq Noorani, 2018, CRC Press, Taylor & Francis Group.
5. Design for Additive Manufacturing, Martin Leary, 2019, Elsevier.
6. Additive Manufacturing Handbook: Product Development for the Defense Industry, Adedeji B. Badiru, Vhance V. Valencia, and David Liu, 2017, CRC Press, Taylor & Francis Group.

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	3	2	1	-	-	-	-	-	-	-	-	-
CO.2	3	2	1	-	-	-	-	-	-	-	-	-
CO.3	3	2	1	-	2	-	-	-	-	-	-	-
CO.4	3	2	1	-	2	-	-	-	-	-	-	-
CO.5	3	2	1	-	2	-	-	-	-	-	-	-
CO*	**3**	**2**	**1**	-	**2**	-	-	-	-	-	-	-

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IV B. TECH I-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	0	**0**	**3**	**2**

18CSE416 **BIG DATA ANALYTICS LAB**

Course Educational Objectives:

CEO1: To provide an overview of an exciting growing field of Big Data analytics.
CEO2: To introduce the tools required to manage and analyze big data like Hadoop, MapReduce.
CEO3: To teach the fundamental techniques and principles in achieving big data analytics with scalability and streaming capability.
CEO4: To enable students to have skills that will help them to solve complex real-world problems in for decision support.
CEO5: To gain knowledge on PIG Latin and HIVE.

Task 1:

a) Understanding the Hortonworks Sandbox for Hadoop.
b) Installing Hortonworks Sandbox – VMware Player on Windows

Task 2:

Understanding and Working with basic HDFS operations such as:

- Starting HDFS,
- Listing files in HDFS.
- Adding files and directories.
- Retrieving files.
- Deleting files.
- Shutting down the HDFS.

Task 3:

Understanding and Working with Ambari for provision, manage and monitor a Hadoop cluster, and also to integrate Hadoop with the existing enterprise infrastructure.

Task 4:

Write a java map-reduce program for counting the number of occurrences of each word in a text file.

Task 5:

Write a java map-reduce program for mines healthcare data and perform various analysis on healthcare dataset.

Task 6:

Working with PIG Latin scripts in Script mode and Grunt shell.

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Task 7:

Write Pig Latin scripts to illustrate Load, Store, Describe, Dump operators

Task 8:

Write Pig Latin scripts to illustrate Group, Co-group, Join, Filter, Union, and Split Operators.

Task 9:

Develop a Map-reduce programming with Hive to create, alter, and drop databases, tables, views, functions, and indexes.

Task 10:

Illustrate unstructured data into NoSQL data and perform various operations

Course Outcomes:

After the successful completion of this course, the students should be able to:

Course Outcomes		**POs related to COs**
CO1	Explain the motivation for big data systems and identify the main sources of Big Data in the real world.	PO1, PO2,
CO2	Demonstrate an ability to use frameworks like Hadoop to efficiently store retrieve and process Big Data for Analytics.	PO1, PO2,
CO3	Implement several Data Intensive tasks using the Map Reduce Paradigm	PO1, PO2, PO3, PO4
CO4	Apply several newer algorithms for Clustering Classifying and finding associations in Big Data	PO1, PO2, PO3,
CO5	Design and implement successful Recommendation engines for enterprises.	PO1, PO2, PO3, PO4, PO5

CO-PO Mapping

PO / CO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-

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PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO5	-	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	3	-	-	-
CO8	-	-	-	-	-	-	-	-	-	3	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO*	**3**	**3**	**3**	**3**	3	-	-	3	3	**3**	**-**	**3**

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IV B. TECH I-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	0	**0**	**2**	**1**

18CSE417 MOBILE APPLICATION DEVELOPMENT LAB

Course Educational Objectives:

CEO1: To know the components and structure of mobile application development frameworks for Android and windows OS based mobiles.
CEO2: To understand how to work with various mobile application development frameworks.
CEO3: To learn the basic and important design concepts and issues of development of mobile applications.
CEO4: To understand the capabilities and limitations of mobile devices.
CEO5: To develop the data base connectivity to the android platform.

LIST OF EXPERIMENTS

1. Study of Android Installation
2. Study of Tools for Developing Mobile Applications.
3. Develop an android application to display a simple text in the emulator
4. Develop an android application to display the internal keyboard in the emulator
5. i. Write an android program to display a message in the toast
   ii. Write an android program to input a text through a text and the same must be displayed in the toast when a button is clicked on the screen
6. Develop an application to perform 5 arithmetic operations: Addition - Subtraction - Multiplication - Division and Modulo operation with necessary user interface creation
7. Write an android application to create a calculator
8. Create an android UI that consists of Different Departments of a company namely Production- Finance - Marketing and HR. If the user clicks on any department it should show details of that department. Use indents.
9. Design an android application to display a list of items on the android screen. If the user clicks any one of the list items a dialogue box should show that the user has clicked that particular item (Use array adopters)
10. Develop an android application to show some categories such as education - entertainment - health - provisions etc. - If the user clicks on any one of the items it should show the sub categories of the category and if is again clicked it should the details of those items. (Use indents and lists)
11. Design an android application to create a service that shows the service is running in the background in the form of a toast
12. Develop an android application to demonstrate the concept of Fragments in Android
13. Develop an android application to demonstrate the database connectivity with the SQLite database to post and retrieve data through the User Interface
    (Example: Student mark list processing- Email Registration and Login - Products and sales)

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Course Outcomes:

After the successful completion of this course, the students should be able to:

Course Outcomes		POs related to COs
CO1	Build a native application using GUI components and Mobile application development framework.	PO1, PO2, PO3, PO4, PO5
CO2	Develop an application using basic graphical primitives and databases.	PO1, PO2, PO3, PO4, PO5
CO3	Construct an application using multi-threading.	PO1, PO2, PO3, PO4, PO5
CO4	Develop an android application using the concept of Fragments.	PO1, PO2, PO3, PO4, PO5
CO5	Develop an application using the database connectivity with the SQLite database to post and retrieve data through the User Interface	PO1, PO2, PO3, PO4, PO5
CO6	Follow the ethical principles in implementing the programs	PO8
CO7	Do experiments effectively as an individual and as a team member in a group	PO9
CO8	Communicate verbally and in written form, the understanding about the experiments	PO10
CO9	Continue updating their skills related to develop mobile application and implementing programs in future	PO12

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	3	-	-	-
CO8	-	-	-	-	-	-	-	-	-	3	-	-

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO*	**3**	**3**	**3**	**3**	3	-	-	3	3	**3**	**-**	**3**

REFERENCES:

1. Android Developer Fundamentals Course, Learn to develop Android Applications, Practical Workbook, Developed by Google Developer Training Team
2. Android Developer Fundamentals Course, Learn to develop Android Applications, Concept Reference, Developed by Google Developer Training Team
3. Android System Programming, Roger Ye, PACKT publishers
4. Programming Android, ZigurdMednieks, Laird Dornin, G.BlakeMeike& Masumi Nakamura, O'Reilly
5. Android application Development-Black Book, Pradeep Kothari, Dreamtech
6. Android Programming, 3rd Edition, The Big Nerd Ranch Guide, Bill Philips, Christ Stewart, Kristin Mariscano, Big Nerd Ranch publishers
7. Android Programming for Beginners, John Horton, PACKT publishers

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18AUD411 **PROFESSIONAL ETHICS**

(Common to all Branches)

(No credits and No examination but attendance will be reckoned)

OBJECTIVE

CEO1: To create an awareness on engineering ethics and human Values
CEO2: To understand social responsibility of an engineer.
CEO3: To appreciate ethic al dilemma while discharging duties in professional life.

UNIT-1: Human Values

Morals-Values and ethics – integrity - work ethic – Honesty- courage – empathy – Self Confidence – Character.

Unit-2: Engineering Ethics

Senses of Engineering Ethics- Varieties of moral issues- Types of inquiry – Moral dilemma – Moral autonomy – Kohlberg's theory – Gilligan's theory – Consensus and Controversy - Models of professional roles - Theories about right action - Self –interest - Customs and religion – Uses of ethical theories- Valuing Time - Co-operation and Commitment

UNIT-3: Engineering as Social Experimentation:

Engineers as Responsible experimenters – Codes of ethics – A balanced outlook on law – The challenger case study.

UNIT-4: Safety Responsibility and Rights

Safety and Risk - Assessment of safety and risk – Risk benefit analysis – The Three Mile Island and Chernobyl Case studies.

UNIT-5: Global Issues

Multinational Corporations – Environmental Ethics - Computer Ethics – Weapons Development – Engineers as Managers – Engineers as expert witness and advisors - Moral leadership.

On successful completion of this course, students should be able to

COURSE OUTCOMES		**POs related to COs**
CO1	Understand the various human values	PO1, PO2, PO7, PO8, PO12
CO2	Analyze usage of engineering ethics	PO1, PO2, PO4, PO6, PO7, PO8, PO12
CO3	Analyze the principles involved in engineering as social experimentation	PO1, PO2, PO4, PO6, PO7, PO8, PO12
CO4	Analyze various principles involved with regard to safety, responsibilities and rights of engineers	PO1, PO2, PO4, PO6, PO7, PO8, PO12
CO5	Analyze the basic principles engaged in study of global issues with regard to engineering ethics	PO1, PO2, PO4, PO6, PO7, PO8, PO12

CO-PO Mapping

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PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	2	-	-	-	-	3	3	-	-	-	3
CO2	3	2	-	2	-	2	3	3	-	-	-	3
CO3	3	2	-	2	-	3	3	3	-	-	-	3
CO4	3	2	-	2	-	3	3	3	-	-	-	3
CO5	3	2	-	2	-	3	3	3	-	-	-	3
CO*	3	2	-	2	-	2.75	3	3	-	-	-	3

Textbooks:

1. A text book on professional ethics and Human Values.1/e 2006,NaagarazanR.S.,New Age International (p)Ltd, Publishers, New Delhi.
2. Professional ethics and Human Values,S.DineshBabu, Laxmi Publications(P)Ltd, New Delhi.

Reference Books:

1. Engineering Ethics ,2004,M.Govindarajan, S Natarajan, V.S. Senthil Kumar, Prentice Hall of India,Pvt. Ltd. New Delhi.
2. EngneeringEthics ,2004, CharlesD.Fleddermann,Pearson Education/Prentice-Hall ,New jersey(Indian Reprint now available).
3. Engineering Ethics – Concepts and Cases -2000,CharlesEHarris,MichaelS.Prtchard and Michael J Rabins ,Wadsworth Thompson LeaningUnited states (Indian reprint now available).
4. Ethics in Engineering ,Mike Marine and Roland Schinzinger, Tata McGraw-hill Education,PvtLtd,.Noida.
5. Ethics and the Conduct of Business,2003, John R.Boatright, Pearson Education,NewDelhi.Fundamentals of Ethics for Scientists and Engineers, 2001, Edmund G Seebauer and Robert L.Barry,Oxford University Press, Oxford.

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IV B. TECH II-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	3	**0**	**0**	**3**

18CSE421 **INTERNET OF THINGS**

Course Educational Objectives:

CEO1: To understand the fundamentals of Internet of Things.
CEO2: To learn about Building state of the art architecture in IoT.
CEO3: To learn about basis of IOT protocols.
CEO4: To build a small low cost embedded system using Raspberry Pi and ARDUINO,
CEO5: To apply the concept of Internet of Things in the real world scenario.

UNIT I: Introduction To IoT **(9)**

Introduction to Internet of Things –Definition and Characteristics of IoT, Physical Design of IOT- IoT Protocols -Logical Design of IoT - IoT communication models - IoT Communication APIs - IoT enabled Technologies- Wireless Sensor Networks - Cloud Computing - Big data analytics - Communication protocols - Embedded Systems.

UNIT II: M2M and IoT Architecture **(9)**

The Vision - Introduction - From M2M to IoT. M2M high-level ETSI architecture - IETF architecture for IoT - OGC architecture - IoT reference model - Domain model - information model - functional model - communication model - IoT reference architecture.

UNIT III: IoT Protocols **(9)**

Protocol Standardization for IoT – Efforts – M2M and WSN Protocols – SCADA and RFID Protocols – Unified Data Standards – Protocols – IEEE 802.15.4 – BACNet Protocol – Modbus– Zigbee Architecture – Network layer – 6LowPAN - CoAP - Security

UNIT IV: Building IotWith Raspberry Pi &Arduino **(9)**

Building IOT with RASPERRY PI- IoT Systems - Logical Design using Python – IoT Physical Devices & Endpoints - IoT Device -Building blocks -Raspberry Pi -Board - Linux on Raspberry Pi - Raspberry Pi Interfaces -Programming Raspberry Pi with Python - Other IoT Platforms - Arduino

UNIT V : Case Studies And Real-World Applications **(9)**

Real world design constraints - Applications - Asset management, Industrial automation, smart grid, Commercial building automation, Smart cities - participatory sensing - Data Analytics for IoT – Software & Management Tools for IoT Cloud Storage Models & Communication APIs - Cloud for IoT - Amazon Web Services for IoT.

Course Outcomes:

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After the successful completion of this course, the students should be able to:

Course Outcomes		POs related to COs
CO1	Demonstrate knowledge on fundamentals of Internet of Things and its functionalities.	PO1, PO2
CO2	Demonstrate knowledge on Building state of the art architecture in IoT.	PO1, PO2
CO3	Analyze various protocols for IoT	PO1, PO2,
CO4	Design a portable IoT using Rasperry Pi	PO1, PO2, PO3, PO4
CO5	Deploy an IoT application and connect to the cloud using Raspberry Pi & ARDUINO and apply the concept of Internet of Things in the real world scenario.	PO1, PO2, PO3, PO4, PO5

CO – PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	2		-	-	-	-	-	-	-	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-
CO3	2	2	3	3	-	-	-	-	-	-	-	-
CO4	2	2	3	3	-	-	-	-	-	-	-	-
CO5	3	3	2	2	3	-	-	-	-	-	-	-
CO*	2.6	2.4	2.6	2	3	-	-	-	-	-	-	-

Text Books:

1. Internet of Things – A hands-on approach, ArshdeepBahga, Vijay Madisetti, 2015, Universities Press.
2. From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence, 1st Edition, Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, StamatisKarnouskos, David Boyle, 2014, Academic Press.

References:

1. Internet of Things (A Hands-on-Approach), 1stEdition, Vijay Madisetti and ArshdeepBahga, 2014,VPT.
2. Rethinking the Internet of Things: A Scalable Approach to Connecting Everything, 1st Edition, Francis daCosta, Apress Publications, 2013

3. Architecting the Internet of Things, Bernd Scholz-Reiter, Florian Michahelles, ISBN 978- 3842-19156-5, Springer.
4. The Internet of Things Key Applications and Protocols, Olivier Hersent, David Boswarthick, Omar Elloumi, ISBN 978-1-119-99435-0, Wiley Publications.
5. The Internet of Things in the Cloud: A Middleware Perspective, HonboZhou , 2012, CRC Press .

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IV B. TECH II-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	3	**0**	**0**	**3**

18CSE422 INTERNETWORKING WITH TCP/IP

Course Educational Objectives:

CEO1: To study the standards of TCP / IP protocol and addressing types.
CEO2: To understand various protocols like ARP, RARP, UDP, ICMP, IGMP.
CEO3: To gain knowledge on TCP and UDP protocols.
CEO4: To learn about the TELNET and SSH- TELNET.
CEO5: To experience the IPv6 version in the network.

UNIT – 1: OSI Model and TCP/IP Protocol Suite (9)

TCP/IP protocol suite - Addressing- Internet protocol version 4 (IPv4) - Datagrams - Fragmentation - Options - Checksum - IPv4 addresses - Introduction - Classful addressing - Classless addressing - Special addresses - NAT

UNIT – 2: Address Resolution Protocol (ARP) (9)

Address mapping - The ARP protocol - ATMARP - ARP package - Internet control message protocol Version 4 - Introduction - Messages - Debugging tools - ICMP package - Unicast routing protocols (RIP, OSPE and BGP) - Introduction - Intra and inter domain routing - Distance vector routing - RIP - Link state routing - OSPF - Path vector routing - BGP

UNIT – 3: User Datagram Protocol (UDP) (9)

Introduction - User datagram - UDP services - UDP applications - UDP package - Transmission control protocol (TCP) - TCP services - TCP features - Segment - A TCP connection-Windows in TCP - Flow control - Error control - Congestion control - TCP timers - Options - TCP package

UNIT – 4: Remote Login (9)

TELNET and SSH- TELNET - Secure shell (SSH) - File transfer - FTP - TFTP

UNIT – 5: Internet Protocol Version 6 (9)

Introduction - Advantages of IPv6 - IPv6 addressing format - IPv6 header - IPv6 extension headers - ICMPv6

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Course Outcomes:

On successful completion of the course the student will be able to,

Course Outcomes		POs related to COs
CO1	Independently understand basic computer network technology.	PO1, PO2
CO2	Understand and explain ARP, RARP, UDP, ICMP, IGMP protocols.	PO1, PO4
CO3	Identify the differences between TCP and UDP	PO1, PO2
CO4	Understand and building the skills of sub netting and routing mechanisms.	PO1, PO2, PO3
CO5	Familiar with IPv6 protocol in communication networks.	PO1, PO2

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	-	-	2	-	-	-	-	-	-	-	-
CO3	3	3	-	-	-	-	-	-	-	-	-	-
CO4	2	2	2	-	-	-	-	-	-	-	-	-
CO5	3	3	-	-	-	-	-	-	-	-	-	-
CO*	**2.8**	**2.75**	**2.0**	**2.0**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Text Books:

1. TCP/IP Protocol Suite, 4/e, BehrouzA.Forouzan, April 2009, Tata McGrawHill, Hyderabad, India.
2. Introduction to Data Communications and Networking, 3/e, Wayne Tomasi, May 1998, Pearson Education, New Delhi, India.

References Books:

1. Internetworking with TCP/IP, 2/e, Douglas E. Comer, Stevens, 2006, PHI, New Delhi, India.
2. TCP/IP Network Administration, 3/e, Craig Hunt, O'Reilly, August 1992, New Delhi, India.
3. TCP/IP Illustrated, Volume 1: The Protocols, 2/e, Kevin R. Fall, W. Richard Stevens, 2011, Pearson Education, New Delhi, India.
4. The TCP/IP Guide:A Comprehensive, Illustrated Internet Protocols Reference, 1/e, Charles M. Kozierok, William Pollock, 2005, San Francisco, Usa.
5. TCP/IP Sockets in C: Practical Guide for Programmers, 1/e, Michael J. Donahoo, Kenneth L. Calvert, Morgan Kaufmann, 2001, San Francisco, Usa.

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IV B. TECH II-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	3	**0**	**0**	**3**

18CSE423A CLOUD COMPUTING (CORE ELECTIVE-III)

Course Educational Objectives:

CEO1: To provide knowledge on different types of Computing Systems and types of Cloud Computing Basics.
CEO2: To describe the different services of cloud
CEO3: To describe the Privacy and security aspects of cloud.
CEO4: To know common standards for Cloud
CEO5: To develop skill to setup our own private cloud and to Know various applications of Cloud.

UNIT – 1: Introductory concepts and overview (9)

Distributed systems - High performance cluster computing - Grid computing - Virtualization - Meaning of the terms cloud and cloud computing - cloud based service offerings - Grid computing versus Cloud computing - Benefits of cloud model - limitations - legal issues - Key characteristics of cloud computing - Challenges for the cloud - Public cloud – Private cloud – Hybrid cloud.

UNIT – 2: Cloud Web Services, Building cloud Networks (9)

Infrastructure as a service - Platform-as-a-service - Software-as-a-Service - Building cloud networks - Evolution from the MSP model to cloud computing and software-as-a-Service - The cloud data center - SOA as step toward cloud computing - Basic approach to a data center based SOA

UNIT – 3: Federation, Presence, Identity, Privacy and Security in the cloud (9)

Federation in the cloud - Presence in the cloud - Privacy and its relation to cloud based information system - Security in the Cloud - Cloud security challenges - Software-as-a-Service security

UNIT – 4: Common Standards in Cloud Computing - End user access to cloud computing (9)

The open cloud consortium - The distributed management task force - Standards for application developers - Standards for messaging - Standards for security - YouTube - Zimbra - Facebook - Zoho - DimDim collaboration - Smartphone - Mobile operating systems for smart phones - Mobile platform virtualization - Future trends.

UNIT – 5: Case Study (9)

Case studies:1 - Amazon EC2 - Amazon simple DB - Amazon S3 - Amazon cloud front.

Case studies:2 - Google App Engine - Google web tool kit - Microsoft Azure Services platform - Microsoft dynamic CRM

Case studies:3 - Setting up your own private cloud using open source tools.

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Course Outcomes:

On successful completion of this course, the students should be able to:

Course Outcomes		POs related to Cos
CO1	Demonstrate Different types of Computing Systems, Cloud Computing Basics, Types of Cloud Computing	PO1, PO2
CO2	Understand the different services of cloud.	PO1, PO2
CO3	Understand the Privacy and security aspects of cloud.	PO1, PO8
CO4	Demonstrate knowledge on common standards for Cloud	PO1, PO6
CO5	Develop skill to setup our own private cloud and to Know various applications of Cloud.	PO1, PO2, PO3, PO5, PO9, PO12

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-
CO3	3	-	-	-	-	-	-	3	-	-	-	-
CO4	3	-	-	-	-	2	-	-	-	-	-	-
CO5	**3**	3	3	-	**2**	-	-	-	**2**	-	-	3
CO*	**3**	**3**	**3**	**-**	**2**	**2**	**-**	**3**	**2**	**-**	**-**	**3**

Text Books:

1. Cloud Computing implementation- management and security, 1/e, John W. Rittinghouse, James F. Ransome ,2009, CRC Press, Taylor & Francis group, US.
2. Cloud Computing: A practical approach, 1/e, Anthony T.velte, TobyJ.velte Robert Elsenpeter–2009, Tata McGraw Hill edition, India.

Reference Books:

1. Cloud Computing: Principles and Paradigms , 1/e, RajkumarBuyya, James Broberg and AndrzejGoscinski, 2013, Wiley Pvt. Ltd, India.
2. Cloud Computing: Concepts, Technology& Architecture, 1/e , Thomas Erl, Ricardo Puttini and ZaighamMahmood, 2013, PH, New Delhi.
3. Cloud Application Architectures,1/e, George Reese, 2009 Oreillypublishers, California.
4. Cloud Computing and SOA convergence in your enterprise, 1/e, David S. Linthicum, Addison, Wesley, Boston, 2010,US.
5. Cloud Computing: SaaS -PaaS - IaaS- Virtualization- Business Models- Mobile, Security and More, 1/e, Kris Jamsa, Jones& Bartlett Learning, Massachusetts, 2013, US.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

IV B. TECH II-SEMESTER (CSE)

L	T	P	C
3	0	0	3

18CSE423B MACHINE LEARNING (CORE ELECTIVE-III)

Course Educational Objectives:

CEO1: To learn the concept learning and Decision Tree Learning algorithms.
CEO2: To understand Appropriate Problem for Neural Networks and Genetic algorithms.
CEO3: To learn Bayesian Belief Networks and sample complexity.
CEO4: To learn Instance-based Techniques
CEO5: To understand Advanced Learning Algorithms

UNIT – 1: INTRODUCTION (9)

Problems – Perspectives and Issues – Concept Learning – Version Spaces and Candidate Eliminations – Inductive bias – Decision Tree learning – Representation – Algorithm – Heuristic Space Search.

UNIT – 2: NEURAL NETWORKS AND GENETIC ALGORITHMS (9)

Network Representation – Problems – Perceptrons – Multilayer Networks and Back Propagation Algorithms – Advanced Topics – Genetic Algorithms – Hypothesis Space Search – Genetic Programming – Models of Evaluation and Learning.

UNIT – 3: BAYESIAN AND COMPUTATIONAL LEARNING (9)

Bayes Theorem – Concept Learning – Maximum Likelihood – Minimum Description Length Principle – Bayes Optimal Classifier – Gibbs Algorithm – Naïve Bayes Classifier – Bayesian Belief Network – EM Algorithm – Probability Learning – Sample Complexity – Finite and Infinite Hypothesis Spaces – Mistake Bound Model.

U**NIT – 4: Instance-based Techniques (9)**

K- Nearest Neighbour Learning – Locally weighted Regression – Radial Basis Functions – Case Based Learning.

UNIT – 5: ADVANCED LEARNING (9)

Learning Sets of Rules – Sequential Covering Algorithm – Learning Rule Set – First Order Rules – Sets of First Order Rules – Induction on Inverted Deduction – Inverting Resolution – Analytical Learning – Perfect Domain Theories – Explanation Base Learning – FOCL Algorithm – Reinforcement Learning – Task – Q-Learning – Temporal Difference Learning

Course Outcomes:

On successful completion of this course, the student will able to

Course Outcomes		POs related to COs
CO1	Formulate the Concept learning and Decision Tree Learning algorithms	PO1, PO2

CO2	Understand Neural networks and Genetic algorithms	PO1, PO2
CO3	Analyze Bayesian theory, to solve real life problems	PO1, PO2, PO3, PO4
CO4	Demonstrate K nearest algorithm for generalization of objects in learning.	PO1, PO2, PO3, PO4
CO5	Analyze the Advanced Learning algorithms.	PO1, PO2, PO3, PO4

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-
CO3	3	3	3	3	-	-	-	-	-	-	-	-
CO4	3	3	3	3	-	-	-	-	-	-	-	-
CO5	3	3	3	3	-	-	-	-	-	-	-	-
CO*	3	3	3	3	-	-	-	-	-	-	-	-

Text Books

1. Tom M. Mitchell, ―"Machine Learning", McGraw-Hill Education (India) Private Limited, 2013.

Reference Books

1. EthemAlpaydin, ―"Introduction to Machine Learning (Adaptive Computation and Machine Learning)", The MIT Press 2004.
2. Stephen Marsland, ―"Machine Learning: An Algorithmic Perspective‖", CRC Press, 2009.

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IV B. TECH II-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	3	**0**	**0**	**3**

18CSE423C DISTRIBUTED SYSTEMS (CORE ELECTIVE-III)

Course Educational Objectives:

CEO1: To understand basics of distributed systems, Networking, Inter process communication.
CEO2: To create an awareness of Distributed Objects and Remote Invocation.
CEO3: To gain the knowledge about the concepts related to Distributed Systems like Name Services and Concurrency Control.
CEO4: To analyze the key issues related to Distributed Transactions.
CEO5: To manage the distributed transactions in real time databases.

UNIT – 1: Characterization of Distributed Systems and System Models (9)

Introduction - Examples of distributed systems - Resource sharing and the web - Challenges - Architectural and fundamental models.

Networking and internetworking: Types of Network – Network Principles.

Inter process communication: The API for the Internet Protocols – External Data Representation and Marshalling – Client Server Communication – Group Communication.

UNIT – 2: Distributed objects and Remote Invocation (9)

Introduction - Communication between distributed objects – Remote procedure call - Events and notifications.

Operating System Support: OS layer - Protection - Processes and Threads - Communication and invocation - Operating system architecture.

UNIT – 3: Name Services (9)

Introduction - Name services and the domain name system - Directory services - Case study of the global name service - Case study of the X.500 directory service

UNIT – 4: Concurrency Control (9)

Introduction - Transactions - Nested transactions - Locks - Optimistic concurrency control - Timestamp ordering - Comparison of methods for concurrency control - Mutual Exclusion.

UNIT – 5: Distributed Transactions (9)

Introduction – Flat and Nested distributed transactions - Atomic commit protocols – Concurrency control – Distributed Deadlocks – Transaction Recovery – Transactions with Replicated data.

Course Outcomes:

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On successful completion of this course, the students should be able to:

Course Outcomes		POs related to COs
CO1	Distinguish characteristics of distributes systems.	PO1, PO2
CO2	Gain knowledge about howthe Distributed objects are used for remote invocation	PO1, PO2
CO3	Analyze the directory services in distributed systems.	PO1, PO2, PO3, PO4
CO4	Manage the concurrency control in distributed systems.	PO1, PO2, PO3, PO5
CO5	Implement distributed transactions in real time data bases.	PO1, PO2, PO3, PO4

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-
CO3	3	3	3	3	-	-	-	-	-	-	-	-
CO4	3	3	3	3	-	-	-	-	-	-	-	-
CO5	3	3	3	3	-	-	-	-	-	-	-	-
CO*	3	3	3	3	-	-	-	-	-	-	-	-

Text Books:

1. Distributed Systems Concepts and Design, 5/e,GCoulouris, J Dollimore and T Kindberg , 2011, Pearson Education, New Delhi.
2. Distributed Systems,2/e, S.Ghosh, Chapman and Hall/CRC, Taylor & Francis Group, 2010, US.

Reference Books:

1. Distributed Computing, 2/e, S.Mahajan and S.Shah, 2013, Oxford University Press, US.
2. Distributed Operating Systems Concepts and Design, 1/e, PradeepK.Sinha, 1998, PHI, New Delhi.
3. Advanced Concepts in Operating Systems, 1/e, M Singhal, N G Shivarathri, 2001 Tata McGraw, Hill Edition, India.
4. Reliable Distributed Systems, 1/e ,K.P.Birman, Springer , 2005, New York.
5. Distributed Systems: Principles and Paradigms, 2/e, A.S. Tanenbaum and M.V. Steen, 2008 Pearson Education, New York.
6. Distributed Operating Systems and Algorithm Analysis, 5/e, R.Chow, T.Johnson,2009Pearson, New Delhi.
7. Distributed Operating Systems, 1/e, A.S.Tanenbaum, 2009, Pearson Education, New Delhi.

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IV B. TECH II-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	3	**0**	**0**	**3**

18CSE423D NETWORK PROGRAMMING AND MANAGEMENT (CORE ELECTIVE-III)

Course Educational Objectives:

CEO1: To analyze the concepts of Sockets and Elementary TCP Sockets
CEO2: To understand TCP Client server Models
CEO3: To gain knowledge about socket programming and usage of TCP and UDP sockets
CEO4: To manage how to build network applications with Advanced sockets
CEO5: Learn to develop Macros for including Objects in MIB Structure

UNIT 1: ELEMENTARY TCP SOCKETS (9)

Inter Process Communication - Introduction to Sockets – Socket address Structures – Byte ordering functions –Byte Manipulation Functions- inet_aton - inet_addr and inet_ntoa functions - inet_pton and inet_ntop functions - sock_ntop and related functions - readn - written and readline functions.
Elementary TCP Sockets – socket – connect – bind – listen – accept – read – write - close functions – Iterative Server – Concurrent Server

UNIT 2:TCP Client-Server Example (9)

Introduction- TCP Echo Server and TCP Echo Client – Posix Signal handling – Handling SIGCHLD Signals-Wait and Waitpid functions- connection Abort before accept returns-Termination of Server process- Crashing of Server host - Crashing and rebooting of server host- Shutdown of server host – I/O multiplexing – I/O Models – select function – shutdown function – TCP echo Server (with multiplexing) – poll function – TCP echo Client (with Multiplexing)

UNIT 3: SOCKET OPTIONS, ELEMENTARY UDP SOCKETS (9)

Socket options – getsocketopt and setsocketopt functions – generic socket options – IP socketoptions – ICMP socket options – TCP socket options – Elementary UDP sockets –recvfrom and sendtofuctions- UDP echo Server – UDP echo Client – Lost datagrams.

Elementary name and Address Conversion: Domain name system – gethostbyname function – Ipv6 support in DNS – gethostbyadr function –getservbyname and getservbyport functions.

UNIT 4: ADVANCED SOCKETS (9)

Ipv4 and Ipv6 interoperability – IPv4 client - IPv6 Server-IPv6 Client - IPv4 Server.

Raw sockets – raw socket creation – raw socket output – raw socket input – ping program – trace route program.

UNIT 5: SIMPLE NETWORK MANAGEMENT (9)

SNMP network management concepts – SNMPv1 – Management information – MIB Structure – Object syntax – Standard MIB‟s – MIB-II Groups – SNMPv1 protocol and Practical issues.

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Course Outcomes:

On successful Completion of this course, students will be able to:

Course Outcomes		POs related to COs
CO1	Understand Inter process communication and Gain Knowledge on Elementary TCP sockets	PO1, PO2
CO2	Analyze different TCP client-server models	PO1, PO2, PO3, PO4
CO3	Work with different Socket options and elementary UDP sockets	PO1, PO2
CO4	Build different network applications in Advanced sockets	PO1, PO2, PO3, PO4
CO5	Develop Macros for including Objects In MIB Structure	PO1, PO2, PO3, PO4

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	3	3	-	-	-	-	-	-	-	-
CO3	3	3	-	-	-	-	-	-	-	-	-	-
CO4	3	3	-	-	-	-	-	-	-	-	-	-
CO5	3	3	3	3	-	-	-	-	-	-	-	-
CO*	**3**	**3**	**3**	**3**	-	-	-	-	-	-	-	-

Text Books:

1. Unix Network Programming – The Sockets Networking API, 3rd edition, W. Richard Stevens, B. Fenner, A.M. Rudoff, 2004,Pearson.
2. Unix Network Programming-Interprocess communication, Vol-2, 2nd edition,W. Richard Stevens, Pentice Hall.
3. William Stallings, SNMP, SNMPv2, SNMPv3 and RMON 1 and 2, Third Edition, Pearson Edition, 2009.

Reference Books:

1. TCP/IP Illustrated Volumes 1,W. Richard Stevens, 1994, Published by Addison-Wesley.
2. UNIX Network Programming, The Sockets Networking API, Volumes 1,W Richard Stevens, Bill Fenner, Andrew M. Rudoff, Addison-Wesley

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IV B. TECH II-SEMESTER	**L**	**T**	**P**	**C**
	3	**0**	**0**	**3**

18CSE423E COMPUTATIONAL INTELLIGENCE (Core Elective-III)

Course Educational Objectives:

The student should be made to:

CEO1: To study the concepts of Computational Intelligence.
CEO2: To Understand the First order logic concepts.
CEO3: To gain insight information about Artificial Neural Networks
CEO4: To study the Deep learning concepts and their Applications
CEO5: To study the Natural language Processing techniques

UNIT -1: Introduction, Intelligent Agents (9)

Introduction to Computational Intelligence - Agents and Environments - The Concept of Rationality – The Nature of Environments – The Structure of Agents.

UNIT -2: First Order Logic, Inference in First Order Logic (9)

Syntax and semantic of first order logic - Using first order logic - Knowledge engineering in first order logic - Propositional vs. First order inference - Ontological engineering - Categories and objects - Actions - Situations and Events.

UNIT -3: Artificial Neural Networks (9)

Forms of Learning – Regression and Classification with Linear Models – Artificial Neural networks – Support Vector Machines – Reinforcement Learning

UNIT - 4: Deep Learning (9)

Deep Feed Forward Networks – Regularization – Optimization for Training deep Models – Convolution Networks – Applications.

UNIT - 5: Natural Language Processing (9)

Language Models – Text Classification – Phrase Structure Grammars - Syntactic Analysis – Augmented Grammars and Semantic Interpretations – Machine Translation – Speech Recognition

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Course Outcomes:

On Successful completion of this course the students will be able to:

Course Outcomes		POs related to COs
CO1	Gain the basic Knowledge about Computational Intelligence	PO1
CO2	Apply the First order logic for data representation	PO1, PO3
CO3	Analyze and Implement Artificial Neural Network methods	PO1, PO2
CO4	Formulate the Deep learning methods for solving problems	PO1, PO4
CO5	Apply Natural Language Processing techniques	PO1, PO2, PO4, PO9

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	3	-	3	-	-	-	-	-	-	-	-	-
CO3	3	3	-	-	-	-	-	-	-	-	-	-
CO4	3	3	-	-	-	-	-	-	-	-	-	-
CO5	3	3	-	3	-	-	-	-	**3**	-	-	-
CO*	**3**	**3**	**3**	**3**	-	-	-	-	**3**	-	-	-

Text Books:

1. Artificial Intelligence A Modern Approach, 4/e, Stuart Russell and Peter Norvig, 2019, Pearson Education, New Delhi, India.
2. Artificial Intelligence, 3/e, Elaine Rich, Kevin Knight and Shiva Shankar B Nair, 2004, Tata McGraw Hill, Hyderabad, India.

Reference Books:

1. Artificial Intelligence A Modern Approach, 4/e, Stuart Russell and Peter Norvig, 2010, Pearson Education, New Delhi, India
2. Artificial Intelligence Structures and Strategies for Complex Problem Solving, 5/e, George F. Luther, 2005, Pearson Education, New Delhi, India.
3. Introduction to Artificial Intelligence, 1/e, Eugene Charniak and Drew McDermott, 1985,Pearson Education, New Delhi, India.
4. Artificial Intelligence: The Basics, 1/e, Kevin Warwick, 2012, Wearset ltd, Boldon.
5. Introduction to Artificial Intelligence, 2/e, Philip C. Jackson, 1985, Dover Publications, New York, USA.
6. Our Final Invention: Artificial Intelligence and the End of the Human Era, 1/e, James Barrat, 2013,Thomas Dunne Books, New York, USA.
7. Machine Learning, Tom M. Mitchell,1997, McGraw-Hill Science.
8. https://rapidminer.com

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IV B. TECH II-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	3	**1**	**0**	**3**

18CSE424A DISTRIBUTED DATABASES (CORE ELECTIVE-IV)

Course Educational Objectives:

CEO1: To gain knowledge on distributed and central data bases.
CEO2: To introduce basic principles and implementation techniques of distributed database systems.
CEO3: To manage the distributed transactions using concurrency control techniques.
CEO4: To understand the concepts of concurrency control and deadlock.
CEO5: To study the basic concepts of reliability control mechanisms.

UNIT – 1: Distributed versus Centralized Databases (9)
Features of distributed versus centralized databases - Principles of distributed databases - Levels of distribution transparency - Reference architecture for distributed databases - Types of data fragmentation - Integrity constraints in distributed databases

UNIT – 2: Translation of Global Queries to Fragment Queries (9)
Translation of global queries to fragment queries - Equivalence transformations for queries - Transforming global queries into fragment queries - Distributed grouping and aggregate function evaluation - Parametric queries - Optimization of access strategies - A framework for query optimization - Join queries - General queries

UNIT – 3: Management of Distributed Transactions (9)
The management of distributed transactions - A framework for transaction management - Supporting atomicity of distributed transactions - Concurrency control for distributed transactions - Architectural aspects of distributed transactions

UNIT – 4: Distributed Concurrency Control (9)
Locking based concurrency control algorithm - Time based concurrency control algorithm – Optimistic concurrency control algorithm - Deadlock management

UNIT – 5: Reliability Control (9)
Reliability - Basic concepts – Non blocking commitment protocols - Reliability and concurrency control - Determining a consistent view of the network - Detection and resolution of inconsistency - Checkpoints and cold restart - Distributed database administration - Catalog management in distributed databases - Authorization and protection

Course Outcomes:
On successful completion of the course the student will be able to,

COURSE OUTCOMES		**POs related to Cos**
CO1	Get familiar with the currently available models, technologies for and approaches to building distributed database systems and services.	PO1, PO2

CO2	Apply practical skills in the use of Query models and approaches to be able to select appropriate methods for a particular case.	PO1, PO3, PO4
CO3	Manage the distributed transactions in the real time data.	PO1, PO2
CO4	Understand the lock based concurrency control algorithms.	PO1, PO2
CO5	Demonstrate the reliability control mechanisms for Detection and resolution of inconsistency.	PO1, PO2, PO4

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	-	2	2	-	-	-	-	-	-	-	-
CO3	3	2	-	-	-	-	-	-	-	-	-	-
CO4	3	2	-	-	-	-	-	-	-	-	-	-
CO5	3	2	-	2	-	-	-	-	-	-	-	-
CO*	**3**	**2**	**2**	**2**	-	-	-	-	-	-	-	-

Text Books:

1. Distributed Database Principles & Systems, 2/e, Stefano Ceri, Giuseppe Pelagatti, 2008, McGrawHill, Hyderabad, India.
2. Principles of Distributed Database Systems, 2/e, M.TamerOzsu, Patrick Valduriez, 2011,Pearson Education, New Delhi, India.

Reference Books:

1. Distributed Database Management Systems: A Practical Approach, 1/e, Saeed K. Rahimi, Frank S. Haug, 2010,Wiley Publications, New Delhi, India.
2. Distributed Database Systems, 1/e, Chhanda Ray, 2012, Pearson Education, New Delhi, India.
3. Distributed Database Systems, 1/e, David Bell, Jane Grimson, Addison Wesley, 1992, New York, Usa.
4. Distributed Databases, Cooperative Processing, and Networking, 1/e, ShakuAtre, 1992, McGrawHill, Hyderabad, India.
5. Distributed Systems: Vol. II: Distributed Data Base Systems, 1/e, Wesley W. Chu, Artechm, 1986, Print on Demand, New York, USA

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

IV B. TECH II-SEMESTER (Core Elective-IV)	**L**	**T**	**P**	**C**
	3	**0**	**0**	**3**

18CSE424B DATA SCIENCE USING PYTHON(CORE ELECTIVE-IV)

Course Educational Objectives:

The student should be made to:

CEO1: To study the Python module concepts NumPy and Pandas.
CEO2: To Understand the statistical analysis in data science.
CEO3: To gain insight information about visualizing techniques in data science
CEO4: To study the concepts of Machine Learning
CEO5: To study the Text mining concepts for analyzing the unstructured data.

UNIT -1: NumPy, Pandas (9)

The World of Arrays with NumPy : Creating an Array – Mathematical Operations – Squaring an Array – Indexing and Slicing – Shape Manipulation.

Empowering data Analysis with Pandas : The Data Structures of Pandas – Inserting and Exporting data – Data Cleaning – Data operations.

UNIT -2: Inferential Statistics (9)

Various forms of Distribution – Z-Score – P-Value – Type 1 and Type 2 Errors – Confidence Interval - Correlation – Z-Test Vs T-Test – F-Distribution – Chi-Square Distribution

UNIT -3: Advanced Visualization (9)

Controlling the line Properties of a chart – Creating multiple plots – Playing with Text – Styling your plots – Box plots – Scatter Plots with histograms – 3D Plot of a surface.

UNIT - 4: Machine Learning (9)

Decision Trees – Linear Regression – Logistic regression – The Naïve Baye's Classifier – The k-means clustering – Hierarchical Clustering.

UNIT - 5: Analyzing unstructured data with Text Mining (9)

Preprocessing data – Creating a wordCloud – Word and Sentence Tokenization – Parts of Speech Tagging – Streaming and Lemmatization.**Case Study:** Performing Sentence Analysis on World Leaders using Twitter

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Course Outcomes:

On Successful completion of this course the students will be able to:

Course Outcomes		POs related to COs
CO1	Gain the basic Knowledge on advanced Python Concepts	PO1
CO2	Comprehend the various Inferential statistics	PO1, PO3
CO3	Analyze and Implement visualization techniques using Python	PO1, PO2
CO4	Apply the various machine learning techniques	PO1, PO4
CO5	Perform data analysis on the unstructured data and generate the results	PO1, PO2, PO4, PO9

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	3	-	3	-	-	-	-	-	-	-	-	-
CO3	3	3	-	-	-	-	-	-	-	-	-	-
CO4	3	-	-	3	-	-	-	-	-	-	-	-
CO5	3	3	-	3	-	-	-	-	3	-	-	-
CO*	**3**	**3**	**3**	**3**	-	-	-	-	**3**	-	-	-

Text Books:

1. Mastering Python for Data Science, 1/e, Samir Madhavan, 2015, Packt Publishing, Mumbai, India.
2. Hands on Data Analysis with NumPy and Pandas, 1/e, Curtis Miller, 2016, Packt Publishing, Mumbai, India.

Reference Books:

1. Hands on Data science and Python Machine Learning, 1/e, Frank Kane, 2017, Packt Publishing, Birmingham, U.K.
2. Python for Data Analysis, 2/e, Samuel Burns, Globaltech NTC, 2019, Amazon KindlePublishing.
3. https://www.amazon.com/Python-Data-Analysis-Step-Step-ebook/dp/B07PXFJGHT

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

IV B. TECH II-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	3	**0**	**0**	**3**

18CSE424C SERVICE ORIENTED ARCHITECTURE (CORE ELECTIVE-IV)

Course Educational Objectives:

CEO1: To understand the basic concepts of SOA, comparison with existing architectures and principles of service orientation.
CEO2: To learn about web services, messaging with SOAP and different layers of SOA and to learn about advanced concepts such as Orchestration.
CEO3: To learn about web services and Contemporary SOA
CEO4: To Study about Web Services Security and Advanced Messaging.
CEO5: To Understand the Service Oriented Business Process Design.

UNIT – 1: Introduction and Evolution of SOA (9)

Fundamental SOA - Common characteristics of contemporary SOA – Common tangible benefits of SOA – Common pitfalls of adopting SOA - SOA timeline (from XML to web services to SOA) - The continuing evolution of SOA (standards organizations and contributing vendors) - The roots of SOA (comparing SOA to past architectures)

UNIT – 2: Principles of Service- Orientation and Service Layers (9)

Services-orientation and the enterprise - Anatomy of a service-oriented architecture - Common principles of service-orientation - Service orientation and object orientation - Service layer abstraction Application service layer - Business service layer - Orchestration service layer

UNIT – 3: Web Services and Contemporary SOA (9)

The web services framework - Services (as web services) - Service descriptions (with WSDL) - Messaging (with SOAP) – Message exchange patterns - Service activity - Coordination - Atomic transactions - Business activities - Orchestration - Choreography

UNIT – 4: Web Services Security and Advanced Messaging (9)

Message level security - Data level security - XML Encryption - XML Signature - Reliable Messaging - Notification - WS - Eventing - WS - Notification

UNIT – 5: Business Process Design (9)

WS - BPEL language basics - WS - Coordination overview – Service Oriented Business Process Design (a step-by-step process) - WS - Addressing language basics - WS - Reliable messaging language basics

Course Outcomes:

On successful completion of this course, the students should be able to:

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Course Outcomes		POs related to COs
CO1	Gained Knowledge on concepts of SOA and comparison with older architectures and principles of service orientation.	PO1
CO2	Understood the Principles of Service- Orientation and Service Layers	PO1, PO2, PO3,PO4
CO3	Gained knowledge on different Web Services and Contemporary SOA	PO1, PO2, PO3
CO4	Understood the concepts of Web Services Security and Advanced Messaging	PO1, PO3
CO5	Gained knowledge to Analyze complex business process critically in identifying appropriate service model logic.	PO1, PO2,PO3,PO4

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3		-	-	-	-	-	-	-	-	-	-
CO2	3	2	3	3	-	-	-	-	-	-	-	-
CO3	3	3	2	-	-	-	-	-	-	-	-	-
CO4	3	-	3		-	-	-	-	-	-	-	-
CO5	3	3	3	2	-	-	-	-	-	-	-	-
CO*	**3**	**2.6**	**2.75**	**2.5**		-	-	-	-	-	-	-

Text Books:

1. Service-Oriented Architecture Concepts and Technology and Design, 1/e, ThomasErl,2006, Pearson Education, New Delhi, India.
2. Understanding SOA with Web Services, 1/e, Eric Newcomer, Greg Lomow, December 2004, Pearson Education, New Delhi, India.

References Books:

1. Service-Oriented Architecture (SOA): A Planning and Implementation Guide for Business and Technology, 1/e, Eric A. Marks, Michael Bell, 2006, Wiley Publication, New Delhi, India.
2. Developing Enterprise Web Services An Architect's Guide, 2/e, SandeepChatterjee, James Webber, 2004, Pearson Education, New Delhi, India.
3. Service-Oriented Architecture (SOA) Compass: Business Value, Planning, and Enterprise Roadmap, 1/e, Norbert Bieberstein, Sanjay Bose, Marc Fiammante, Keith Jones, Rawn Shah, 2005, IBM Press, New Delhi, India.
4. SOA in Practice: The Art of Distributed System Design(Theory in Practice), 1/e, Nicolai M.Josuttis, O'Reilly, 2007, New York, Usa.

5. IT Architecture and Middleware Strategies for Building Large Integrated Systems, 1/e, Chris Britton, Addison Wesley, 2000, New Delhi, India

IV B. TECH II-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	3	**0**	**0**	**3**

18CSE424D MOBILE COMPUTING (CORE ELECTIVE-IV)

Course Objectives:

CEO1: To describe the basic concepts and principles in mobile computing.
CEO2: To understand the concepts of wireless networks and application software.
CEO3: To explain the structure and components for Mobile IP and Mobility Management.
CEO4: To analyze the different transaction models in mobile data management.
CEO5: To gain knowledge about different mobile platforms and application development.

UNIT 1: Introduction (9)

Wireless and Mobile Computing Architecture – Limitations of wireless and mobile communication – Wireless Telecommunication Networks: Digital cellular Systems - TDMA - CDMA – Wireless Networking Techniques – Mobility Bandwidth Tradeoffs – Portable Information Appliances.

UNIT 2: Emerging Wireless Network Standards (9)

3 G Wireless Networks – State of Industry – Mobility support Software – End User Client Application – Mobility Middleware –Middleware for Application Development - Adaptation and Agents - Service Discovery Middleware – Finding Needed Services - Interoperability and Standardization.

UNIT 3: Mobile Networking (9)

Virtual IP Protocols - Loose Source Routing Protocols - Mobile IP – CDPD – GPRS – UMTS Security and Authentication – Quality of Service – Mobile Access to the World Wide Web.

UNIT 4: Mobile Data Management (9)

Mobile Transactions - Reporting and Co Transactions –Kangaroo Transaction Model – Clustering Model –Isolation only transaction – 2 Tier Transaction Model – Semantic based nomadic transaction processing.

UNIT V: Mobile Platforms And Applications (9)

Mobile Device Operating Systems – Special Constraints & Requirements – Commercial Mobile Operating Systems – Software Development Kit: iOS, Android, BlackBerry, Windows Phone – MCommerce – Structure – Pros & Cons – Mobile Payment System – Security Issues

Course Outcomes:

On successful completion of the course the student will be able to,

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Course Outcomes		POs related to COs
CO1	Apply the fundamental design paradigms and technologies to mobile computing applications.	PO1, PO2, PO3
CO2	Understand the concepts of wireless networks and application software.	PO1, PO2
CO3	Use the skill to demonstrate the virtual IP and mobile IP.	PO1, PO2, PO4
CO4	Understand the mobile transactions for data management.	PO1, PO2,
CO5	Develop a mobile application using android/blackberry/ios/Windows SDK	PO1, PO2, PO5

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	3	-	-	-	-	-	-	-	-	-
CO2	3	2	-		-	-	-	-	-	-	-	-
CO3	3	3	-	3	-	-	-	-	-	-	-	-
CO4	2	2	-	-	-	-	-	-	-	-	-	-
CO5	3	3	-	-	3	-	-	-	-	-	-	-
CO*	**2.8**	**2.75**	**3.0**	**3.0**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Text Books:

1. Mobile Computing Principles, Reza B Fat and Roy.T. Fielding, 2005.Cambridge University Press.
2. Anytime, Anywhere Computing, Mobile Computing Concepts and Technology, Abdelsalam A Helal, Richard Brice, Bert Haskel, MarekRusinkiewicz, Jeffery L Caster andDarellWoelk, 2000. Springer International Series in Engineering and Computer Science.

Reference Books:

1. Fundamentals of Mobile and Pervasive Computing, Golden Richard, Frank Adelstein, Sandeep KS Gupta, Golden Richard and Loren Schwiebert, 2005, McGraw-Hill ,Professional Publishing.

2. Principles of Mobile Computing, UweHansmann, LotharMerk, Martin S. Nicklons and Thomas Stober,2003, Springer.

3. Android Developers :http://developer.android.com/index.html

4. Apple Developer : https://developer.apple.com/

5. Windows Phone DevCenter :http://developer.windowsphone.com

6. BlackBerry Developer: http://developer.blackberry.com

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IV B. TECH II-SEMESTER (CSE)

L	T	P	C
3	0	0	3

18CSE424E REAL TIME SYSTEMS (CORE ELECTIVE-IV)

Course Educational Objectives:

CEO1: To learn the features of Real time OS.
CEO2: To study the various Uniprocessor and Multiprocessor scheduling mechanisms.
CEO3: To learn about various real time communication protocols.
CEO4: To study the difference between traditional and real time databases
CEO5 : To learn about the different types of real time tools

Unit – I Introduction **(9)**
Introduction to real-time computing - Structure of a real-time system - Characterization of real-time systems and tasks - Performance measures

Unit – II Task Assignment and Scheduling **(9)**
Task Assignment and Scheduling - Uniprocessor scheduling algorithms - Task assignment - Mode changes - Fault tolerant scheduling.

Unit – III Real Time Communication **(9)**
Real-time Communication - Network topologies and architecture issues - Protocols - Contention-based, token-based, polled bus - Fault tolerant routing.

Unit – IV Real Time Databases **(9)**
Real-time Databases - Transaction priorities and aborts - Concurrency control issues - Scheduling algorithms - Two-phase approach to improve predictability.

Unit – V Programming Languages and Tools **(9)**
Programming Languages and Tools - Hierarchical decomposition - Run-time error handling - Overloading - Timing specification - Recent trends and development

Course Outcomes:

Course Outcomes		POs related to COs
CO1	Understand the features of Real Time System	PO1, PO2, PO4
CO2	Implement the different processor scheduling and Task assignment	PO1, PO4
CO3	Understand the various real time protocols	PO1, PO2, PO4
CO4	Analyze the difference between traditional and real time database	PO1, PO2
CO5	Demonstrate the function of real time system function using tools	PO1, PO2, PO3, PO4

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CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	3	-	-	-	-	-	-	-	-
CO2	3	-	-	3	-	-	-	-	-	-	-	-
CO3	3	3	-	3	-	-	-	-	-	-	-	-
CO4	3	3	-	-	-	-	-	-	-	-	-	-
CO5	3	3	3	3	-	-	-	-	-	-	-	-
CO*	**3**	**3**	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Text Book

1. C. M. Krishna and Kang G. Shin, "Real-Time Systems", International Edition, McGraw Hill Companies, Inc., New York, 1997

Reference Book

1. Rajib Mall, "Real-Time Systems: Theory and Practice", 1st edition, Pearson Education, 2012

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

IV B.Tech II Semester

L	T	P	C
0	0	20	10

18CSE425 PROJECT WORK

Course Educational Objectives:

1. Discovering potential research areas in the field of Computer science and Engineering.
2. Comparing and contrast the several existing solutions for the problem identified.
3. Formulating and propose a plan for creating a solution for the research plan identified.
4. Conducting the experiments as a team and interpret the results.
5. Reporting and presenting the findings of the work conducted.

The aim of the project work is to deepen comprehension of principles by applying them to a new problem which may be the design / fabrication / analysis for a specific application, a research project with a focus on an application needed by the industry / society, a computer project, or a design and analysis project. A project topic must be selected by the students in consultation with their guides.

To train the students in preparing project reports and to face reviews and viva voce examination. The progress of the project is evaluated based on a minimum of three reviews. The review committee may be constituted by the Head of the Department. A project report is required at the end of the semester. The project work is evaluated jointly by external and internal examiners constituted by the Head of the Department based on oral presentation and the project report.

Course Outcomes:

On successful completion of course, the student will be able to		**POs related to COs**
CO1	Demonstrate in-depth knowledge on the project topic	**PO1**
CO2	Identify, analyze and formulate complex problem chosen for project work to attain substantiated conclusions.	**PO2**
CO3	Design solutions to the chosen project problem.	**PO3**
CO4	Undertake investigation of project problem to provide valid conclusions	**PO4**
CO5	Use the appropriate techniques, resources and modern engineering tools necessary for project work	**PO5**
CO6	Apply project results for sustainable development of the society.	**PO6**
CO7	Understand the impact of project results in the context of environmental sustainability.	**PO7**
CO8	Understand professional and ethical responsibilities while executing the project work.	**PO8**

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III B. TECH I-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	2	**1**	**0**	**3**

18CSE311 **OPERATING SYSTEMS**

Course Educational Objectives:
CEO1: To understand main components of OS, System structures and the operations performed by OS as a resource manager.
CEO2: To Study process concurrency and synchronization.
CEO3: To Analyze the different memory management techniques.
CEO4: To gain knowledge about concepts of input/ output systems and storage management
CEO5: To manage different file systems, protection and security to the systems

UNIT – 1 : Operating Systems Overview **(9)**

Introduction - What Operating system do - Operating system operations - Process management - Memory management - Storage management - Protection and Security - Distributed Systems - Special purpose systems.
System structures : Operating system services - user operating system interface - System calls - Types of system calls - Operating system design and implementation - Operating system structure - Operating system generation - System boot.

UNIT - 2 : Process Management and Concurrency **(9)**
Process Management: Process concepts – threads - scheduling-criteria – algorithms and their evaluation - Thread scheduling.
Concurrency : Process synchronization - the critical- section problem - Peterson's Solution - synchronization Hardware – semaphores - classic problems of synchronization - monitors.

UNIT – 3 : Memory Management **(9)**
Memory Management and Virtual Memory : Logical & physical Address Space – Swapping - Contiguous Allocation – Paging - Structure of Page Table – Segmentation - Virtual Memory - Demand Paging - Performance of Demanding Paging - Page Replacement - Page Replacement Algorithms - Allocation of Frames - Thrashing.

UNIT – 4 : Principles of deadlock AND Mass-storage structure & I/O systems **(9)**
Principles of deadlock - system model - deadlock characterization - deadlock prevention - detection and avoidance - recovery form deadlock.
Mass-storage structure - overview of Mass – storage structure - Disk structure - disk attachment - disk scheduling - swap-space management - RAID structure - stable-storage implementation - Tertiary storage structure.

UNIT - 5 : File system Interface **(9)**
File system Interface- the concept of a file - Access Methods - Directory structure - File system mounting - file sharing – protection - File System implementation - File system structure - file system implementation - directory implementation - allocation methods - free-space management - efficiency and performance.
Protection and Security - Goals of protection - Principles of protection - Access matrix - The security problem - program threats - System and network threats.

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Course Outcomes:

On successful completion of this course, student will be able to:

Course Outcomes		**POs related to COs**
CO1	Analyze operating system operations ,system design and implementation	PO1, PO2
CO2	Implement Thread scheduling , solutions to synchronize problems	PO1, PO4,
CO3	Apply memory management techniques, virtual memory concepts	PO1,PO3,PO4
CO4	Manage process execution without deadlock, mass storage structure	PO1,PO4
CO5	Understand file system interface, protection and security in System and Network	PO1, PO2, PO4

CO-PO Mapping

PO / CO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	2	-	-	3	-	-	-	-	-	-	-	-
CO3	3	-	3	3	-	-	-	-	-	-	-	-
CO4	3	-	-	3	-	-	-	-	-	-	-	-
CO5	2	3	-	3	-	-	-	-	-	-	-	-
CO*	**2.6**	**3**	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Text Books:

1. Operating System Principles, 9th Edition, Abraham Silberchatz, Peter B. Galvin, Greg Gagne, Wiley Student Edition.
2. Operating systems - Internals and Design Principles, 6th Edition,W. Stallings, Pearson.

References books:

1. Operating System Principles,8th Edition, Abraham Silberchatz, Peter B. Galvin, Greg Gagne, Wiley Student Edition
2. Modern Operating Systems, 3rd Edition ,Andrew S Tanenbaum PHI.
3. Operating Systems A concept - based Approach, 2nd Edition, D. M. Dhamdhere, TMH.
4. Principles of Operating Systems, B. L. Stuart, Cengage learning, India Edition.
5. Operating Systems, 2nd Edition,A. S. Godbole, TMH
6. An Introduction to Operating Systems, P.C.P. Bhatt, PHI.
7. Operating Systems, S, Haldar and A. A. Arvind, Pearson Education.
8. Operating Systems, R. Elmasri, A. G. Carrick and D. Levine, McGraw Hill.

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III B. TECH I-SEMESTER (CSE)

L	T	P	C
2	1	0	3

18CSE312 COMPUTER NETWORKS

Course Educational Objectives:

CEO1: To provide knowledge on Identify the components required to build different types of networks, understand the OSI and TCP/IP architectures and different data link layer protocols.
CEO2: To be exposed to the required functionality at the Ethernet.
CEO3: To understand the different routing protocols, internet protocols and IP addressing.
CEO4: To learn the use of TCP, UDP protocols.
CEO5: To develop skills to apply the concept of application layer protocols

UNIT – 1: Fundamentals, Physical Layer and Data Link Layer (9)
Network Hardware - Network software – OSI & TCP/IP References models - Guided transmission media - Communication satellites - The public switched telephone network – Switching - Data link layer design issues - Elementary data link protocols – Stop and Wait Protocol - Sliding window protocol.

UNIT – 2: The Medium Access Control Sublayer (9)
The channel allocation problem - Multiple access protocols - Ethernet- Ethernet cabling - Manchester encoding - Ethernet MAC sub layer protocol - Switched Ethernet - Fast Ethernet - Wireless LANS - The 802.11 protocol stack - The 802.11 physical layer – The 802.11 MAC sub layer protocol - The 802.11 frame structure.

UNIT- 3: The Network Layer (9)
Network layer design issues - Routing algorithms (DSDV, RIP, OSPF, DSR) – Congestion control algorithms – Internetworking – Internet Protocols : IPv4 , IPv6 - Addresses.

UNIT-4: The Transport Layer (9)
Overview of Transport layer - Elements of transport protocols - The internet transport protocols: UDP and TCP.

UNIT– 5: The Application Layer (9)
Traditional applications: DNS- Electronic mail (SMTP, POP3, IMAP, MIME) - WWW – HTTP – FTP - Web Services – SNMP

Course Outcomes:

On successful completion of the course the student will be able to,

Course Outcomes		POs related to COs
CO1	Demonstrate knowledge on fundamentals of network components and topologies, Analyze the OSI and TCP/IP stack and the different protocols in Data Link layer.	PO1, PO2

CO2	Classify the Media Access Control Protocols and different Internetworking	PO1, PO2
CO3	Demonstrate various types of routing techniques and design the different routing protocols for wired / wireless.	PO1, PO2, PO3, PO4
CO4	Demonstrate uses of datagram delivery	PO1, PO2, PO3, PO4
CO5	Apply the different strategies Operations of DNS, FTP, HTTP, Email Protocols, SNMP	PO1, PO2, PO3, PO4

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-
CO3	2	3	3	2	-	-	-	-	-	-	-	-
CO4	2	3	3	2	-	-	-	-	-	-	-	-
CO5	2	3	3	3	-	-	-	-	-	-	-	-
CO*	**2.4**	**3**	**3**	**2.33**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Text Books :

1. Computer Networks, 5/e, Andrew S. Tanenbaum, 2016,Pearson Education, New Jersey.
2. Data Communications and Networking, 4/e, Behrouz A. Forouzan, 2006,Tata McGraw Hill, New Delhi.

Reference Books:

1. Computer Networks, 4/e, Andrew S. Tanenbaum, 2008,Pearson Education, New Jersey
2. Computer Communications and Networking Technologies,1/e, Michael A.Gallo, William M. Hancock, 2001,Cengage Learning, New Delhi.
3. Computer Networks: Principles, Technologies and Protocols for Network Design,1/e, Natalia Olifer, Victor Olifer, 2006,Wiley India, New Jersey.
4. Computer and Communication Network,1/e, Nader F. Mir, 2007,Pearson Education, New Jersey.
5. Computer Networking: A Top-Down Approach Featuring the Internet, 3/e, James F.Kurose - K.W.Ross,2005, Pearson Education, New Jersey.
6. Data and Computer Communications,1/e, G.S.Hura and M.Singhal,2001, CRC Press, Taylor and Francis Group, FL United States.

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III B. TECH I-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	3	**1**	**0**	**3**

18CSE313 SOFTWARE ENGINEERING

Course Educational Objectives:

The student should be made to:

CEO1: To provide knowledge of basic software engineering methods, practices and their appropriate application.
CEO2: To understand software requirements and the SRS documents.
CEO3: To design components based on different software architectural styles.
CEO4: To understanding of approaches to verification and validation including static analysis, and Reviews.
CEO5: To describe software measurement and software risks.

UNIT – 1: Introduction to Software Engineering and Process Models (9)

The evolving role of software - Changing nature of software - Legacy software - Introduction to Agility-Agile process-Extreme programming- XP Process.-Software myths - A generic view of process - Software engineering a layered technology - A process framework - The Capability Maturity Model Integration (CMMI) - Process patterns - Process assessment - Personal and team process models

Process Models: The waterfall model - Incremental process models - Evolutionary process models - Specialized process models - The unified process

UNIT – 2: Software Requirements (9)

Functional and non-functional requirements - User requirements - System requirements - Interface specification - The software requirements document

Requirements Engineering Process: Feasibility studies - Requirements elicitation and analysis - Requirements validation - Requirements management - System models - Context models - Behavioral models - Structured methods

UNIT - 3: Design Engineering (9)

Design process and design quality - Design concepts - The design model - Creating an architectural design - Software architecture - Data design - Architectural styles and patterns

Modeling Component-Level Design: Designing class based components - Conducting component level design - Object constraint language - Designing conventional components

UNIT - 4: Testing Strategies (9)

A strategic approach to software testing - Test strategies for conventional software - Validation testing - System testing - The art of debugging – Black box and white box testing

Product metrics: Software quality - Frame work for product metrics - Metrics for analysis model - Metrics for design model - Metrics for source code - Metrics for testing - Metrics for maintenance

UNIT – 5: Metrics for Process and Products (9)

Software measurement - Metrics for software quality - Risk management: reactive Vs proactive risk strategies - Software risks - Risk identification - Risk projection - Risk refinement - RMMM - RMMM plan- CASE TOOLS

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Quality Management: Quality concepts - Software quality assurance - Software reviews - Formal technical reviews - Statistical software quality assurance - Software reliability - The ISO 9000 quality standards

Course Outcomes:

On successful completion of this course, student will be able to:

Course Outcomes		POs related to COs
CO1	Demonstrate knowledge on fundamentals of software engineering methods and software process models.	PO1, PO2
CO2	Identify software requirements and design SRS document by analyzing the data flows.	PO1, PO3, PO4
CO3	Design class based components and conduct component level design based on architectural styles and patterns.	PO1,PO2, PO3,PO4
CO4	Identify various types of testing and development metrics for various phases of software development.	PO1, PO2, PO4
CO5	Identify the software risks and analyze the quality assurance activities	PO1, PO4

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	2	-	3	3	-	-	-	-	-	-	-	-
CO3	2	2	3	2	-	-	-	-	-	-	-	-
CO4	2	2	-	3	-	-	-	-	-	-	-	-
CO5	3	-	-	2	-	-	-	-	-	-	-	-
CO*	**2.4**	**2**	**3**	**2.5**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Text Books :

1. Software Engineering, A practitioner's Approach, 8/e, Roger S Pressman,2019, Tata McGraw Hill International Edition.
2. Software Engineering, 7/e, Ian Somerville, 2004, Pearson Education.

References:

1. Software Engineering, A practitioner's Approach, 6/e, Roger S Pressman,2005, Tata McGraw Hill International Edition.
2. Fundamentals of Software Engineering, 2/e, Rajib Mall, 2005,Prentice Hall Inc.
3. Software Engineering: A Precise Approach, 1/e, Pankaj Jalote, 2010, Wiley India.
4. Software Engineering: A Primer, 1/e, Waman S Jawadekar, 2008, Tata McGraw Hill.
5. Software Engineering - Principles and Practices, 1/e, Deepak Jain, Oxford University Press.
6. Software Engineering – A Supporting Processes, 1/e, Richard H. Thayer and Merlin Dorfman, 2005, Wiley.

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III B. TECH I-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	3	**1**	**0**	**3**

18CSE314 UNIX AND SHELL PROGRAMMING

Course Educational Objectives:

CEO1: To acquire information on UNIX architecture, general purpose utilities, file handling commands, Network commands.
CEO2: To develop the basic skills of UNIX shell, standard streams, redirection, pipes, command execution, quotes, command substitution, Job control, variables,
CEO3: To develop skills to design regular expression feature with Grep, Sed and AWK.
CEO4: To inculcate skill on korn shell features for construct Korn shell programming for the given task.
CEO5: To develop skill to apply various UNIX system calls in designing different UNIX utilities.

UNIT – 1: Introduction to UNIX: (9)

The UNIX Operating System - The UNIX Architecture - Features of UNIX - Internal And External Commands - Command Structure.

General-Purpose Utilities - cal - date - echo - printf - bc - script - passwd - PATH - who - uname - tty - stty - pwd - cd - mkdir - rmdir - od.

Handling Files - The File System - cat - cp - rm - mv - more - file - ls - wc - pg - cmp–comm-diff - gzip - tar - zip - df - du - mount - umount - chmod - The vi editor - security by file Permissions.

Networking Commands - ping - telnet - ftp - finger - arp - rlogin.

UNIT- 2: Introduction to Shells (9)

Unix Session - Standard Streams - Redirection - Pipes - Tee Command - Command Execution - Command-Line Editing - Quotes - Command Substitution - Job Control - Aliases - Variables - Predefined Variables - Options - Shell Environment -Customization**.**

Filters: Introduction - Concatenating files - Display Beginning and End of files - Cut and Paste - Sorting - Translating Characters - Ordering a File - uniq.

UNIT – 3: Regular Expressions (9)

Atoms - operators GREP - Operation - grep Family - searching for File Content.SED - Scripts - Operation - Addresses - commands - applications - grep and sed.AWK - Execution - Fields and Records - Scripts - Operations - Patterns - Actions - Associative Arrays - String Functions - String Functions - Mathematical Functions - User – Defined Functions - Using System, commands in awk - Applications - awk and grep - sed and awk.

UNIT - 4: Interactive Korn Shell (9)

Korn Shell Features - Two Special Files - Variables - Output - Input - Exit Status of a Command - eval Command - Environmental Variables - Options - Startup Scripts - Command History - Command Execution Process.

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Korn Shell Programming : Basic Script concepts - Expressions - Decisions: Making Selections - Repetition - special Parameters and Variables - changing Positional Parameters - Argument Validation - Debugging Scripts - Script Examples.

UNIT – 5: Interactive C Shell **(9)**

File Management : File Structures - System Calls for File Management – create - open - close - read - write - lseek - link - symlink - unlink - stat - fstat - lstat - chmod - chown - Directory API – opendir - readdir - closedir - mkdir - rmdir - umask.

Course Outcomes:

On successful completion of the course the student will be able to,

	Course Outcomes	**POs related to COs**
CO1	Demonstrate knowledge on fundamentals of UNIX operating system, Analyze Unix general purpose, file handling and Networking commands and utilities.	PO1, PO2
CO2	Review and Identify various features of Unix shell	PO1, PO2
CO3	Analyse and design various regular expressions for GREP, SED and AWK.	PO1, PO2, PO3
CO4	Construct korn shell programming using korn shell features.	PO1, PO2, PO3,PO5
CO5	Understanding the concept of UNIX system calls to develop various UNIX utilities	PO1, PO2, PO3, PO4,PO5

CO-PO Mapping

PO / CO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-
CO3	2	2	3	-	-	-	-	-	-	-	-	-
CO4	2	2	-	3	3	-	-	-	-	-	-	-
CO5	3	2	3	2	3	-	-	-	-	-	-	-
CO*	**2.6**	**2.2**	**2**	**2.5**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Text Books:

1. Unix and shell Programming,1st Edition ,Behrouz A. Forouzan - Richard F. Gilbery,2003,Cengage Learning India.
2. Unix Concepts and Applications, 4th Edition, Sumitabha Das, 2006, TMH.

References:

1. Unix for programmers and users, 3rd Edition, Graham Glass, King Ables, 2008,Pearson Education.
2. Advanced Unix programming, 2nd Edition, N.B Venkateswarlu, 2010,BS Publications.
3. Unix Shell programming, 1st Edition, YashwanthKanitkar, 2010, BPB Publisher.

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III B. TECH I-SEMESTER (CSE)

L	T	P	C
3	1	0	3

18ECE419 MICROPROCESSORS AND MICROCONTROLLERS

Course Educational Objectives:

CEO1: To provide knowledge on
- Architecture of 8086, Registers and Memory.
- Physical memory organization
- Interrupts of 8086

CEO2: To become skilled in 8086 assembly language programming..

CEO3: To understand the concepts of Programmable Interfacing devices,
- 8086 interfacing with Input output devices and ARM processor.

CEO4: Acquire the knowledge on 8051 Microcontroller architecture and its memory

CEO5: Analyze how the 8051 is interfaced with different peripheral devices.

UNIT-1: INTRODUCTION TO 8086 MICROPROCESSOR **(9)**

8085 Overview-8086 Internal Architecture- Register Organization, Memory Segmentation, Flag Register, Pin Configuration, Physical Memory Organization, General Bus Operation- Minimum and Maximum Mode Signals, Timing Diagrams - Interrupts Of 8086.

UNIT-2: INSTRUCTION SET AND ASSEMBLY LANGUAGE PROGRAMMING (9)

Instruction Formats -Addressing Modes-Instruction Set, Assembler Directives-Macros, Programs Involving Logical, Branch Instructions – Sorting and Evaluating Arithmetic Expressions – String Manipulations-Simple ALPs.

UNIT-3: PROGRAMMABLE INTERFACING DEVICES& ADVANCED RISC PROCESSORS (9)

8255 PPI- Block Diagram, Various Modes of Operation-Programmable Interval Timer 8254-Architecture,Operating Modes – Key Board/Display Controller 8279-Architecture, Modes of Operation, D/A and A/D interfacing, Programmable Communication Interface 8251 USART-Architecture, Description Of Operating Modes-Introduction to ARM Processor-ARM Cortex M3 processor.

UNIT-4: 8051 MICROCONTROLLER & ADVANCED MICROCONTROLLERS (9)

Introduction to Micro Controllers 8051, Architecture, Registers, Pin Description, Connections, I/O Ports, Memory Organization, Addressing Modes, Instruction Set.

UNIT-5: 8051 INTERFACING (9)

Assembly directives, Simple assembly software programs, interfacing with keyboards, 7 segment LEDs, LCDs, Interfacing with ADCs, Interfacing with DACs.

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Course Outcomes:

On successful completion of the course the student will be able to		POs related to COs
CO1	Understand the 8086 microprocessors internal architecture and its operation within the area of manufacturing.	PO1, PO2
CO2	Apply knowledge and design programming proficiency using the various addressing modes and data transfer instructions of the target microprocessors	PO1, PO2, PO3, PO4
CO3	Analyze and design different I/O devices and how they are interfaced with 8086 microprocessor	PO1, PO2, PO3, PO4
CO4	Understand the 8051 microcontroller internal architecture and its operation within the area of manufacturing .	PO1, PO2
CO5	Analyze and design assembly language programs, select appropriate assemble into machine a cross assembler utility of a advance microprocessors and Interfacing for 8051	PO1, PO2, PO3, PO4

CO-PO Mapping

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	2	3	2	-	-	-	-	-	-	-	-
CO3	3	2	3	2	-	-	-	-	-	-	-	-
CO4	3	3	-	-	-	-	-	-	-	-	-	-
CO5	3	2	2	2	-	-	-	-	-	-	-	-
CO*	3	2.2	2.6	2	-	-	-	-	-	-	-	-

TEXT BOOKS :

1. Advanced microprocessor and Peripherals ,A,K,Ray and K,M,Bhurchandi, 3rd edition, TMH, New Delhi,2017.
2. The 8051 Microcontroller, Kenneth j.Ayala, 3rd edition, Thomson Delmar Learning, AsiaPvt.Ltd.
3. Joseph Yiu, The Definitive Guide to the ARM Cortex-M3 & M4, Elsevier, 3rd Edition, 2013.

REFERENCE BOOKS:

1. Advanced microprocessor and Peripherals ,A,K,Ray and K,M,Bhurchandi, 2nd edition, TMH, New Delhi,2000.
2. Micro Processors &Interfacing ,Douglas U, Hall,revised 2nd edition,TMH,New Delhi,2007.
3. The 8088 and 8086 microprocessors, Walter A,Triebel, Avtar Singh, 1st edition, PHI, New Delhi,2003.
4. Microcomputer Systems the 8086/8088 Family: Architecture Programming and Design", Liu & Gibson, 2nd edition, PHI, New Delhi.
5. The 8086 microprocessor programming and interafacing, KennethJ,Ayala, 1/e, Cenange learning private limited, New Delhi, 2007.
6. Microprocessors and microcontrollers, Krishna Kanth, 2nd edition, PHI learning, New delhi, 2012.

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III B. TECH I-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	2	**1**	**0**	**3**

18CSE315 COMPILER DESIGN

Course Educational Objectives:

CEO1: To provide knowledge on list the different stages in the process of compilation and Identify different methods of lexical analysis.
CEO2: To design top-down parsers.
CEO3: To design bottom-up parsers and Identify synthesized and inherited attributes.
CEO4: To learn the use of intermediate code generation and runtime environments and implementation intermediate code generation.
CEO5: To develop skill to apply the concept of optimization and develop algorithms to generate code for a target machine.

UNIT 1 : Introduction to Compiler and Lexical Analysis (9)
Introduction to Compiler - Phases of a compiler - Lexical Analysis : The Role of the Lexical Analyzer - Input Buffering - Specification of Tokens - The Lexical-Analyzer Generator Lex.

UNIT - 2 : Top Down Parsing (9)
Introduction: The Role of the Parser - Context free grammar - Eliminating Ambiguity - Eliminating of Left Recursion and Left Factoring.
Top-Down Parsing: Recursive descent parsing - Non-Recursive Predictive parsing - LL (1) Grammars.

UNIT - 3 : Bottom Up Parsing and Syntax Directed Translation (9)
Bottom-Up Parsing : Shift reduce parsing – Operator precedence parser - LR parsers - Simple LR parser - Canonical LR parser - LALR parser - The Parser Generator YACC .
Syntax Directed Translation : Syntax directed definition - S-attributed and L - attributed definitions - Construction of syntax trees

UNIT -4 : Intermediate Code Generator And Run Time Environments (9)
Intermediate Code Generation: Intermediate Languages - Boolean expressions - Flow-of-Control Statements - Control- Flow Translation of Boolean Expressions.
Run time Environments : Storage organization - Stack Allocation strategies - Symbol table structure - Symbol attributes and management.

UNIT - 5 : Code Optimization and Code Generation (9)
Code Optimization: Basic Blocks and Flow Graphs - Optimization of Basic Blocks - The principle sources of optimization - Introduction to data flow analysis, DAG.
Code Generation : Issues in the Design of a Code Generator - The Target Language - A Simple Code Generator - Peephole optimization - Register allocation and assignment.

Course Outcomes:

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After completion of this course student will be able to :

Course Outcomes		POs related to COs
CO1	Demonstrate knowledge on fundamentals of compiler phases, Design the Lexical Analyzer and input buffering.	PO1, PO2
CO2	Design Top-Down Parser	PO1, PO2, PO3, PO4
CO3	Design Bottom-up Parser and Develop syntax directed translation schemes.	PO1, PO2, PO3, PO4
CO4	Demonstrate the ability to write intermediate code for a given high level programming language (preferably C or FORTRAN) and be able to represent the intermediate code as Quadruples, Triples and Indirect Triples	PO1, PO2, PO3, PO4
CO5	Write three address code and identify the basic blocks, draw flow graphs and represent directed Acyclic graphs for the identified basic blocks. They will also be able to write the target optimized code (assembly code) for the given three address code.	PO1, PO2, PO3, PO4, PO5

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	3	-	-	-	-	-	-	-	-	-
CO2	3	3	3	2	-	-	-	-	-	-	-	-
CO3	2	3	3	2	-	-	-	-	-	-	-	-
CO4	2	3	3	2	-	-	-	-	-	-	-	-
CO5	2	3	3	3	2	-	-	-	-	-	-	-
CO*	**2.4**	**3**	**3**	**2.25**	**2**	-	-	-	-	-	-	-

Text Books :

1. Compilers-Principles - Techniques and Tools ,2nd edition , Alfred V. Aho - Monica S.Lam - Ravi Sethi - Jeffrey D. Ullman , 2018,Pearson Education.

Reference Books:

1. Compilers-Principles - Techniques and Tools ,2nd edition , Alfred V. Aho - Monica S.Lam - Ravi Sethi - Jeffrey D. Ullman , 2012,Pearson Education
2. Compilers-Principles Techniques and Tools - Low price edition , 2004,Alfred V. Aho - Ravi Sethi - Jeffrey D. Ullman - Pearson Education.
3. Theory of computerscience- Automata Languages and computation , 2nd edition,K.L.P Mishra and N. Chandrashekaran ,2003,PHI.

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III B. TECH I-SEMESTER (CSE)

L	T	P	C
0	0	2	1

18CSE 316 NETWORK SIMULATION LABS

Course Educational Objectives:

CEO1: To understand various network simulator tools and functionalities.
CEO2: To Learn TCL commands.
CEO3: To learn how to create new agent for Communication.
CEO4: To learn how to create new routing protocols for different networks.
CEO5: To analysis the different routing protocols using different tools.

Exercises :

1. Study of Network Simulator Tools.
2. Installation of Network Simulator (NS2).
3. Study of TCL Commands.
4. Write a TCL script to simulate a simple wired network with four nodes.
5. Create a simple TCP scenario with droptail queue mechanism on the gateway.
6. Create a New Agent using C++ and TCL.
7. Create a New protocol for ping using C++ and TCL.
8. Implement Dijkstra‘s algorithm to compute the Shortest path through a graph.
9. Implement Link state routing algorithm to find the shortest distance using link state packets.
10. Write a program for Trace file Analysis using C++ or awk.
11. Write a TCL script to LAN simulation.
12. Write a TCL script to simulate a simple wireless network with DSDV - DSR and AODV routing protocols.
13. Write a TCL script to Simulation of Black Hole Attack.
14. Comparison of different routing protocols performance using Xgraph and Gnuplot.

Mini Project: Create new routing protocols for routing protocol in MANET.

Course Outcomes:

On Successful completion of this course student will be able to:

Course Outcomes		POs related to COs
CO1	Demonstrate knowledge on various network simulator tools and functionalities.	PO1, PO2
CO2	Create different program using TCL commands	PO1, PO2, PO3, PO4
CO3	Demonstrate knowledge on various existing agent and design new agent using TCL and C++ for communication.	PO1, PO2, PO3, PO4
CO4	Demonstrate knowledge on various existing routing protocols and design new routing protocols.	PO1, PO2, PO3, PO4
CO5	Analysis the different routing protocols performance based on number of nodes and speed using different tools.	PO1, PO2, PO3, PO4, PO5, PO11

CO-PO Mapping

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PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	2	-	-	-
CO8	-	-	-	-	-	-	-	-	-	2	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO*	**3**	**3**	**3**	**3**	3	-	-	3	2	**2**	-	**3**

Reference Books:

1. Introduction to Network Simulator NS2 , 2/e,Issariyakul, Teerawat, Hossain and Ekram,2012,Springer US.

Reference Website:

1. Network Simulator - http://www.jgyan.com/ns2
2. Network Simulator Tutorial - https://www.isi.edu/nsnam/ns/tutorial/

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III B. TECH I-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	0	**0**	**3**	**2**

18CSE317 UNIX AND SHELL PROGRAMMING LAB

Course Educational Objectives:

CEO1: To understand the concepts of UNIX environment with vi editor.
CEO2: To gain knowledge on appropriate commands to access the UNIX environment.
CEO3: To experience the shell scripting for developing the solutions for complex problems.
CEO4: To manage the file handling procedures in UNIX environment.
CEO5: To develop the UNIX programs by using system calls.

Week-1

Session-1

a)Log into the system
b)Use vi editor to create a file called myfile.txt which contains some text.
c)correct typing errors during creation.
d)Save the file
e)logout of the system

Session-2

a)Log into the system
b)open the file created in session 1
c)Add some text
d)Change some text
e)Delete some text
f)Save the Changes
g)Logout of the system

Week-2

a)Log into the system
b)Use the cat command to create a file containing the following data. Call it mytable use tabsto separate the fields.

1425 Ravi 15.65
4320 Ramu 26.27
6830 Sita 36.15
1450 Raju 21.86

c)Use the cat command to display the file, mytable.
d)Use the vi command to correct any errors in the file, mytable.
e)Use the sort command to sort the file mytable according to the first field. Call the sorted file mytable
f)Print the file mytable
g)Use the cut and paste commands to swap fields 2 and 3 of mytable. Call it mytable
h)Print the new file, mytable
i)Logout of the system.

Week-3

1) a)Login to the system
b)Use the appropriate command to determine your login shell
c)Use the /etc/passwd file to verify the result of step b.
d)Use the who command and redirect the result to a file called myfile1. Use the more command to see the contents of myfile1.

e)Use the date and who commands in sequence (in one line) such that the output of date will display on the screen and the output of who will be redirected to a file called myfile2. Use the more command to check the contents of myfile2.

2) a) Write a sed command that deletes the first character in each line in a file.
b) Write a sed command that deletes the character before the last character in each line in a file.
c) Write a sed command that swaps the first and second words in each line in a file.

Week-4

a)Pipe your /etc/passwd file to awk, and print out the home directory of each user.
b)Develop an interactive grep script that asks for a word and a file name and then tells how many lines contain that word.
c)Repeat
d)Part using awk

Week-5

a)Write a shell script that takes a command –line argument and reports on whether it is directory, a file, or something else.

b)Write a shell script that accepts one or more file name as arguments and converts all of them to uppercase, provided they exist in the current directory.

c)Write a shell script that determines the period for which a specified user is working on the system.

Week-6

a)Write a shell script that accepts a file name starting and ending line numbers as arguments and displays all the lines between the given line numbers.

b) Write a shell script that deletes all lines containing a specified word in one or more files supplied as arguments to it.

Week-7

a) Write a shell script that computes the gross salary of a employee according to the following rules:
i)If basic salary is < 1500 then HRA =10% of the basic and DA =90% of the basic.
ii)If basic salary is >=1500 then HRA =Rs500 and DA=98% of the basic
The basic salary is entered interactively through the key board.
b) Write a shell script that accepts two integers as its arguments and computers the value of first number raised to the power of the second number.

Week-8

a) Write an interactive file-handling shell program. Let it offer the user the choice of copying, removing, renaming, or linking files. Once the user has made a choice, have the program ask the user for the necessary information, such as the file name, new name and so on.
b) Write shell script that takes a login name as command – line argument and reports when that person logs in.

c) Write a shell script which receives two file names as arguments. It should check whether the two file contents are same or not. If they are same then second file should be deleted.

Week-9

a) Write a shell script that displays a list of all the files in the current directory to which the user has read, write and execute permissions.

b) Develop an interactive script that ask for a word and a file name and then tells how many times that word occurred in the file.

c) Write a shell script to perform the following string operations:

i) To extract a sub-string from a given string.

ii) To find the length of a given string.

Week-10

Write a C program that takes one or more file or directory names as command line input and reports the following information on the file:

i)File type

ii)Number of links

iii)Read, write and execute permissions

iv)Time of last access

(Note : Use stat/fstat system calls)

Week-11

Write C programs that simulate the following unix commands: (Use system calls)

a)mv

b)cp

Week-12

Write a C program that simulates ls Command

(Use system calls / directory API)

Course Outcomes:

On successful completion of this course student will be able to:

Course Outcomes		POs related to COs
CO1	Demonstrate knowledge on various commands in UNIX	PO1, PO2
CO2	Create different programs using Shell Scripting.	PO1, PO2, PO3, PO4
CO3	Use file handling mechanisms to access the directory and file structures.	PO1, PO2, PO3,
CO4	Develop programs for managing the file permissions	PO1, PO2, PO3,
CO5	Use system calls for simulating the different UNIX commands	PO1, PO2, PO3, PO4, PO5

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CO-PO Mapping

CO \ PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	3	-	-	-
CO8	-	-	-	-	-	-	-	-	-	2	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO*	**3**	**3**	**3**	**3**	**3**	**-**	**-**	3	3	**2**	**-**	**3**

TEXT BOOKS :

1. Introduction to UNIX & SHELL programming, M.G. Venkatesh Murthy, Pearson Education.
2. Unix concepts and applications, Fourth Edition, Sumitabha Das, TMH.
3. Unix for programmers and users, 3rd edition, Gaham Glass & K. Ables, pearson education.
4. Unix and shell Programming –A text book, B.A. Forouzan& R.F. Giberg, Thomson.
5. Beginning shell scripting, E. Foster – Johnson & other, Wile Y- India.

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III B.Tech I Semester

L	T	P	C
0	0	2	1

18SAH311 COMMUNICATION AND SOFT SKILLS LAB

Course Educational Objectives:

CEO1: To expose the students to variety of self instructional, learner friendly modes of language learning.

CEO2: To help the students cultivate the habit of reading passages from the computer monitor.

CEO3: To enable them to learn better pronunciation through Stress, Intonation and Rhythm.

CEO4: To train them to use language effectively to face interviews, group discussions, public speaking.

CEO5: To initiate them into greater use of the computer in resume preparation, report writing.,

List of Exercises:

1. Pronunciation of English words using Phonetic sounds and Symbols.
2. Describing –Objects-People-Situations
3. Stress and Intonation
4. Oral Presentations
5. Functional English
6. Reading Comprehension
7. Vocabulary Building
8. Group Discussion
9. Resume writing and Report writing
10. Interview Skills

Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to COs**
CO1	To remember and understand the different aspects of the English Language proficiency with emphasis on LSRW skills.	PO1
CO2	To analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking by group discussion.	PO2
CO5	Use of modern computing facilities and suitable software tools to improve the communication skills and elocution.	PO5
CO6	Follow the ethical principles to prepare the group tasks	PO8

CO7	Perform exercise individually and also a team to complete the task	PO9
CO8	To apply communication skills through various language learning activities.	P10
CO9	To create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.	P12

Text Books:

1. Lab manual provided by the department.

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III B. TECH II-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	3	**1**	**0**	**3**

18CSE321 DATA MINING AND DATAWAREHOUSING

Course Educational Objectives:

The student should be made to:

CEO1: Gain the knowledge about the basics of data mining and data warehousing concepts, data mining functionalities, and Preprocessing concepts.
CEO1: Understand and implement the data warehouse architecture, different data warehouse schemas
CEO1: Analyze and implement the Association Rules for analyzing the Transactional Databases
CEO1: Study and Implement the major Classification and Clustering Algorithms
CEO1: Study the advanced data mining concepts.

UNIT -1: **(9)**

Introduction: Motivation and Importance of Data Mining - Data Mining - Kind of Data to be mined - Data Mining Functionalities - Kind of patterns to be mined - Classification of Data Mining Systems - Major Issues in Data Mining.
Data Pre-processing: The need for Preprocessing - Data Cleaning - Data Integration and Transformation - Data Reduction - Data Discretization and Concept Hierarchy Generation.

UNIT -2: **(9)**

An Overview: Data Warehouse: Basic Concepts- Data Warehouse Modeling: Data Cube and OLAP- Data Warehouse Design and Usage- Data Warehouse Implementation- Data Generalization by Attribute-Oriented Induction.

UNIT -3: **(9)**

Mining Frequent Patterns, Associations, and Correlations: Basic Concepts - Frequent Itemset Mining Methods- Pattern Evaluation Methods.

UNIT -4: **(9)**

Classification: Basic Concepts- Decision Tree Induction- Bayes Classification Methods- Rule-Based Classification- Advanced Methods: Bayesian Belief Networks- Classification by Back propagation- Support Vector Machines.

Clustering: Clustering Overview - Partitioning Clustering - K-Means and K-Medoids Algorithms - Hierarchical Clustering - Agglomerative Methods and divisive methods - Outlier Detection.

UNIT -5: **(9)**

Advanced Mining: Multimedia Data Mining - Text Mining - Mining the World Wide Web -Data Mining Applications - Social Impacts of Data Mining.

Course Outcomes:

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On Successful completion of this course student will be able to :

Course Outcomes		POs related to COs
CO1	Understand the need and applications of Data Warehouse and Data Mining	PO1, PO2
CO2	Design and Implement the data warehouse by using major data warehouse schemas	PO1, PO3
CO3	Implement Association Rules for analyzing Transactional databases	PO1, PO4
CO4	Understand and Implement major Classification And Clustering Algorithms	PO1, PO4
CO5	Apply the Data mining techniques in real time problems.	PO1, PO2, PO4

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	-	2	-	-	-	-	-	-	-	-	-
CO3	3	-	-	3	-	-	-	-	-	-	-	-
CO4	3	-	-	3	-	-	-	-	-	-	-	-
CO5	3	3	-	3	-	-	-	-	-	-	-	-
CO*	3	3	2	3	-	-	-	-	-	-	-	-

Text books:

1. Data Mining – Concepts and Techniques – Jiawei Han, Micheline Kamber, Morgan Kaufmann Publishers, Elsevier, 3rd Edition, 2011.

Reference Books:

1. Data Mining – Concepts and Techniques – Jiawei Han, Micheline Kamber, Morgan Kaufmann Publishers, Elsevier, 2 Edition, 2006
2. Data Mining Techniques, Arun K Pujari, 3rd Edition, Universities Press.
3. Data Warehouse Fundamentals, PualrajPonnaiah, Wiley Student Edition.
4. Data Mining, VikaramPudi, P Radha Krishna, Oxford University Press

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III B. TECH II-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	2	**1**	**0**	**3**

18CSE322 OBJECT ORIENTED ANALYSIS AND DESIGN USING UML

Course Educational objectives:

CEO1: To study the importance and basics of Object Oriented modeling.
CEO2: To Study the notations of Unified Modeling Language.
CEO3: To identify, analyze, and model structural and behavioral concepts of the system.
CEO4: To model the event driven state of object and transform them into implementation specific layouts.
CEO5: To analyze and design solutions to problems using object oriented approach

UNIT -1: Introduction To OOM (9)

Elements of Object Model - Classes and Objects - Nature of object - Relationships among objects - Nature of a Class - Relationship among Classes - Interplay of Classes and Objects - Importance of Proper Classification - Identifying Classes and Objects - Key abstractions and Mechanisms.

UNIT -2: Introduction To Uml

(9)

Why we model - Conceptual model of UML - Architecture - Classes - Relationships - Common Mechanisms - Class diagrams - Object diagrams.

UNIT -3: Structural And Behavioral Modeling (9)

Advance Classes - Advanced Relationships - Interfaces - Types &Roles - Packages - Interactions - Usecases - Usecase diagrams.

UNIT -4: Advanced Behavioral And Architectural Modeling (9)

Activity diagrams - Events and Signals - Statechart diagrams - Components and Component diagrams - Deployment and Deployment diagrams.

UNIT -5:Case Studies (9)

Analysis and Design of Library management system - Online Railway reservation system using object oriented approach -ATM System-Hospital Management System-E-ticketing.

Course Outcomes:

On Successful completion of this course the students will be able to:

Course Outcomes	**POs related to COs**

CO1	Find solutions to the complex problems using object oriented approach	PO1
CO2	Represent classes, responsibilities and states using UML notationand model structural concepts of the system.	PO1, PO3
CO3	Model behavioral concepts of the system and analyze and document the requirements through use case driven approach	PO1, PO2
CO4	Apply the concepts of architectural design for deploying the code for software.	PO1, PO4
CO5	Perform Analysis and Design of application systems	PO1, PO2, PO4

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	3	-	2	-	-	-	-	-	-	-	-	-
CO3	3	3	-	-	-	-	-	-	-	-	-	-
CO4	3	-	-	2	-	-	-	-	-	-	-	-
CO5	3	3	-	3	-	-	-	-	-	-	-	-
CO*	3	3	2	2.5	-	-	-	-	-	-	-	-

Text Books:

1. Object- Oriented Analysis and Design with Applications, 3/e, Grady Booch, 2009,Pearson Education, New Delhi, India.

2. The Unified Modeling Language User Guide, 2/e, Grady Booch, James Rumbaugh and Ivar Jacobson, 2005,Pearson Education, New Delhi, India.

Reference Books:

1. Object- Oriented Analysis and Design with Applications, 2/e, Grady Booch, 2007,Pearson Education, New Delhi, India.
2. Fundamentals of Object Oriented Design in UML, 1/e, Meilir Page, Jones, 1999,Pearson Education, India.
3. Modeling Software Systems Using UML2, 1/e, Pascal Roques, 2010,WILEYDreamtech India Pvt. Ltd.
4. Object Oriented Analysis & Design,1/e, AtulKahate, 2004,TheMcGrawHill Companies, Hyderabad, India.
5. Practical Object Oriented Design with UML, 2/e, Mark Priestley, 2005,TATA McGraw Hill, Hyderabad, India.

6. Object-Oriented Analysis and Design with Applications 3/e, Grady Booch, Robert A. Maksimchuk, Michael W. Engle, Bobbi J. Young, Jim Conallen, Kelli A. Houston,2007,Pearson Education, India.

III B. TECH II-SEMESTER (CSE)

L	T	P	C
2	1	0	3

18CSE323 WEB TECHNOLOGIES

Course Educational Objectives:

CEO1: To understand how to write a valid HTML document involving a variety of element types, including hyperlinks, images, lists, tables, and forms.
CEO2: To analyze how CSS to implement a variety of presentation effects in HTML documents.
CEO3: To develop client-side scripting on web pages to provide interactivity and rapid response to user actions at client side.
CEO4: To understand basics of server side scripting language.
CEO5: To gain knowledge about sending the data from client side to server, creating sessions and interact with database.

UNIT-1: Hypertext Markup Language (9)

Introduction: Internet and Web - Introduction to web technologies.
HTML 5: Fundamentals of HTML - Working with text - Organizing text in HTML - Working with links and URLs - Creating Tables - Working with images, Colors and Canvas – Working with Forms - Interactive elements and Working with Multimedia.

UNIT-2: Cascading Style Sheets (9)

CSS: Overview of CSS - Backgrounds and Color Gradients in CSS - Fonts and Text Styles - Creating Boxes and Columns Using CSS: Exploring the Box Model - Exploring the Line Box Model - Exploring the Template Layout Model. List Styles -Table Layouts - Effects, Frames and Controls in CSS: Exploring Different Types of Effects in CSS - Creating Frames Using CSS.

UNIT-3: Javascript, JQuery and AJAX (9)

Javascript: Overview of JavaScript - JavaScript functions , Events, Image maps and animations - JavaScript objects : Exploring Objects in JavaScript, Exploring the Standard/Built-in JavaScript Objects - Working with browser and document objects.
JQuery: Introduction - JQuery selectors - Methods to access HTML attributes – Events - Introduction to AJAX.

UNIT-4: PHP Fundamentals (9)

PHP: Introduction - Data types - Variables - Constants - Expressions - String interpolation - Control structures - Functions – Arrays - Embedding PHP code in web pages - Object Oriented PHP.

UNIT-5: PHP with database (9)

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PHP Web forms: PHP and web forms - Sending form data to a server - Working with cookies and session

PHP with MySQL: Interacting with the database -prepared statement - Database transactions.

Course Outcomes:

After completion of this course student will be able to :

	Course Outcomes	**POs related to COs**
CO1	Create web pages using different elements of HTML	PO1,PO2,PO5
CO2	Apply various styles to the HTML elements in web pages using CSS	PO1,PO2,PO3,PO5
CO3	Use client side scripting to make the web pages responsive and interactive.	PO1,PO2,PO3,PO5
CO4	Demonstrate knowledge on basics of server side scripting language: PHP	PO1,PO2,PO3,PO5
CO5	Develop web applications with database interaction	PO1,PO2,PO4,PO5

CO-PO Mapping

PO / CO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**
CO1	3	2	-	-	3	-	-	-	-	-	-	-
CO2	2	3	3	-	3	-	-	-	-	-	-	-
CO3	2	3	3	-	3	-	-	-	-	-	-	-
CO4	2	3	3	-	3	-	-	-	-	-	-	-
CO5	3	3	-	2	3	-	-	-	-	-	-	-
CO*	**2.4**	**2.8**	**3**	**2**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Text books:

1. HTML 5 Black Book: CoversCSS3, JavaScript, XML, XHTML, AJAX, PHP and JQuery, Second Edition, 2016, DreamtechPress,Kogent Learning Solutions Inc.
2. Beginning PHP and MySQL, Fourth Edition,W. Jason Gilmore, 2011,Apress.

Reference Books:

1. The Complete Reference: HTML andCSS, Fifth Edition, Thomas A. Powell, 2010,Tata McGraw Hill.
2. PHP and MySQL, Andrea Tarr, 2012,Willy India,

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III B. TECH II-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	3	**1**	**0**	**3**

18CSE 324 SOFTWARE TESTING METHODOLOGIES

Course Educational Objectives:
CEO1: To understand different testing levels on software models.
CEO2: To Identify structured and unstructured flow graphs and representing path and regular expressions
CEO3: To create control flow graphs from programs and specifying the requirements of complicated transaction flow.
CEO4: To model logic based testing with decision tables and state graphs.
CEO5: To Analyze the testing tools like JMeter or Win Runner.

UNIT-1: Introduction: (9)

Purpose of testing – Dichotomies – Model for testing – consequences of bugs – taxonomy of bugs.

Flow graphs and Path testing: Basic concepts of path testing – predicates - path predicates and achievable paths - path sensitizing - path instrumentation.

UNIT-2: Paths, Path products and Regular expressions (9)

Path Products & Path Expression - Reduction Procedure - Applications - Regular expressions & Flow anomaly detection.

UNIT-3: (9)

Transaction Flow Testing:-transaction flows - transaction flow testing techniques. **Dataflow testing**: Basics of dataflow testing - strategies in dataflow testing.

Domain Testing:-domains and paths - Nice & ugly domains - domain testing.

UNIT-4: (9)

Logic Based Testing: overview - decision tables - path expressions - kv charts - **State, State Graphs and Transition testing:** state graphs - good & bad state graphs - state testing.

UNIT-5: Testing tools: (9)

Win runner – Load runner – Test director –Jmeter – Selenium – Bug zilla – Silk Test

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Course Outcomes:

On successful completion of the course the student will be able to,

Course Outcomes		POs related to COs
CO1	Identify the various bugs and correcting them after knowing the consequences of the bug.	PO1, PO2
CO2	Design the path expression and reduce them very well when needed.	PO1, PO2, PO3
CO3	Perform functional testing using control flow and transaction flow graphs.	PO1, PO2, PO3
CO4	Test logic or an application and identifying the nice and ugly domains.	PO1, PO2, PO3, PO4
CO5	Use appropriate software testing tools, techniques and methods for even more effective systems during both the test planning and test execution phases of a software development project.	PO1, PO2, PO3, PO5, PO9

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	2	3	3	-	-	-	-	-	-	-	-	-
CO3	2	3	3	-	-	-	-	-	-	-	-	-
CO4	2	3	3	3	-	-	-	-	-	-	-	-
CO5	2	3	3	-	3	-	-	-	3	-	-	-
CO*	**2.2**	**3**	**3**	**3**	**3**	**-**	**-**	**-**	**3**	**-**	**-**	**-**

Text Books:

1. "Software Testing Techniques", 2/e, Reprint 2009, BorisBeizer, Dreamtech, New Delhi, India.
2. "Software Testing Tools", 2/e, 2004, Dr.K.V.K.K.Prasad, Dreamtech, New Delhi, India.

Reference Books:

1. "Software Testing Techniques", 2/e, 1990, BarisBeizer, Dreamtech, New Delhi, India.
2. "The craft of software testing", 2/e, 1995, BrianMarick, Pearson Education, New Delhi, India.
3. "Software Testing Techniques", 1/e, 2008 SPD (Oreille), New Delhi, India.
4. "Software Testing in the Real World", 1/e, 2008, Edward Kit, Pearson Education, New Delhi, India.
5. "Effective methods of Software Testing", 3/e, 2000, Perry, John Wiley, India.
6. "Art of Software Testing", 3/e, 2011, Meyers, John Wiley, India.

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III B. TECH II-SEMESTER (CSE)

L	T	P	C
3	0	0	3

18CSE325 ARTIFICIAL INTELLIGENCE

Course Educational Objectives:

The student should be made to:

CEO1: To study the concepts of Artificial Intelligence.
CEO2: To Understandthesearch strategies and Problem solving using Artificial Intelligence.
CEO3: To gain insight information about Logical Agents and Reasoning patterns in propositional logic
CEO4: To analyze and implement the First Order Logic and Knowledge Representation
CEO5: To study the Uncertain Knowledge and Reasoning and Application of Robotics

UNIT -1: Introduction to Artificial Intelligence, Problems, Problem Spaces and Search (9)

The AI Problems - The underlying assumption - The AI technique - The levels of the model - Criteria of success - Some general references - One final word and beyond - Defining the problem as a State space search - Production systems - Problem characteristics - Production system characteristics - Issues in the design of search programs

UNIT -2: Problem Solving, Un-informed Search Strategies, Informed Search and Exploration (9)

Uninformed search strategies - Avoiding repeated states - Informed (Heuristic) search strategies - Heuristic functions - Local search algorithms and optimization problems - Local search in continuous spaces - Backtracking search for CSPs

UNIT -3: Knowledge and Reasoning (9)

Logical agents – Knowledge based agents - The wumpus world – Logic - Propositional logic - a very simple logic - Reasoning patterns in propositional logic - Effective propositional inference - Agents based on propositional logic

UNIT - 4: First-Order Logic, Inference in First-Order Logic, Knowledge Representation (9)

Representation revisited - Syntax and semantic of first order logic - Using first order logic - Knowledge engineering in first order logic - Propositional vs. First order inference - Ontological engineering - Categories and objects - Actions - Situations and Events - The internet shopping world - Reasoning systems for categories - Reasoning with default information - Truth maintenance systems

UNIT - 5: Uncertain Knowledge and Reasoning, Learning, and Robotics (9)

Uncertainty - Acting under uncertainty - Basic probability notation - The axioms of probability - Baye's rule and its use - Learning from observations - Forms of learning - Inductive learning - Learning decision trees. **Robotics:** Introduction-Robot hardware - Robotic perception - Planning to move-Robotic software Architectures - Application Domains

Course Outcomes:
On Successful completion of this course the students will be able to:

Course Outcomes		POs related to COs
CO1	Gain the basic Knowledge about AI technique and Production systems	PO1
CO2	Comprehend the Un informed and Informed Search Strategies.	PO1, PO3
CO3	Analyze and Implement Reasoning patterns in propositional logic	PO1, PO2
CO4	Formulate the Knowledge Representation using First Order Logic	PO1, PO4
CO5	Apply the Robotics for Solving Real world Problems	PO1, PO2, PO4

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	3	-	3	-	-	-	-	-	-	-	-	-
CO3	3	2	-	-	-	-	-	-	-	-	-	-
CO4	3	3	-	-	-	-	-	-	-	-	-	-
CO5	3	3	-	3	-	-	-	-	-	-	-	-
CO*	**3**	**2.8**	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Text Books:

1. Artificial Intelligence A Modern Approach, 3/e, Stuart Russell and Peter Norvig, 2016, Pearson Education, New Delhi, India.
2. Artificial Intelligence, 3/e, Elaine Rich, Kevin Knight and Shiva Shankar B Nair, 2004, Tata McGraw Hill, Hyderabad, India.

Reference Books:

1. Artificial Intelligence A Modern Approach, 2/e, Stuart Russell and Peter Norvig, 2003, Pearson Education, New Delhi, India.

2. Artificial Intelligence Structures and Strategies for Complex Problem Solving, 5/e, George F. Luther, 2005, Pearson Education, New Delhi, India.
3. Introduction to Artificial Intelligence, 1/e, Eugene Charniak and Drew McDermott, 1985,Pearson Education, New Delhi, India.
4. Artificial Intelligence: The Basics, 1/e, Kevin Warwick, 2012, Wearset ltd, Boldon.
5. Introduction to Artificial Intelligence, 2/e, Philip C. Jackson, 1985, Dover Publications, New York, USA.
6. Our Final Invention: Artificial Intelligence and the End of the Human Era, 1/e, James Barrat, 2013,Thomas Dunne Books, New York, USA.

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III B.Tech II Semester

L	T	P	C
3	0	0	3

18OSAH321 MATHEMATICAL MODELLING - ANALYSIS AND APPLICATIONS
(OPEN ELECTIVE-I)

Course Educational Objectives:

1. The course is designed to equip the students with the necessary mathematical skills and techniques that are essential for an engineering course.
2. To learn the need and techniques of mathematical modeling, to design mathematical models through trigonometry and calculus.
3. To understand, familiarize the knowledge of the significance of ordinary differential equations of second order based mathematical models through linear.
4. To explore the practical utility of mathematical models through linear programming including transportation and assignment models.
5. To learn the concepts of Partial differential equations and its nature. To explore the knowledge on practical utility of mathematical models through mass balance equations and momentum balance equations

UNIT – 1: INTRODUCTION (9)

The technique of mathematical modeling – Classification of mathematical models – Some characteristics of mathematical models – Mathematical modeling through trigonometry, calculus – Limitations of mathematical modeling.

UNIT – 2: MATHEMATICAL MODELLING THROUGH ORDINARY DIFFERENTIAL EQUATIONS OF SECOND ORDER (9)

Mathematical Modeling of planetary motions, circular motion and motion of satellites – Mathematical Modeling through linear differential equations of second order.

UNIT – 3: MATHEMATICAL MODELING THROUGH LINEAR PROGRAMMING (9)

Mathematical modeling through linear programming – Graphical method – Simplex method – Transportation – Assignment models.

UNIT – 4: MATHEMATICAL MODELING THROUGH DIFFERENCE EQUATIONS (9)

The need for mathematical modeling through difference equations: some simple models – Basic theory of linear difference equations with constant coefficients – Solution by Z-transformation – Mathematical modeling through difference equations in probability theory.

UNIT – 5: MATHEMATICAL MODELING THROUGH PARTIAL DIFFERENTIAL EQUATIONS (9)

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Mass-Balance Equations: The first method of getting PDE models – Momentum-balance equations: The second method of obtaining PDE Models – Nature of partial differential equations.

TOTAL: 45 HOURS

Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to COs**
CO1	Acquire knowledge in necessity and techniques of mathematical modeling, to develop analytical and designing skills in mathematical models through trigonometry and calculus.	**PO1,PO2,PO3 PO4**
CO2	Demonstrate knowledge in Ordinary differential equations of second order, mathematical modeling through differential equations, and Develop analytical skills in modeling geometrical problems through Ordinary differential equations of second order	**PO1,PO2,PO3 PO4**
CO3	Demonstrate knowledge in Linear programming and various techniques including Graphical method and Simplex method. Develop analytical and designing skills in modeling and solving Transportation and assignment models	**PO1,PO2,PO3 PO4**
CO4	Acquire knowledge in difference equations, theory of difference equations with constant coefficients. Develop designing and analytical skills in modeling and solving mathematical models difference equations in probability theory.	**PO1,PO2,PO3 PO4**
CO5	Acquire knowledge in partial differential equations and develop designing and analytical skills in modeling and solving mathematical models through Mass-Balance equations and Momentum-Balance equations	**PO1,PO2,PO3 PO4**

Text Books:

1. Mathematical Modelling, J.N. Kapur, New Age International (P) Limited Publishers, New Delhi
2. Advanced Engineering Mathematics, Kreysig, , John Wiley, NewYork, 1999.

Reference Books:

1. Principles of Mathematical Modelling (2004)-Clive L. Dyne, Elsevier Publication
2. Mathematical Modelling – A case study approach , R Illner, C Sean Bohun, S McCollum, T van Roode, AMS publication, 2005
3. Mathematical Modelling , D N P Murthy, N W Page, E Y Rodin, Pergamon Press,1990
4. OR Theory & Applications, J.K. Sharma , Mac Milian India Ltd., 1998
5. Mathematical Modelling(A Comprehensive Introduction), Gerhard Dangelmayr and Michael Kirby, Prentice Hall,New Jersey

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	3	3	3	2	-	-	-	-	-	-	-	-
CO.2	3	3	3	2	-	-	-	-	-	-	-	-
CO.3	3	3	3	2	-	-	-	-	-	-	-	-

CO.4	3	3	3	2	-	-	-	-	-	-	-	-
CO.5	3	3	3	2	-	-	-	-	-	-	-	-
CO*	**3**	**3**	**3**	2	-	-	-	-	-	-	-	-

III B.Tech II Semester

L	**T**	**P**	**C**
3	**0**	**0**	**3**

18OSAH322 BUSINESS COMMUNICATION AND CAREER SKILLS
(OPEN ELECTIVE-I)

Course Educational Objectives:

1. To enhance the communication skills.
2. To enable students to understand the nuances of corporate communication
3. To develop the writing skills for business purposes
4. To develop the presentation skills for corporate situations.
5. To enable students to manage interviews successfully.

UNIT – 1: NATURE AND SCOPE OF COMMUNICATION (9)

Introduction: Functions of Communication – Roles of a Manager – Communication Basics – Communication Networks – Informal Communication – Interpersonal Communication –Communication Barriers.

UNIT – 2: CORPORATE COMMUNICATION (9)

Introduction: What is Corporate Communication? – Corporate Citizenship and Social Responsibility – Corporate Communication Strategy – Crisis Management/Communication – Cross-Cultural Communication.

UNIT – 3: WRITING BUSINESS DOCUMENTS (9)

Introduction: Importance of Written Business Communication, Types of Business Messages – Five Main Stages of Writing Business Messages – Business Letter Writing - Email writing skills – Effective Business Correspondence – Common Components of Business Letters – Strategies for Writing the Body of a Letter- Business Communication and different cultures.

UNIT – 4: CAREERS AND RESUMES (9)

Introduction – Career Building – Business Presentations and Speeches – Resume Formats – Traditional, Electronic and Video Resumes – Sending Resumes – Follow-up Letters – Online Recruitment Process.

UNIT – 5: INTERVIEWS (9)

Introduction – Fundamental Principles of Interviewing – General Preparation for an Interview – Success in an Interview – Types of Interviewing Questions – Important Non-verbal Aspects – Types of Interviews – Styles of Interviewing.

TOTAL: 45 HOURS

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Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to COs**
CO1	Explain the concept of communication, its methods and types.	**PO10, PO12**
CO2	Demonstrate knowledge of Corporate Communication	**PO10, PO11**
CO3	Apply written and oral communication techniques in preparing and presenting various documents in technical writing.	**PO10,PO11, PO12**
CO4	Exhibit the presentation skills in business situations	**PO10,PO12**
CO5	Apply verbal and nonverbal aspects in the most appropriate way in interviews	**PO10, PO12**

Text Book:

1. Meenakshi Raman and Prakash, Singh Business Communication, Oxford University Press, New Delhi, Second Edition, 2012.

Reference Books:

1.Neera Jain and Sharma Mukherji, Effective Business Communication, Tata Mc Graw-Hill Education, Pvt. Ltd., New Delhi, 2012.
2. Courtland L.Bovee et al., Business Communication Today, Pearson, New Delhi, 2011.
3. Krizan, Effective Business Communication, Cengage Learning, New Delhi, 2010.
4. R.K. Madhukar, Business Communication, Vikas Publishing House Pvt. Ltd., New Delhi, 2005.

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	-	-	-	-	-		-			3	-	2
CO.2	-	-	-	-	-		-			3	2	-
CO.3	-	-	-	-	-		-			3	2	2
CO.4	-	-	-	-	-		-			3	-	2
CO.5	-	-	-	-	-		-			3	-	2
CO*	-	-	-	-	-		-			**3**	**2**	**2**

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III B.Tech II Semester

L	T	P	C
3	0	0	3

18OSAH323 LASERS AND FIBER OPTICS
(OPEN ELECTIVE-I)

Course Educational Objectives:

1. To acquire knowledge on fundamentals of LASERS
2. To study the working of different types of LASERS
3. To develop knowledge on applications of LASERS in various fields
4. To gain knowledge in fundamentals of Optical fiber, construction, types and attenuations
5. To develop knowledge on applications of Optical fibers in various fields

UNIT – 1: LASER INTRODUCTION (9)

Introduction- Spontaneous and stimulated emission of radiation- Properties of lasers (monochromacity, directionality, coherence and brightness) - Conditions for laser action: population inversion- Pumping and different pumping mechanisms- Einstein coefficients and relation among the coefficients.

UNIT – 2: TYPES OF LASERS (9)

Types of Lasers: Nd-YAG laser- He:Ne laser- Semiconductor laser(GaAs)- Argon Ion Laser-CO2 Laser.

UNIT – 3: APPLICATIONS OF LASERS (9)

Lasers in Holography- Laser in fusion reaction- Lasers in Raman spectroscopy- Lasers in industry - Lasers in isotope separation- Lasers in medicine.

UNIT – 4: OPTICAL FIBERS (9)

Introduction- Construction of fiber – Working principle of optical fiber (total internal reflection)- Propagation of light through the fibers- Numerical aperture , Acceptance angle and Acceptance cone - Fiber types: Refractive index profile and ray propagation-Step and graded index fibers -Attenuation in fibers: Attenuation coefficient and different loss mechanisms.

UNIT – 5: APPLICATIONS OF FIBERS (9)

Fiber optic communication system(block diagram)- Sensing applications of fibers: Pressure sensor, Liquid level sensor, Displacement sensor, Chemical sensor – Optical fibers in medicine (endoscopes) - Optical fibers in computer networks (block diagram).

TOTAL: 45 HOURS

Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to COs**
CO1	Acquire the basic knowledge on LASERS	**PO1, PO12**
CO2	Understand different types of LASERS	**PO1, PO12**
CO3	Develop knowledge on different applications of LASERS	**PO1, PO12**
CO4	Acquire the basic knowledge on Optical Fibers	**PO1,PO12**

CO5	Develop knowledge on different applications of Optical Fibers	**PO1,PO12**

Reference Books:

1 .Lasers Theory and Applications By K.Thyagarajan and A.K.Ghatak: Macmillan India Limited, New Delhi.,
2.Lasers And non-Linear Opics, second edition, By BBLaud. NewAge International(P) limited,Publishers,New Delhi,
3. An Introduction to Fiber Optic Systems ,Second Edition,By John Powers,Richard D Irwin ,a Times Mirror Higher education,Inc Company,USA,
4. Physics for Engineers - M.R.Srinivasan , New Age International, 2009

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	-	-	-	-	-	-	-	-	-	-	1
CO.2	3	-	-	-	-	-	-	-	-	-	-	1
CO.3	3	-	-	-	-	-	-	-	-	-	-	1
CO.4	3	-	-	-	-	-	-	-	-	-	-	1
CO.5	3	-	-	-	-	-	-	-	-	-	-	1
CO*	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	1

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III B.Tech II Semester

L	T	P	C
3	0	0	3

18OCIV321 CONSTRUCTION AND PROJECT MANAGEMENT
(OPEN ELECTIVE-I)

Course Educational Objectives:

1. To study the fundamentals of construction technology
2. To study the earth work methods
3. To study the concepts of project management and milestones
4. To study the concept of elements of network and development of network
5. To study the concept of network analysis

UNIT – 1: FUNDAMENTALS OF CONSTRUCTION TECHNOLOGY (9)

Definitions and Discussion – Construction Activities – Construction Processes - Construction Works – Construction Estimating – Construction Schedule – Productivity and Mechanized Construction – Construction Documents – Construction Records – Quality – Safety – Codes and Regulations

UNIT – 2: EARTHWORK (9)

Classification of Soils – Project Site – Development – Setting Out - Mechanized Excavation – Groundwater Control – Trenchless (No-dig) Technology – Grading – Dredging. Excavation By Blasting: Rock Excavation – Basic Mechanics of Breakage – Blasting Theory – Drillability of Rocks – Kinds of Drilling – Selection of the Drilling Method and Equipment – Explosives – Blasting Patterns and Firing Sequence – Smooth Blasting – Environmental Effect of Blasting.

UNIT – 3: PROJECT MANAGEMENT AND BAR CHARTS AND MILESTONE CHART (9)

Introduction – Project planning – Scheduling – Controlling – Role of decision in project management – Techniques for analyzing alternatives Operation research – Methods of planning and programming problems Development of bar chart – Illustrative examples – Shortcomings of bar charts and remedial measures – Milestone charts – Development of PERT network problems.

UNIT – 4: ELEMENTS AND DEVELOPMENT OF NETWORK (9)

Introduction – Event – Activity – Dummy – Network rules – Graphical guidelines for network – Common partial situations in network – Numbering the events – Cycles Problems – Planning for network construction – Modes of network construction – Steps in development of network – Work breakdown structure –Hierarchies – Illustrative examples – Problems.

UNIT – 5: NETWORK ANALYSIS (9)

CPM : process – CPM : Networks – Activity time estimate – Earliest event time – Latest allowable occurrence time – Combined tabular computations for TE and TL - Start and finish times of activity – Float – Critical activities and critical path – Illustrative examples Problems.

TOTAL: 45 HOURS

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Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to COs**
CO1	Apply theoretical and practical aspects of project management techniques to achieve project goals.	**PO1,PO3**
CO2	Exhibit organizational and leadership capabilities for effective management of construction projects.	**PO2,PO3**
CO3	Apply knowledge and skills of modern construction practices and techniques.	**PO2,PO5, P11**
CO4	Demonstrate the basic of project management	**PO2 PO4**
CO5	Develop the network for construction projects and examine the critical path	**PO2,PO3**

Text Books:

1. Construction Technology by SubirK.Sarkar and SubhajitSaraswati – Oxford Higher Education-Univ.Press, Delhi.
2. Project Planning and Control with PERT and CPM by Dr.B.C.Punmia, K.K.Khandelwal, Lakshmi Publications New Delhi.
3. Construction project management by Jha, Pearson pubilications, New Delhi

Reference Books:

1. Optimal design of water distribution networks P.R.Bhave, Narosa Publishing house 2003.
2. Total Project management, the Indian context- by: P.K.Joy- Mac Millan Publishers India Limited.

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	1	-	3	-		-	-	-	-	-	-	-
CO.2	-	2	3	-		-	-	-	-	-	-	-
CO.3	-	2	-	-	2	-	-	-	-	-	1	-
CO.4	-	2	-	2		-	-	-	-	-	-	-
CO.5	-	2	2			-	-	-	-	-	-	-
CO*	**1**	**2**	**2.6**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**1**	**-**

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L	T	P	C
3	0	0	3

18OCIV322 REMOTE SENSING AND GIS
(OPEN ELECTIVE-I)

Course Educational Objectives:

1. To know the basics, importance, analysis and applications of RS and GIS
2. To study the various types of operating systems of RS and GIS
3. To know the applications of RS and GIS

UNIT – 1: INTRODUCTION TO REMOTE SENSING (10)

Concept and scope of remote sensing: Definitions, Process and Characteristics of Remote Sensing System, Advantages and limitations. **Concept of electromagnetic radiation (EMR):** Wavelength-frequency-energy relationship of EMR, EMR Spectrum and its properties, EMR wavelength regions and their applications, Spectral signatures. **Energy interaction in the atmosphere and with earth surface features:** Scattering, absorption, transmission, atmospheric windows Spectral Reflectance Curve, Concept of signatures.

UNIT – 2: PLATFORMS AND SENSORS (12)

Introduction: Sensor materials, Sensor System - Framing and Scanning System, Whiskbroom scanners, Push-broom scanners. **Types and characteristics of sensor:** Imaging and non-imaging sensors, Active and passive sensors, Resolution of Sensors - Spectral, Spatial, Radiometric & Temporal, Scale, Mapping unit, Multi-band concepts and False Colour Composites. **Remote sensor platforms and satellite orbits:** Ground, Airborne and Space borne Platforms, Orbital Characteristics – Coverage, Passes, Pointing Accuracy, Geostationary, Sun synchronous, shuttle orbit. **Space imaging satellites:** Early history of space imaging; Multispectral and Hyperspectral sensors, Radar, Lidar; Specification of some popular satellites – IRS, Landsat and SPOT series; High resolution satellites – IKONOS, Cartosat, Quick bird, Orb View, Geo Eye, Pléiades, World View; Other latest earth resource satellites.

UNIT – 3: REMOTE SENSING APPLICATIONS (9)

Scope of Remote Sensing Applications - Potentials and Limitations. Applications in land use and land cover analysis. Resource evaluation - Soils, forest and agriculture. Water Resource Applications - Mapping, monitoring of surface water bodies, tanks, lakes/reservoirs. Environmental applications.

UNIT – 4: GEOGRAPHIC INFORMATION SYSTEM (7)

Basic Concepts: Definition of GIS, Components of GIS, Variables - points, lines, polygon, Functionality of GIS, Areas of GIS application, Advantage and Limitation of GIS

UNIT – 5: GIS DATA (9)

Spatial and Attribute Data, Information Organization and Data Structures – Raster and Vector data structures, Data file and database. **Creating GIS Database**: GIS Software's, file organization and formats, Geo-database, Database model, Rectification, Digitization and Map Composition

TOTAL: 45 HOURS

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Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to COs**
CO1	Explain the principles and applications of Remote Sensing and various types of platforms used in Remote Sensing.	**PO1, PO2, PO3,**
CO2	Understand the principles of remote sensing and digital image processing;	**PO1**
CO3	Understand the principles of geographic information systems (GIS)	**PO1, PO2, PO4,**
CO4	Demonstrate the applications of remote sensing and GIS to solving problems in the environmental and life sciences;	**PO1, PO3**
CO5	Demonstrate the use of image processing and GIS software	**PO3**

Text Books:

1. Text Book of Remote Sensing and Geographic Information System, M. Anji Reddy, BS Publication.
2. Concepts and Techniques of GIS, Lo C.P. &Yeung A.K.W., Prentice-Hall of India, New Delhi, 2004

Reference Books:

1. Remote sensing and Geographic Information System, B.Bhatta, Oxford Publications.
2. Introduction to Geographical Information System, Siddiqui, M.A., ShardaPustak , Bhavan, Allahabad, 2006
3. Principles of Remote Sensing, Curran, Paul J, Longman, London, 1985.
4. Data User Handbook, NRSA, IRS, Hyderabad

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	1	2	2	-	-	-	-	-	-	-	-	-
CO.2	3	-	-	-	-	-	-	-	-	-	-	-
CO.3	1	2	-	2	-	-	-	-	-	-	-	-
CO.4	1	-	2	-	-	-	-	-	-	-	-	-
CO.5	-	-	2	-	-	-	-	-	-	-	-	-
CO*	**1.5**	**2**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

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III B.Tech II Semester

L	T	P	C
3	0	0	3

18OCIV323 GREEN BUILDINGS AND ENERGY CONSERVATION
(OPEN ELECTIVE-I)

Course Educational Objectives:

1. To introduces green building concepts.
2. To explain the design process of green buildings
3. To teach the thermal flow in buildings
4. To demonstrate the materials required .for green house construction
5. To analyze the costs involved in green buildings

UNIT – 1: GREEN BUILDING CONCEPTS (9)

Orientation – Introduction to bioclimatic architecture, sustainability in building science functional planning – Elements of building design and drawing, regulations and bylaws –Traditional Vs vernacular architecture – Climate zones, design charts, sun path diagram, solar angles, indices of thermal comfort, vernacular buildings in different climate zones.

UNIT – 2: CLIMATE RESPONSIVE SCIENTIFIC PROCESS OF DESIGN (9)

Introduction, various steps, site planning , plan form building envelope landform, topography, vegetation, water bodies; orientation, S/V ratio, P/A ratio, walls, fenestration, roof and floors active Vs passive, passive solar architecture.

UNIT – 3: THERMAL FLOW IN BUILDINGS (9)

Calculation of thermal conductance, heat flow through different building elements; various software ventilation and day lighting – Design and placement of openings – Water management in buildings techniques to recycle, reuse and harvest water.

UNIT – 4: GREEN BUILDING MATERIALS AND CONSTRUCTION (9)

Material properties, energy efficiency using various materials, emerging new materials construction techniques – Techniques for roof, wall and foundations.

UNIT – 5: ECONOMY OF GREEN BUILDING (9)

Cost of building, operation and maintenance – Green building rating system, evaluation criteria of LEED, TERI GRIHA case studies, and case studies in different climate zones.

TOTAL: 45 HOURS

Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to COs**
CO1	Explain the green building concepts	**PO1**
CO2	explain the design process of green buildings	**PO1**
CO3	Demonstrate the thermal flow in buildings	**PO1, PO2**
CO4	Demonstrate the materials required .for green house construction	**PO1,**
CO5	Identify the costs involved in green buildings	**PO1**

Text Books:

1. Climate Responsive Architecture, A Design Handbook For Energy Efficient Buildings, Krishnan, A., Baker, N., Yannas, S., and Szokolay, S., Eds., 2001, Tata McGraw–HillPublishing Company, New Delhi.
2. Sustainable building design manual (Vol.II), TERI & ICAEN (InstitutCataladEnergia), 2004, The Energy and Resources Institute (TERI) Press, New Delhi.

Reference Books:

1. Bureau of Indian Standards, SP:41, Handbook on Functional Requirements of Buildings (Other Than Industrial Buildings) 1/e rp,1995, Bureau of Indian Standards, New Delhi.
2. Indian Green Building Council, LEED-India, 2011, LEED 2011 for India- Green building Rating system, abridged reference guide for new construction and major renovations (LEED India NC). Hyderabad: Indian Green Building Council.
3. Manual of Tropical Housing and Building, Koenigsberger, O., ingersoll, T. G., Mayhew, A., &Skozolay, S. V., 2011, Universities Press, Hyderabad.
4. Building Design and Drawing, Prabhu, Balagopal T S, K Vincent Paul, and C Vijayan, 2008, Calicut:Spades Publishers.

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	-	-	-	-	-	-	-	-	-	-	-
CO.2	3	-	-	-	-	-	-	-	-	-	-	-
CO.3	3	2	-	-	-	-	-	-	-	-	-	-
CO.4	3	-	-	-	-	-	-	-	-	-	-	-
CO.5	3	-	-	-	-	-	-	-	-	-	-	-
CO*	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

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L	T	P	C
3	0	0	3

18OEEE321 SCADA SYSTEM AND APPLICATIONS
(OPEN ELECTIVE-I)

Course Educational Objectives

1. To understand the fundamentals of SCADA.
2. To analyze the SCADA Components, Communication, Monitoring and Control
3. To analyze the application of SCADA in power System
4. Understand the Energy efficient motors and power factor improvement.
5. Know the concept Energy Measuring Instruments.

UNIT – 1: INTRODUCTION TO SCADA (9)

Evolution of SCADA, SCADA definitions, SCADA Functional requirements and Components, SCADA Hierarchical concept, SCADA architecture, General features, SCADA Applications, Benefits.

UNIT – 2: SCADA SYSTEM COMPONENTS (9)

Remote Terminal Unit (RTU), Interface units, Human- Machine Interface Units (HMI), Display Monitors/Data Logger Systems, Intelligent Electronic Devices (IED), Communication Network, SCADA Server, SCADA Control systems and Control panels.

UNIT – 3: SCADA COMMUNICATION (10)

SCADA Communication requirements, Communication protocols: Past, Present and Future, Structure of a SCADA Communications Protocol, Comparison of various communication protocols, IEC61850 based communication architecture, Communication media like Fiber optic, PLCC etc. Interface provisions and communication extensions, synchronization with NCC, DCC.

UNIT – 4: SCADA MONITORING AND CONTROL (8)

Online monitoring the event and alarm system, trends and reports, Blocking list, Event disturbance recording. Control function: Station control, bay control, breaker control and disconnector control.

UNIT – 5: SCADA APPLICATIONS IN POWER SYSTEM (9)

Applications in Generation, Transmission and Distribution sector, Substation SCADA system Functional description, System specification, System selection such as Substation configuration, IEC61850 ring configuration, SAS cubicle concepts, gateway interoperability list, signal naming concept. System Installation, Testing and Commissioning.

TOTAL: 45 HOURS

Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to COs**
CO1	Explain the fundamentals of SCADA.	**PO1, PO2.**
CO2	Describe the system components of SCADA	**PO1,PO2**
CO3	Elucidate the SCADA communication	**PO1,PO2**
CO4	Acquire knowledge on the monitoring and control of SCADA	**PO1,PO2**
CO5	Describe the applications of SCADA in power system.	**PO1**

Text Books:

1. Stuart A. Boyer: SCADA-Supervisory Control and Data Acquisition, Instrument Society of America Publications, USA.

Reference Books:

1. Gordon Clarke, Deon Reynders: Practical Modern SCADA Protocols: DNP3, 60870.5 and Related Systems, Newness Publications, Oxford, UK, 2004.
2. William T. Shaw, Cybersecurity for SCADA systems, PennWell Books, 2006

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	2	-	-	-	-	-	-	-	-	-	-
CO.2	2	3	-	-	-	-	-	-	-	-	-	-
CO.3	3	2	-	-	-	-	-	-	-	-	-	-
CO.4	3	3	-	-	-	-	-	-	-	-	-	-
CO.5	3	3	-	-	-	-	-	-	-	-	-	-
CO*	**2.8**	**2.6**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

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L	T	P	C
3	0	0	3

18OEEE322 SERVICING OF ELECTRICAL APPLIANCES
(OPEN ELECTIVE-I)

Course Educational Objectives:

1. To learn the servicing of various Electrical appliances.
2. To understand the importance of Earthing for safe operation
3. To Know the concept of different electrical appliances
4. To understand the concept of Protection devices
5. To know the concept of Electrical Safety

UNIT – 1: INTRODUCTION (9)

Introduction to electrical appliances-Importance of electrical wiring – Principle of domestic wiring-Wiring system using casing & capping, PVC, and concealed system- wiring connections: tube light wiring, staircase wiring, house wiring.

UNIT – 2: TESTING AND FAULT IDENTIFICATION OF LOW POWER APPLIANCES (9)

Maintenance and repair of domestic equipments - electric iron box- - ceiling fan - electric kettle, Heater/immersion heater-washing machine- grinder-mixer.

UNIT – 3: SERVICING OF HIGH POWER APPLIANCES (9)

Testing of different electrical appliances-geyser-hot plates-pumps– induction stove- refrigerator etc.

UNIT – 4: PROTECTION DEVICES AND TESTING EQUIPMENTS (9)

Study of fuses- Contactors-Circuit Breakers- Relays - Measurement of voltage, current and resistance using multi meter and Clamp meter - Usage of continuity tester- line tester - test lamp.

UNIT – 5: PRACTICE ON EARTHING AND ELECTRICAL SAFETY (9)

Basic principles of earthing-different methods of earthing-importance of earthing- fundamental of safe installation of equipments – precautions & prevention of electrical shock- Types of Shocks - first Aid.

TOTAL: 45 HOURS

Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to COs**
CO1	Understand the fundamental concepts of Electrical appliances.	**PO1,PO2,PO3,PO12**
CO2	Apply the concept to trace and identify the fault in low power appliances.	**PO1,PO2,PO3,PO12**
CO3	Apply the concept to trace and identify the fault in power appliances	**PO1,PO2,PO3,PO12**
CO4	Illustrate the concept of protective devices and measuring instruments.	**PO1,PO2,PO3,PO12**
CO5	Understand the importance of earthing for safe operations and Analyze any electrical connection and rectify the fault	**PO1,PO2,PO3,PO12**

Text Books:

1. Troubleshooting and Repairing Commercial Electrical Equipment by David Herres, Mc Graw Hill Publications, 2013
2. Elements of Induction Heating design and control application by S. Zinn, S. L. Semiatin, ASM International Publications.

Reference Books:

1. Elstan A. Fernandez, Marine Electrical technology.
2. Electrical Safety, Fire Safety Engineering and Safety Management by S. Rao, R.K. Jain, H.L. Saluja

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	2	2	-	-	-	-	-	-	-	-	2
CO.2	3	2	2	-	-	-	-	-	-	-	-	2
CO.3	3	2	2	-	-	-	-	-	-	-	-	2
CO.4	3	2	2	-	-	-	-	-	-	-	-	2
CO.5	3	2	2	-	-	-	-	-	-	-	-	2
CO*	**3**	**2**	**2**	-	-	-	-	-	-	-	-	**2**

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
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III B.Tech II Semester

L	T	P	C
3	0	0	3

18OEEE323 POWER SYSTEM REFORMS
(OPEN ELECTIVE-1)

Course Educational Objectives:

1. To study fundamentals of power system deregulation and restructuring.
2. To study available transfer capability.
3. To study congestion management
4. To study various electricity pricing methods.
5. To study operation of power system in deregulated environment.

UNIT – 1: OVER VIEW OF KEY ISSUES IN ELECTRIC UTILITIES (9)

Introduction – Restructuring models – Independent system operator (ISO) – Power Exchange– Market operations – Market Power – Standard cost – Transmission Pricing – Congestion Pricing – Management of Inter zonal/Intra zonal Congestion.

UNIT – 2: AVAILABLE TRANSFER CAPABILITY (ATC) (9)

Structure of OASIS – Processing of Information – Transfer capability on OASIS –Definitions Transfer Capability Issues – ATC – TTC – TRM – CBM calculations –Methodologies to calculate ATC.

UNIT – 3: CONGESTION MANAGEMENT (9)

Introduction to congestion management – Methods to relieve congestion

UNIT – 4: ELECTRICITY PRICING (9)

Introduction – Electricity price volatility electricity price indexes – Challenges to electricity pricing – Construction of forward price curves – Short–time price forecasting.

UNIT – 5: POWER SYSTEM OPERATION IN COMPETITIVE ENVIRONMENT (9)

Introduction – Operational planning activities of ISO – The ISO in pool markets – The ISO in bilateral markets – Operational planning activities of a GENCO.

TOTAL: 45 HOURS

Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to COs**
CO1	Will understand importance of power system deregulation and restructuring.	**PO1,PO2,PO3**
CO2	Able to compute Available Transfer Capability**.**	**PO1,PO2,PO3,**
CO3	Will understand transmission congestion management.	**PO1,PO2, PO3**
CO4	Able to compute electricity pricing in deregulated environment.	**PO1,PO2,PO3**
CO5	Will be able to understand power system operation in deregulated environment.	**PO1,PO2,PO3**

Text Books:

1. Kankar Bhattacharya, Math H.J. Boller, JaapE.Daalder, 'Operation of Restructured Power System' Kluver Academic Publisher – 2001.
2. Mohammad Shahidehpour, and Muwaffaqalomoush, – "Restructured electrical Power systems" Marcel Dekker, Inc. 2001

Reference Books:

1. Loi Lei Lai; "Power system Restructuring and Deregulation", Jhon Wiley & Sons Ltd., England.
2. Electrical Power Distribution Case studies from Distribution reform, upgrades and Management (DRUM) Program, by USAID/India, TMH

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	2	2	-	-	-	-	-	-	-	-	2
CO.2	3	2	2	-	-	-	-	-	-	-	-	2
CO.3	3	2	2	-	-	-	-	-	-	-	-	2
CO.4	3	2	2	-	-	-	-	-	-	-	-	2
CO.5	3	2	2	-	-	-	-	-	-	-	-	2
CO*	**3**	**2**	**2**	-	-	-	-	-	-	-	-	**2**

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III B.Tech II Semester

L	T	P	C
3	0	0	3

18OECE321 MACHINE VISION SYSTEM
(OPEN ELECTIVE-I)

Course Educational Objectives:

1. To introduce theory, applications and techniques of machine vision to students
2. Provide the students with an understanding of the problems involved in the development of machine vision systems.
3. Introduces the "low-level" algorithms of image processing that are necessary for the "mid-level" vision or feature extraction.
4. To describe and analyze the pattern recognition, and 3D analysis and modeling of objects and scenes.
5. Tolay emphasis on the practical integration of machine vision systems, and the related applications in real time.

UNIT – 1: INTRODUCTION (9)

Human vision – Machine vision and Computer vision – Benefits of machine vision - Block diagram and function of machine vision system implementation of industrial machine vision system – Physics of Light – Interactions of light – Refraction at a spherical surface – Thin Lens Equation.

UNIT – 2: IMAGE ACQUISITION (9)

Scene constraints – Lighting parameters – Lighting sources, Selection – Lighting Techniques – Types and Selection – Machine Vision Lenses and Optical Filters, Specifications and Selection – Imaging Sensors – CCD and CMOS, Specifications – Interface Architectures – Analog and Digital Cameras – Digital Camera Interfaces – Camera Computer Interfaces, Specifications and Selection – Geometrical Image formation models – Camera Calibration, line and progressive scan.

UNIT – 3: IMAGE PROCESSING` (9)

Machine Vision Software – Fundamentals of Digital Image – Image Acquisition Modes – Image Processing in Spatial and Frequency Domain – Point Operation, Thresholding, Grayscale Stretching – Neighborhood Operations, Image Smoothing and Sharpening – Edge Detection – Binary Morphology.

UNIT – 4: IMAGE ANALYSIS (9)

Feature extraction – Region Features, Shape and Size features – Texture Analysis – Template Matching and Classification – 3D Machine Vision Techniques – Decision Making.

UNIT – 5: MACHINE VISION APPLICATIONS (9)

Machine vision applications in manufacturing, electronics, printing, pharmaceutical, textile, applications in non-visible spectrum, metrology and gauging, OCR and OCV, vision guided robotics – Field and Service Applications – Agricultural, and Bio medical field, augmented reality, surveillance, bio-metrics, automobile industries, Food packaging industry, research and aeronautics.

TOTAL: 45 HOURS

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Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to COs**
CO1	Formulate the concepts of machine vision system and its applications	**PO1, PO2**
CO2	Determine the geometrical image formation model and analyze the lighting effects for image acquisition	**PO1,PO2**
CO3	Demonstrate various the image acquisition and processing techniques in spatial and frequency domain	**PO1, PO2,PO3**
CO4	Analyze the digital image for feature extraction and 3D vision techniques for decision making.	**PO1, PO2,PO3, PO4**
CO5	Apply machine vision concepts and visual sensing technologies in real time applications	**PO1, PO2**

Text Books:

1. Handbook of Machine Vision, First Edition, Alexander Hornberg,2006, Wiley VCH.
2. Machine Vision Theory, Algorithms and Practicalities, Davis E.R., 2005, Elsevier.

Reference Books:

1. Understanding and Applying Machine Vision, NelloZuech,, 2000,Marcel Decker.
2. Introductory Techniques For 3D Computer Vision, first Edition.,EmanueleTrucco, Alessandro Verri,
3. Digital Image Processing Using MATLAB, Rafael C.Gonzales, Richard.E.Woods, 2014, Mc. Graw Hill Education.

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	3	2	-	-	-	-	-	-	-	-	-	2
CO.2	2	3	-	-	-	-	-	-	-	-	-	2
CO.3	2	3	2	-	-	-	-	-	-	-	-	2
CO.4	3	2	2	2	-	-	-	-	-	-	-	2
CO.5	3	2	-	-	-	-	-	-	-	-	-	2
CO*	**2.6**	**2.4**	**2**	**2**	-	-	-	-	-	-	-	**2**

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L	T	P	C
3	0	0	3

18OECE322 FOUNDATION OF NANO-ELECTRONICS
(OPEN ELECTIVE-I)

Course Educational Objectives:

1. To learn the basic fundamentals of Nano electronics
2. To better understand the of the Nano-micro fabrication.
3. To classify the different Nano materials depending on the properties.
4. To Understand the phenomena using the characterization techniques
5. To provide a foundation for the device fabrication and various applications in the field of sensors technology, optoelectronics, communication and nanotechnology etc.

UNIT – 1: INTRODUCTION TO TUNNELING (9)

Tunnel junction and applications of tunneling, Tunneling Through a Potential Barrier, Metal-Insulator, Metal-Semiconductor, and Metal-Insulator-Metal Junctions, Coulomb Blockade, Tunnel Junctions, Tunnel Junction Excited by a Current Source.

UNIT – 2: TUNNELING DEVICES (9)

Field Emission, Gate—Oxide Tunneling and Hot Electron Effects in nano MOSFETs, Theory of Scanning Tunneling Microscope, Double Barrier Tunneling and the Resonant Tunneling Diode.

UNIT – 3: LITHOGRAPHY TECHNIQUES (9)

Introduction to lithography- Contact, proximity printing and Projection Printing, Resolution Enhancement techniques, Positive and negative photo resists, Electron Lithography, Projection Printing. Lithography based on Surface Instabilities: Wetting, De-wetting, Adhesion, Limitations, Resolution and Achievable / line widths, Lift off process, Bulk Micro machining.

UNIT – 4: MEMS DEVICES (9)

Introduction to MEMS and NEMS, working principles, micro sensors, micro actuation- thermal actuation, piezoelectric actuation and electrostatic actuation–micro gripers, motors, valves, pumps, accelerometers, fluidics and capillary electrophoresis, active and passive micro fluidic devices, Pizoresistivity, Pizoelectricity and thermoelectricity.

UNIT – 5: NANO ELECTRONIC DEVICES (9)

Scaling of physical systems – Geometric scaling & Electrical system scaling. The Single-Electron Transistor: The Single- Electron Transistor Single-Electron Transistor Logic, Other SET and FET Structures, Carbon Nanotube Transistors (FETs and SETs), Semiconductor Nanowire FETs and SETs, Molecular SETs and Molecular Electronics. Graphenes, fullerenes- Structure and Properties.

TOTAL: 45 HOURS

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to COs**
CO1	To understand and analyze the fundamental physics of nano electronics	**PO1**
CO2	Discuss various Properties of electrons in nanostructures	**PO1,PO2**
CO3	Describe deep insight to fabrication and characterization techniques in Nanostructures.	**PO1,PO2**
CO4	Familiarize with concepts of electronics transportation in nanostructures, understanding the working principles of MEMS and NEMS	**PO1**
CO5	Demonstrate the working of various nano electronics devices	**PO1,PO2,PO3**

Text Books:

1. Stephen D. Senturia, "Microsystem Design, Springer Verlag", 2001.
2. Marc Madou, "Fundamentals of microfabrication & Nano Technology", Taylor and Francis, 2011.
3. T. Fukada & W.Mens, "Micro Mechanical system Principle & Technology", Elsevier, 1998.
4. Julian W.Gardnes, Vijay K. Varda, "Micro sensors MEMS & Smart Devices", 2001.

Reference Books:

1. Nano Terchnology and Nano Electronics – Materials, devices and measurement Techniques by WR Fahrner – Springer.
2. Nano: The Essentials – Understanding Nano Scinece and Nanotechnology by T.Pradeep; Tata Mc.Graw Hill.
3. Nanoelectronics and Nanosystems – From Transistor to Molecular and Quantum Devices by Karl Goser, Peter Glosekotter, Jan Dienstuhl
4. Quantum-Based Electronic Devices and Systems by M. Dutta and M.A. Stroscio, World Scientific.
5. Micro sensors MEMS& Smart Devices, Julian W.Gardnes, Vijay K. Varda, 2001

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	3	-	-	-	-	-	-	-	-	-	-	2
CO.2	3	2	-	-	-	-	-	-	-	-	-	2
CO.3	3	2	-	-	-	-	-	-	-	-	-	2
CO.4	3	-	-	-	-	-	-	-	-	-	-	2
CO.5	3	2	2	-	-	-	-	-	-	-	-	2
CO*	**3**	**2**	**2**	-	-	-	-	-	-	-	-	**2**

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III B.Tech II Semester

L	T	P	C
3	0	0	3

18OECE323 MEDICAL ELECTRONICS
(OPEN ELECTIVE-I)

Course Educational Objectives:

1. To gain knowledge and analyze the various physiological parameters.
2. To understand the respiratory, Blood pressure, temperature measurements etc.
3. To study about the various assist devices used in the hospitals.
4. To gain knowledge about equipment used for various diagnostic and therapeutic techniques.
5. To know the recent trends in tele medicine and laser in medicine.

UNIT – 1: ELECTRO-PHYSIOLOGY AND BIO-POTENTIAL RECORDING (9)

The origin of Bio-potentials; biopotential electrodes, biological amplifiers, ECG, EEG, EMG,PCG, lead systems and recording methods, typical waveforms and signal characteristics.

UNIT – 2: BIO-CHEMICAL AND NON ELECTRICAL PARAMETER MEASUREMENT (9)

PH, PO2, PCO2, colorimeter, Auto analyzer, Blood flow meter, cardiac output, respiratory measurement, Blood pressure, temperature, pulse, and Blood cell counters.

UNIT – 3: ASSIST DEVICES (9)

Cardiac pacemakers, DC Defibrillator, Dialyzer, Heart lung machine.

UNIT – 4: PHYSICAL MEDICINE AND BIOTELEMETRY (9)

Diathermies- Shortwave, ultrasonic and microwave type and their applications, Surgical Diathermy Telemetry principles, frequency selection, biotelemetry, radio pill, electrical safety.

UNIT – 5: RECENT TRENDS IN MEDICAL INSTRUMENTATION (9)

Thermograph, endoscopy unit, Laser in medicine, cryogenic application, Introduction to telemedicine.

TOTAL: 45 HOURS

Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to COs**
CO1	Distinguish and analyze the various physiological parameters and its recording methods, signal characteristics.	**PO1,PO2**
CO2	Describe the respiratory, Blood pressure, temperature measurements etc.	**PO1,PO2,PO5**
CO3	Analyze function of various assist devices used in the hospitals.	**PO1,PO2, PO5**
CO4	Demonstrate knowledge about equipment used for physical medicine and the various recently developed diagnostic and therapeutic techniques.	**PO1,PO2, PO5**
CO5	Extend knowledge on recent trends in tele medicine and laser in medicine.	**PO1,PO2, PO5**

Text Books:

1. Leslie Cromwell, ―Biomedical instrumentation and measurement‖, Prentice Hall of India, New Delhi, 2007.

2. John G.Webster,‖ Medical Instrumentation Application and Design‖, 3rd Edition, Wiley India Edition, 2007.

Reference Books:

1. Khandpur, R.S., ―Handbook of Biomedical Instrumentation‖, TATA McGraw-Hill, New Delhi, 2003.
2. Joseph J.Carr and John M.Brown, ―Introduction to Biomedical equipment Technology‖, John Wiley and Sons, New York, 2004.

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	3	3	-	-	2	-	-	-	-	-	-	-
CO.3	3	3	-	-	2	-	-	-	-	-	-	-
CO.4	3	3	-	-	2	-	-	-	-	-	-	-
CO.5	3	3	-	-	2	-	-	-	-	-	-	-
CO*	**3**	3	-	-	2	-	-	-	-	-	-	-

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III B.Tech II Semester

L	T	P	C
3	0	0	3

18OMEC321 INDUSTRIAL ROBOTICS (OPEN ELECTIVE-I)

Course Educational Objectives:

1. To know the robot drive systems and internal grippers and external grippers
2. To understand the image processing and analysis of image data
3. To learn Robot motion analysis and control.
4. To study the robot language structure and programming
5. To explain the various applications of robots in industry

UNIT – 1: FUNDAMENTALS OF ROBOTIC TECHNOLOGY AND DRIVE SYSTEM (9)

Introduction – Robot anatomy – Robot configuration and motions – Robot specifications – Pitch, yaw, roll, joint notations, speed of motion, pay load – Work volume. **Robot Drive System:** Pneumatic, hydraulic drives, mechanical and electrical drives – Servo motors and stepper motor. **Grippers:** Mechanical, pneumatic and hydraulic grippers, magnetic grippers and vacuum grippers – Two fingered and three fingered grippers – Internal and external grippers.

UNIT – 2: ROBOT SENSORS AND MACHINE VISION (9)

Robot Sensors: Position of sensors – Range sensors – Proximity sensors – Touch sensors – Wrist sensors – Compliance sensors – Slip sensors. **Machine Vision**: Camera – Frame grabber – Sensing and digitizing image data – Signal conversion – Image storage and lighting techniques – Image processing and analysis – Data reduction – Edge detection – Segmentation feature extraction – Object recognition.

UNIT – 3: ROBOT MOTION ANALYSIS AND CONTROL (11)

Robot Kinematics: Manipulator kinematics – Position representation – Forward and reverse transformation – Adding orientation – Homogeneous transformations – D-H notation – Forward and inverse kinematics. **Robot Dynamics:** Differential transformation – Compensating for gravity – Robot arm dynamics. **Trajectory Planning:** Trajectory planning and avoidance of obstacles – Path planning – Skew motion – Joint integrated motion – Straight line motion.

UNIT – 4: ROBOT PROGRAMMING (9)

Robot Programming: Lead through programming – Robot language structure – Motion commands of move, speed control, workplace, path, frames, end effecter operation, sensor operation and react statement – Program sequence and subroutine – Teach pendant programming – VAL II programming.

UNIT – 5: ROBOT APPLICATIONS AND IMPLEMENTATION PRINCIPLES (7)

Robot Applications: Material transfer and machine loading / unloading – Processing applications in spray coating – Assembly and inspection automation – Future applications of robot in mines, under water and space. **Implementation Principles:** Selection of robots in industry applications – Economic analysis of the robot. **TOTAL: 45 HOURS**

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Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to COs**
CO1	Understand the robot drive systems and internal grippers and external grippers.	**PO1**
CO2	Recognize the image data and analysis the image processing	**PO1, PO12**
CO3	Understand the basic concepts of robot motion and analysis	**PO1,PO2,PO3**
CO4	Know the robot language structure and robot programming.	**PO1,PO2, PO3, PO12**
CO5	Explain the applications of robots in industries and Safety considerations in workplace	**PO1,PO11, PO12**

Text Books:

1. Industrial Robotics: Technology, Programming and Applications, Mikell P Groover, Mitchell Weiss, Roger N. Nagel, Nicholas G Odrey and Ashish Dutta 2/e, 2012, Tata McGraw-Hill Education Pvt. Ltd.,
2. Robotics: Control, Sensing, Vision and Intelligence, K.S. Fu, R.C.Gonzales and C.S.G.Lee, 1/e, 2008, Tata McGraw-Hill Education Pvt. Ltd., Noida.

References:

1. Introduction to Robotics: Analysis, Control, Applications, 3/e, 2020, Saeed B.Niku, Wiley India Pvt, Ltd., New Delhi.
2. Robotics Technology and Flexible Automation, S.R.Deb and Sankha Deb, 2/e, 2010, Tata McGraw-Hill Education Pvt. Ltd., Noida.
3. Robots and Robotics - Principles, Systems, and Industrial Applications, Mark R Miller & Rex Miller 2017, McGraw-Hill Education.
4. Introduction to Robotics: Mechanics and Control, John J. Craig, 3/e, 2008, Pearson Education, New Delhi.
5. Robotics: Fundamental Concepts and Analysis, Ashitava Ghosal, 1/e, 2006, Oxford University Press, New Delhi.
6. Robotics and Industrial Automation, Rajput R.K, 2008, S.Chand Publications, New Delhi.

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	3	-	-	-	-	-	-	-	-	-	-	-
CO.2	3	-	-	-	-	-	-	-	-	-	-	1
CO.3	3	2	1	-	-	-	-	-	-	-	-	-
CO.4	3	2	1	-	-	-	-	-	-	-	-	1
CO.5	3	-	-	-	-	-	-	-	-	-	1	1
CO*	**3**	2	1	-	-	-	-	-	-	-	1	1

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

III B.Tech II Semester

L	T	P	C
3	0	0	3

18OMEC322 POWER PLANT TECHNOLOGY (OPEN ELECTIVE-I)

Course Educational Objectives:

1. To understand the working principles of steam power plants and analyzes its performance.
2. To know the working principles of diesel and gas turbine power plant
3. To clarify the working of nuclear power plant and safety measures
4. To recognize the sources of renewable energies and hydroelectric power generation techniques.
5. To learn the economics, Energy management and environmental issues of power generation.

UNIT – 1: STEAM POWER PLANT (9)

Rankine cycle – Layout of modern coal power plant – Super critical boilers, FBC Boilers, turbines, condensers, steam and heat rate – Subsystems of thermal power plants – Fuel and ash handling – Draught system – Feed water treatment – Binary cycles and cogeneration systems.

UNIT – 2: DIESEL AND GAS TURBINE POWER PLANT (9)

Diesel Power Plant: Introduction – IC Engines, types, construction – Plant layout with auxiliaries – Fuel supply system, air starting equipment, lubrication and cooling system – Super charging. **Gas Turbine Power Plant**: Introduction – Classification – Construction – Layout with auxiliaries – Principles of working of closed and open cycle gas turbines – Combined cycle power plants and comparison.

UNIT – 3: NUCLEAR POWER PLANT (9)

Basics of nuclear engineering– Fuels and nuclear reactions – Layout and subsystems – Reflectors – Pressurized water reactor (PWR) – Boiling water reactor (BWR) – CANada Deuterium- Uranium reactor (CANDU) – Gas cooled and liquid metal fast breeder reactor – Heavy water reactor – Working and comparison – Safety measures for nuclear power plants.

UNIT – 4: HYDROELECTRIC POWER PLANT AND RENEWABLE ENERGY SOURCE (9)

Hydroelectric Power Plant: Water power – Hydrological cycle – Hydrographs – Storage and pondage – Classification of dams and spill ways – Hydroelectric typical plant layout and components – Pumped storage power plants – Selection of turbines. **Renewable Energy Sources:** Principle, construction and working of wind, tidal, solar photo voltaic, solar thermal, geo thermal, biogas and fuel cell systems.

UNIT – 5: ENERGY MANAGEMENT, ECONOMICS AND ENVIRONMENTAL ISSUES (9)

Energy Management: Power tariff types – Load distribution parameters – load curve – Comparison of site selection criteria, relative merits and demerits – Capital and operating cost of different power plants. **Environmental Issues:** Effluents from power plants – Impact on environment – Pollutants – Pollution standards – Methods of Pollution control – Control of waste disposal and recovery – Waste disposal options for coal and nuclear power plants.

TOTAL: 45 HOURS

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Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to COs**
CO1	Understand the working principles of steam power plants and analyze performance	**PO1,PO2,PO3, PO6, PO7, PO12**
CO2	Understand the working principles of diesel and gas turbine power plant	**PO1,PO3, PO6, PO7,PO12**
CO3	Explain the working of nuclear power plant with safety measures	**PO1,PO2,PO3, PO6, PO7, PO12**
CO4	Explain the working power generation technologies from various renewable energy sources and hydroelectric power generation system	**PO1,PO2,PO3, PO6, PO7, PO12**
CO5	Describe environmental issues of power generation.	**PO1,PO2,PO3, PO6, PO7, PO12**

Text books:

1. Power Plant Engineering, P.K.Nag, 4/e, 2014, McGraw-Hill Education Pvt. Ltd., New Delhi.
2. Power Plant Engineering, R.K Hegde, 1/e, 2015, Pearson Education, India.

Reference books:

1. Power Plant Technology, M. M. El-Wakil, 1/e, 2010, Tata McGraw-Hill, New Delhi.
2. A Course in Power Plant Engineering, Arora and S. Domkundwar, 6/e, 2012, Dhanpat Rai Publishing Company (P) Ltd., New Delhi.
3. Introduction to Power Plant Technology, G.D.Rai, 3/e, 2012, Khanna Publishers, New Delhi.
4. Power Plant Engineering, G.R. Nagpal and S.C. Sharma, 16/e, 2004, Khanna Publisher, New Delhi.
5. A Text Book of Power Plant Engineering, R.K.Rajput, 5/e, 2016, Laxmi Publications (P) Ltd., New Delhi.
6. Power Generation Handbook, Philip Kiameh, 2/e, 2013, Tata McGraw-Hill, New Delhi.

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	3	2	2	-	-	1	1	-	-	-	-	1
CO.2	3	-	2	-	-	1	1	-	-	-	-	1
CO.3	3	2	1	-	-	1	1	-	-	-	-	1
CO.4	3	2	1	-	-	1	1	-	-	-	-	1
CO.5	3	2	1	-	-	1	3	-	-	-	-	2
CO*	**3**	**2**	**1.4**	-	-	**1**	**1.2**	-	-	-	-	**1.5**

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
(AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

III B.Tech II Semester

L	T	P	C
3	0	0	3

18OMEC323 MECHATRONICS SYSTEM (OPEN ELECTIVE-I)

Course Educational Objectives:

1. To recognize the fundamentals of Mechatronics, Control Systems, Transducers and Sensors
2. To understand the functions of Mechanical, Electrical, Hydraulic, and Pneumatic Actuators.
3. To express the Basic system models and Controllers used in Mechatronic systems
4. To realize the applications of microprocessors and Programmable Peripheral Interface
5. To recognize the Elements of programmable logic controller in mechatronic system

UNIT – 1: MECHATRONICS, SENSORS AND TRANSDUCERS (9)

Introduction: Integrated design issues in mechatronics – Mechatronics key elements – Applications in mechatronics – Introduction to mechatronics systems and measurement systems. **Control Systems:** Open loop, closed loop, automatic control, block diagram, pneumatic control and hydraulic control systems. **Transducers:** Actuating mechanisms – Electro-mechanical, resistance, variable inductance, capacitive, piezoelectric, photoelectric, thermo electric and Hall Effect transducers – Strain gauge. **Sensors:** Proximity, pneumatic, light, tactile and smart sensors – Load cells – Digital encoders – Selection of sensors.

UNIT – 2: ACTUATIORS (9)

Mechanical Actuator: Gear drive, belt drive, chain drive and bearings. **Electrical Actuator:** Mechanical and solid state switches – Construction and working principle of stepper motor and servo motor. **Hydraulic Actuators:** Hydraulic systems – Pumps, regulator, compressors and valves – Linear and rotary actuator. **Pneumatic Actuators:** Pneumatic systems – Valves – Linear and rotary actuator.

UNIT – 3: SYSTEM MODELS AND CONTROLLERS (9)

System Models: Basic system models – Mechanical system buildings – Electrical system buildings – Fluid system buildings – Thermal system buildings – Rotational-translational systems – Electro mechanical systems – Hydraulic mechanical systems. **Controller:** Control, two step, proportional and derivative mode – Combination of PD, PI and PID – PID and igital controllers – Concepts in adaptive control systems.

UNIT – 4: MICROPROCESSORS AND PROGRAMMABLE PERIPHERAL INTERFACE (9)

Microprocessors: Architecture of 8085 – Pin Configuration – Addressing Modes –Instruction set, Timing diagram of 8085 – Concepts of 8051 microcontroller with block diagram. **Programmable Peripheral Interface:** Architecture of 8255 – Keyboard interfacing – LED display – Interfacing – ADC and DAC interface – Temperature control – Stepper motor control – Traffic control interface.

UNIT– 5: PROGRAMMABLE LOGIC CONTROLLER & MECHATRONIC SYSTEMS (9)

Programmable Logic Controller: Introduction – Basic structure – Input and output processing – Programming – Mnemonics – Timers, counters and internal relays – Data handling – Selection of PLC. **Mechatronic Systems:** Design process of engine management system, automatic camera, automatic washing machine, pick and place robot, automatic car park barrier, wireless surveillance balloon, uninterruptible power supply, coin counter and electrically controlled robotic arm.

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TOTAL: 45 HOURS

Course Outcomes:

On successful completion of the course, Students will be able to		POs related to COs
CO1	Understand the fundamentals of Mechatronics, Control Systems, Transducers and Sensors	**PO1, PO2**
CO2	Illustrate the functions of Mechanical, Electrical, Hydraulic, Pneumatic Actuators in mechatronics systems	**PO1, PO2, PO3**
CO3	demonstrate the Basic system models and Controller used in Mechatronic systems	**PO1, PO2**
CO4	Understand the applications of microprocessors and and Programmable Peripheral Interface	**PO1, PO2**
CO5	Know the Elements of programmable logic controller in mechatronic system	**PO1, PO2, PO3**

Text Books:

1. Mechatronics: Electronic control systems in mechanical and electrical engineering, William Bolton, 6/e, 2019, Pearson Education, India.
2. A Textbook of Mechatronics, R.K.Rajput, 4/e, 2007, S. Chand & Co.

Reference Books:

1. Mechatronics Systems Design, Devdas Shetty and Richard A. Kolk, 2/e, 2011, Cengage Learning.
2. Mechatronics, Principles and Applications, Godfrey Onwubolu, 1/e, 2005, Elsevier Butterworth-Heinemann.
3. Introduction to Mechatronics and Measurement Systems, David G. Alciatore and Michael B. Histand, 4/e, 2014, Tata McGraw Hill Education.
4. Mechatronics: A Foundation Course, Clarence W. de Silva, 1/e, 2010, CRC Press, Taylor & Francis Group
5. Mechatronics with Experiments, Sabri Cetinkunt, 2/e, 2015, John Wiley & Sons Ltd
6. Mechatronics : Principles, Concepts and Applications, Nitaigour Premchand Mahalik, 1/e, 2003, Tata McGraw Hill Education.

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	2	-	-	-	-	-	-	-	-	-	-
CO.2	3	2	1	-	-	-	-	-	-	-	-	-
CO.3	3	2	-	-	-	-	-	-	-	-	-	-
CO.4	3	2	-	-	-	-	-	-	-	-	-	-
CO.5	3	2	1	-	-	-	-	-	-	-	-	-
CO*	**3**	**2**	**1**	-	-	-	-	-	-	-	-	-

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
(AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

III B. TECH II-SEMESTER (CSE)

L	T	P	C
0	0	2	1

18CSE326 **WEB TECHNOLOGIES LAB**

Course Educational Objectives:

The Students should be made to

CEO1: To design web pages consisting of hyperlinks, tables, images, multimedia content and input forms.
CEO2: To develop web pages with different styles to the HTML elements using CSS.
CEO3: To make use of java scripts to make the web pages responsive and validate the user input.
CEO4: To gain knowledge on PHP scripts using the concepts of functions, arrays and OOP.
CEO5: To develop PHP scripts that can interact with MYSQL databases.

Exercise 1:

Design web pages using html5 which includes the following:

a) Describing your Department use paragraph and list tags, apply various colors, header tags, font styling like italics, underline.
b) Create links on the words e.g. HTML and Java to link them to Wikipedia pages and image as a link such that clicking on image takes user to other page
c) Create a table to show your class time table

Exercise 2:

Design web pagesthat provide information about your College using html5 which includes the following:

a) Images
b) Borders and Colors

Exercise 3:

Create a "registration form" in html5 with the following fields: Name (Text field), Password (Password field), E-mail id (Text field), Phone number (text field), Sex (radio button), Date of birth (3 select boxes), Languages known (check boxes – English, Telugu, Hindi, Tamil) and Address (text area).

Exercise 4:

Create a web page embedding audio and video files using html 5.

Exercise 5:

Design a web page using CSS which includes the following:

a) Backgrounds and Colors
b) Fonts and Text
c) Creating Boxes and Columns

d) List Styles and Table Layouts

Exercise 6:

Write a Java script to validate the appropriate fields in the registration form of Exercise 3 which includes the following validation : Name (Name should contains alphabets and the length should not be less than 6 characters), Password (Password should not be less than 6 characters length), E-mail id (should not contain any invalid and must follow the standard pattern name@domain.com), Phone number (Phone number should contain 10 digits only and accepted digits only). If any one of the field is empty then display the error message.

Exercise 7:

Write Java script to work with the following:

a) Window Object
b) Navigator Object
c) Document Object

Exercise 8:

Write JQuery to work with the following:

a) Selectors
b) HTML Attributes
c) Events

Exercise 9:

Write PHP scripts covering the following:

a) Functions
b) Arrays
c) Object Oriented Concepts

Exercise 10:

a) Write a PHP program to read user name and favorite color from the HTML form. Display the name of the user in green color and set user's favorite color as a background for the web page.
b) Write a PHP code to read the username and password entered in the Login form and authenticate with the values available in cookies. If user enters a valid username and password, welcome the user by username otherwise display a message stating that, entered details are invalid.

Exercise 11:

Write a PHP code to read the user details entered through the registration form like Name , Password , E-mail id , Phone number , Address and store these details in the MySQL database.

Exercise 12:

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A user validation web application, where the user submits the login name and password to the server. The name and password are checked against the data already available in Database and if the data matches, a successful login page is returned. Otherwise a failure message is displayed to the user.

Course Outcomes		**POs related to COs**
CO1	Demonstrate knowledge on web page design elements	PO1, PO3
CO2	Demonstrate knowledge on client side scripting and server side scripting	PO1, PO2, PO3
CO3	Analyze user requirements to develop web applications.	PO1, PO2, PO3, PO5
CO4	Design client-server applications using web technologies.	PO1, PO2, PO3, PO5
CO5	Demonstrate problem solving skills to develop enterprise web applications.	PO1, PO2, PO3, PO5
CO6	Follow the ethical principles in implementing the programs	PO8
CO7	Do experiments effectively as an individual and as a team member in a group	PO9
CO8	Communicate verbally and in written form, the understanding about the experiments	PO10
CO9	Continue updating their skills realted to design the web pages and implementing programs in future	PO12

CO-PO Mapping

PO / CO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	2	-	-	-
CO8	-	-	-	-	-	-	-	-	-	2	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO*	**3**	**3**	**3**	**3**	**3**	**-**	**-**	**3**	**2**	**2**	**-**	**3**

Reference Books:

1. Kogent Learning Solutions Inc, HTML 5 Black Book: Covers CSS3, JavaScript, XML, XHTML, AJAX, PHP and JQuery, Dreamtech Press, Second Edition, 2016.

2. W. Jason Gilmore, Beginning PHP and MySQL, APress, Fourth Edition, 2011.
3. SnigBahumik, Bootstrap Essentials, PACKT Publishing, 2015. (e-book).

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III B. TECH II-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	0	**0**	**2**	**1**

18CSE327 UNIFIED MODELING LANGUAGE & DATA MINING LAB

Course Educational Objectives:

The student should be made to:

CEO1: Understand various UML Concepts using Rationalrose Software
CEO2: To develop a mini-project by applying the UML Concepts
CEO3: Understand the data sets and data pre-processing, Association Rules, Classification and Clustering.
CEO4: Build a data warehouse and query it using open source tools like Pentaho Data Integration and Pentaho Business Analytics
CEO5: Learn data mining tasks using a data mining toolkit

Case Tools:

Suggested domains for Mini-project:

1. ATM System
2. Library Management System
3. Passport automation system.
4. Hospital Management System
5. College Management System
6. On-line Examination System
7. E-ticketing
8. Recruitment system
9. Conference Management System
10. BPO Management System

Suggested Software Tools:

ArgoUML, Eclipse IDE, Visual Paradigm, Visual case and Rational Suite

Data Mining Task 1: Credit Risk Assessment Description: The business of banks is making loans. Assessing the credit worthiness of an applicant is of crucial importance. You have to develop a system to help a loan officer decide whether the credit of a customer is good, or bad. A bank's business rules regarding loans must consider two opposing factors. On the one hand, a bank wants to make as many loans as possible. Interest on these loans is the banks profit source. On the other hand, a bank cannot afford to make too many bad loans. Too many bad loans could lead to the collapse of the bank. The bank's loan policy must involve a compromise: not too strict, and not too lenient. To do the assignment, you first and foremost need some knowledge about the world of credit. You can acquire such knowledge in a number of ways.

1. **Knowledge Engineering:** Find a loan officer who is willing to talk. Interview her and try to represent her knowledge in the form of production rules.

2. **Books:** Find some training manuals for loan officers or perhaps a suitable textbook on finance. Translate this knowledge from text form to production rule form.

3. **Common sense:** Imagine yourself as a loan officer and make up reasonable rules which can be used to judge the credit worthiness of a loan applicant.

4. **Case histories:** Find records of actual cases where competent loan officers correctly judged when, and when not to, approve a loan application.

The German Credit Data:
Actual historical credit data is not always easy to come by because of confidentiality rules. Here is one such dataset, consisting of 1000 actual cases collected in Germany. credit dataset (original) Excel spreadsheet version of the German credit data. In spite of the fact that the data is German, you should probably make use of it for this assignment. (Unless you really can consult a real loan officer !) A few notes on the German dataset

• DM stands for Deutsche Mark, the unit of currency, worth about 90 cents Canadian (but looks and acts like a quarter).

• Owns_telephone. German phone rates are much higher than in Canada so fewer people own telephones.

• foreign_worker. There are millions of these in Germany (many from Turkey). It is very hard to get German citizenship if you were not born of German parents.

• There are 20 attributes used in judging a loan applicant. The goal is the classify the applicant into one of two categories, good or bad.

Subtasks: (Turn in your answers to the following tasks)

1. List all the categorical (or nominal) attributes and the real-valued attributes separately.

2. What attributes do you think might be crucial in making the credit assessment ? Come up with some simple rules in plain English using your selected attributes.

3. One type of model that you can create is a Decision Tree - train a Decision Tree using the complete dataset as the training data. Report the model obtained after training.

4. Suppose you use your above model trained on the complete dataset, and classify credit good/bad for each of the examples in the dataset. What % of examples can you classify correctly? (This is also called testing on the training set) Why do you think you cannot get 100 % training accuracy?

5. Is testing on the training set as you did above a good idea? Why or Why not ?

6. One approach for solving the problem encountered in the previous question is using cross-validation? Describe what is cross-validation briefly. Train a Decision Tree again using cross-validation and report your results. Does your accuracy increase/decrease? Why?

7. Check to see if the data shows a bias against "foreign workers" (attribute 20), or "personal-status" (attribute 9). One way to do this (perhaps rather simple minded) is to remove these attributes from the dataset and see if the decision tree created in those cases is significantly different from the full dataset case which you have already done. To remove an attribute you can use the preprocess tab in Weka's GUI Explorer. Did removing these attributes have any significant effect? Discuss.

8. Another question might be, do you really need to input so many attributes to get good results? Maybe only a few would do. For example, you could try just having attributes 2, 3, 5, 7, 10, 17 (and 21, the class attribute (naturally)). Try out some combinations. (You had removed two attributes in problem 7. Remember to reload the arff data file to get all the attributes initially before you start selecting the ones you want.)

9. sometimes, the cost of rejecting an applicant who actually has a good credit (case 1) might be higher than accepting an applicant who has bad credit (case 2). Instead of counting the misclassifications equally in both cases, give a higher cost to the first case (say cost 5) and lower cost to the second case. You can do this by using a cost matrix in Weka. Train your Decision Tree again and report the Decision Tree and cross-validation results. Are they significantly different from results obtained in problem 6 (using equal cost)?

10. Do you think it is a good idea to prefer simple decision trees instead of having long complex decision trees? How does the complexity of a Decision Tree relate to the bias of the model?

11. You can make your Decision Trees simpler by pruning the nodes. One approach is to use Reduced Error Pruning - Explain this idea briefly. Try reduced error pruning for training your Decision Trees using cross-validation (you can do this in Weka) and report the Decision Tree you obtain? Also, report your accuracy using the pruned model. Does your accuracy increase?

12. How can you convert a Decision Trees into "if-then-else rules". Make up your own small Decision Tree consisting of 2-3 levels and convert it into a set of rules. There also exist different classifiers that output the model in the form of rules - one such classifier in Weka is rules. PART, train this model and report the set of rules obtained. Sometimes just one attribute can be good enough in making the decision, yes, just one ! Can you predict what attribute that might be in this dataset? OneR classifier uses a single attribute to make decisions (it chooses the attribute based on minimum error). Report the rule obtained by training a one R classifier. Rank the performance of j48, PART and oneR.

Task Resources:

- Andrew Moore's Data Mining Tutorials (See tutorials on Decision Trees and Cross Validation)
- Decision Trees (Source: Tan, MSU)
- Tom Mitchell's book slides (See slides on Concept Learning and Decision Trees)
- Weka resources:
- Introduction to Weka (html version) (download ppt version)
- Download Weka
- Weka Tutorial
- ARFF format
- Using Weka from command line (or) Using R Programming(or)Using Rapid Miner Tool

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Course Outcomes:
On Successful Completion of this Course the Students will be able to

Course Outcomes		POs related to COs
CO1	Design different models for solving the problems	PO1, PO3,PO5
CO2	Develop the mini projects using CASE Tools	PO1, PO2, PO5
CO3	Analyze the data sets by using Association Rules, Classification and Clustering Techniques.	PO1, PO2, PO5
CO4	Create a Data Warehouse and perform data accessing	PO1, PO4, PO5
CO5	Perform Data Preprocessing such as data cleaning, Transformation and Reduction	PO1, PO2, PO5, PO11
CO6	Follow the ethical principles in implementing the programs	PO8
CO7	Do experiments effectively as an individual and as a team member in a group	PO9
CO8	Communicate verbally and in written form, the understanding about the experiments	PO10
CO9	Continue update skill related to CASE Tools, WEKA Tool and implementing programs in future	PO12

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	2	-	-	-
CO8	-	-	-	-	-	-	-	-	-	3	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO*	**3**	**3**	**3**	**3**	3	-	-	3	2	**3**	-	**3**

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III B.Tech II Semester

L	T	P	C
0	0	2	1

18CSE328 **PROJECT SKILLS LAB**

Course Educational Objectives:

CEO1: Objective is to give an opportunity to the student to get hands on training in design and innovation.
CEO2: Comparing and contrast the several existing solutions for the problem identified.
CEO3: Formulating and propose a plan for creating a solution for the research plan identified.
CEO4: Conducting the experiments as a team and interpret the results.
CEO5: Reporting and presenting the findings of the work conducted.

The aim of the project skill lab is to deepen comprehension of principles by applying them to a new problem which may be the device / system / component / working mode to be created / fabricated may be decided in consultation with the supervisor and if possible with an industry. A project topic must be selected by the students in consultation with their supervisor. The students may be grouped into 3 to 5 and work under a project supervisor.

A project report to be submitted by the group and along with the model / system, which will be reviewed and evaluated for internal assessment by a Committee constituted by the Head of the Department. At the end of the semester examination the project work is evaluated based on oral presentation and the project report along with device / system / component / working model jointly by external and internal examiners constituted by the Head of the Department.

Course Outcomes:

On successful completion of course, the student will be able to		POs related to COs
CO1	Demonstrate in-depth knowledge on the project topic	**PO1**
CO2	Identify, analyze and formulate complex problem chosen for project work to attain substantiated conclusions.	**PO2**
CO3	Design solutions to the chosen project problem.	**PO3**
CO4	Undertake investigation of project problem to provide valid conclusions	**PO4**
CO5	Use the appropriate techniques, resources and modern engineering tools necessary for project work	**PO5**
CO6	Apply project results for sustainable development of the society.	**PO6**
CO7	Understand the impact of project results in the context of environmental sustainability.	**PO7**
CO8	Understand professional and ethical responsibilities while executing the project work.	**PO8**
CO9	Function effectively as individual and a member in the project team	**PO9**
CO10	Develop communication skills, both oral and written for preparing and presenting project report.	**PO10**
CO11	Demonstrate knowledge and understanding of cost and time analysis required for carrying out the project.	**PO11**
CO12	Engage in lifelong learning to improve knowledge and competence in the chosen area of the project.	**PO12**

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III B. TECH II-SEMESTER (CSE)

L	T	P	C
2	0	0	1

18CSE329 **ONLINE COMPREHENSIVE EXAM-II**

Course Educational Objectives:

CEO1: To assess the comprehensive knowledge gained in basic courses relevant to the branch of study.

CEO2: To comprehend the questions asked and answer them with confidence.

On-line Comprehensive Test:

On-line comprehensive test will be conducted at the end of the II year II semester with 100 objective questions (multiple choice questions) for 100 marks on the courses studied in the respective semesters (II year I semester and II year II semester).

Course Outcomes:

On successful completion of the course, students will be able to

Course Outcomes		POs related to Cos
CO1	Understand and comprehend any given problem related to computer science and engineering field.	PO1,PO2,PO3,PO4, PO5,PO6, PO7, PO8, PO9,PO10,PO11,PO12
CO2	The students will be confident in discussing the fundamental aspects of any engineering problem/situation and give answers in dealing with them.	PO1,PO2,PO3,PO4, PO5,PO6, PO7, PO8, PO9,PO10,PO11,PO12

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	3	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3	3	3	3	3	3
CO*	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

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IV B. TECH I-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	2	**1**	**0**	**3**

18CSE411 CRYPTOGRAPHY AND NETWORK SECURITY

Course Educational Objectives:

CEO1: To understand basics of Cryptography and Network Security. Identify computer and network security threats, classify the threats and develop a security model to prevent, detect and recover from the attacks.
CEO2: Encrypt and decrypt messages using block ciphers, sign and verify messages using well known signature generation and verification algorithms.
CEO3: Analyze existing authentication and key agreement protocols; identify the weaknesses of these protocols.
CEO4: Download and install an e-mail and file security software, PGP, and efficiently use the code to encrypt and sign messages.
CEO5: Develop SSL or Firewall based solutions against security threats, employ access control techniques.

UNIT - 1: Classical Encryption Techniques (9)
Security attacks - Security services and mechanisms - A model for Network Security - Classical encryption techniques - Symmetric cipher model - Substitution techniques - Caesar Cipher - Mono alphabetic Cipher - Play fair Cipher - Hill Cipher - Transposition techniques.

UNIT - 2: Block Ciphers- Data Encryption Standards and Public Key Cryptography (9)
Simplified DES - Block Cipher Principles - DES – AES - Block Cipher Design Principles - Block Cipher modes of Operation - Public Key Cryptography - Principles of Public Key Cryptosystems - The RSA Algorithm -Diffie Hellman Key Exchange.

UNIT - 3: Message Authentication Codes - Hash Functions And Digital Signatures (9)
Message Authentication Requirements - Message Authentication Functions - Message Authentication Codes - Hash Functions - Security of Hash Functions and MACs - Hash algorithms – SHA – HMAC - Digital Signatures -Digital Signature Standard(DSS) - Authentication applications – Kerberos - X.509 Authentication Service

UNIT - 4: Electronic Mail and IP Security (9)
Pretty good privacy - S/MIME - IPsec overview – architecture - Authentication Header and Encapsulating security pay load - combining security associates.

UNIT - 5: Web Security-Intruders-Firewalls (9)
Web security considerations - Secure socket layer and transport layer security - Secure electronic transaction - Intruders - Intrusion detection - Password management - Firewall design and principles - Trusted systems.

Course Outcomes:

On successful completion of this course the students should be able to:

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Course Outcomes		POs related to Cos
CO1	Understand basics of Cryptography and Network Security.	PO1, PO2
CO2	Encrypt and decrypt messages, sign and verify messages using well known signature generation and verification algorithms.	PO1, PO2
CO3	Analyze existing authentication and key agreement protocols.	PO1, PO2, PO3, PO4
CO4	Use e-mail and file security software's.	PO1, PO2, PO3, PO5
CO5	Develop SSL/Firewall.	PO1, PO2, PO3, PO4

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	2	3	3	2	-	-	-	-	-	-	-	-
CO2	3	3	3	3	-	-	-	-	-	-	-	-
CO3	3	3	2	3	-	-	-	-	-	-	-	-
CO4	2	3	2	-	1	-	-	-	-	-	-	-
CO5	2	3	3	2	2	-	-	-	-	-	-	-
CO*	**2.4**	**3**	**2.6**	**2.5**	**1.5**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Text Books:

1. Cryptography and Network Security: Principles and Practices,7/e, William Stallings Low Price Edition, 2017, Pearson Education.
2. Network Security and Cryptography, 1/e, Bernard Menezes, 2010,Thomson Press Ltd,USA.

Reference Books:

1. Cryptography and Network Security: Principles and Practices,4/e, William Stallings Low Price Edition, 2008, Pearson Education.
2. Principles and Practices of Information Security,4/e, Michal E. Whitman and Herbert J. Mattord, 2012,CengageLearning, New Delhi.
3. Network Security Essentials (Applications and Standards), 4/e, William Stallings Pearson Education.
4. Hack Proofing your network , 2/e ,Ryan Russell, Dan Kaminsky, Rain Forest Puppy, Joe Grand, David Ahmad, Hal Flynn IdoDubrawsky, Steve W.Manzuik and Ryan Permeh,wileyDreamtech, 2002.
5. Fundamentals of Network Security, 1/e, Eric Maiwald (Dreamtech press) ,2008.
6. Network Security - Private Communication in a Public World,2/e, Charlie Kaufman, Radia Perlman and Mike Speciner,2002, Pearson/PHI.

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IV B. TECH I-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	3	**1**	**0**	**3**

18CSE412 **BIG DATA ANALYTICS**

Course Educational Objectives:
CEO1: To make familiar with the basics of Big Data Analytics platform.
CEO2: To apply the skills to manage Hadoop and HDFS.
CEO3: To gain knowledge on developing the Map Reduce application.
CEO4: To know how to work with Pig and Hive.
CEO5: To understand the concepts of HBASE, Zookeeper and Sqoop

UNIT I : INTRODUCTION TO BIG DATA ANALYTICS (9)

Types of Digital Data- Introduction to Big Data: Characteristics of Data- Evolution of Big Data-Challenges of Big Data -Big data Characteristics: Volume, Velocity, Variety-Traditional Business Intelligence (BI) versus Big Data- A Typical Data Warehouse Environment-A Typical Hadoop Environment-What is New Today? Big Data Analytics: What is Big Data Analytics? Classification of Analytics- Greatest Challenges that Prevent Business from Capitalizing on Big Data-Top Challenges Facing Big Data-What is Big Data Analytics Important?Data Science-Data scientist-Terminologies using in Big Data Environment- Top Analytics Tool.

UNIT - 2: HADOOP (9)

Introduction to Hadoop-Data Storage and Analysis- Comparison with Other Systems - A brief history of Hadoop - Apache Hadoop and The Hadoop Ecosystem - The Hadoop Distributed File System - The Design of HDFS-HDFS concepts - The Command Line Interface- Hadoop File systems- The Java Interface - Data Flow - parallel copying with distcp-Hadoop Archives - Hadoop I/O - Data Integrity-Compression-Serialization- File Based Data Structures.

UNIT – 3: MAP REDUCE PROGRAMMING (9)

Developing a Map Reduce Application - How Map Reduce Works - Anatomy of a Map Reduce Job run-Failures-Job Scheduling-Shuffle and Sort - Map Reduce Types and Formats - Map Reduce Features.

UNIT – 4: WORKING WITH PIG AND HIVE (9)
Installing and running pig- An Example- Comparison with Databases- Pig Latinscripts-User defined functions-Data processing Operators-Pig in Practice.
Installing Hive-Running Hive-Comparison with Traditional Databases – HiveQL – Tables-Querying Data.

UNIT – 5: HBASE- ZOOKEEPER – SQOOP (9)
HBasics – Concepts – Example-HBase Versus RDBMS-Praxis – Zookeeper-Installing and Running Zookeeper – Example-Zookeeper Services-Building applications with Zookeeper - Introduction to Sqoop-Database Imports-Working with Imported data-Importing large objects-performing exports.
Case Study: Apache Spark, Apache Oozie and Apache Flume.

Course Outcomes:

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On successful completion of this course the students should be able to:

Course Outcomes		POs related to Cos
CO1	Understand the basics of Big data Analytics	PO1, PO2
CO2	Manage Hadoop data storage and file system.	PO1, PO2, PO4
CO3	Design the application using Map Reduce programming	PO1, PO2, PO3
CO4	Perform operations on Pig and Hive	PO1, PO2, PO3, PO5
CO5	Analyze the Hadoop Eco systems like HBASE, Zookeeper and Sqoop	PO1, PO2, PO3, PO4, PO5

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	3	-	-	-	-	-	-	-	-
CO3	3	3	3	-	-	-	-	-	-	-	-	-
CO4	3	3	3	-	3	-	-	-	-	-	-	-
CO5	3	3	3	3	3	-	-	-	-	-	-	-
CO*	**3**	**3**	**3**	**3**	**3**	-	-	-	-	-	-	-

Text Books:

1. Hadoop- the definitive guide, Tom White,O'Relly 4th Edition, Media, 2015.
2. Big Data Analytics, SeemaAcharya, SubhasiniChellappan, Wiley, 2015.
3. Big Data for Dummies, Hurwitz, Alan Nugent, Dr. Fern Halper, Marcia Kaufman, John Wiley & Sons, 2012.

Reference Books:

1. Hadoop- the definitive guide, Tom White,O'Relly Media, 2010
2. Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics, Bill Franks, John Wiley &Sons, 2012.
3. Big Data Analytics: Turning big Data in to Big Money, Frank J Ohlhorst, Wiley and SAS Business series, 2012
4. ArshdeepBahga, Vijay Madisetti, "Big Data Science & Analytics: A HandsOnApproach",VPT,2016
5. Bart Baesens "Analytics in a Big Data World: The Essential Guide to Data ScienceanditsApplications(WILEYBigDataSeries)",JohnWiley&Sons,2014

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IV B. TECH I-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	2	**1**	**0**	**3**

18CSE413 MOBILE APPLICATION DEVELOPMENT

Course Educational Objectives:

CEO1: To learn the characteristics of mobile applications.
CEO2: To gain knowledge about the intricacies of UI required by mobile applications.
CEO3: To study about the design aspects of mobile application.
CEO4: To identify the different options in designing the mobile application
CEO5: To evaluate the techniques for the installation of mobile applications and delivery via various channels.

UNIT- 1: Java Review & Introduction and Installation of Android Tools (9)
Java Review - OOPs Concepts - Method Overriding - Android Overview - History - Android Versions - Android Flavors -Android Stack – Linux - Native Layer -Dalvik Virtual Machine - Application Framework – Applications - Installation and Use of Android Tools - Installing JDK - Installing the Android SDK - Anatomy of an Android Project - Drawable Resources - Steps in Building Projects in Android - Android Emulator

UNIT– 2: User Interface Android Building Blocksand User Interface (9)
XML Introduction - Need of XML for Android User Interface – Creating user interface using XML – Drag and Drop methods - Overview of Android Building Blocks: Activities - Activity Life Cycle – Methods in Activity Life Cycle. Services - Services Life Cycle –Intents - Types – Creation - Content Providers - Application Context - Android User Interface - Types and creation - Views and Layout - Logging Messages in Android - Threading in Android – Examples using Threading

UNIT– 3: Application Design Fragments- Intents- Action Bar- Services and Content Providers (9)
Fragments: Definition – Types - Fragment Life cycle – Creating a Fragment in android - Dynamically Adding Fragments - Example. Intents: Definition – Usage of Intends – Creation of Indents with example program - Action Bar - Preferences and Action Bar - Android File systems - Content Providers - Overview – Role of Content Providers - Databases on Android - SQLite - Status Contract Class.

UNIT– 4: Lists- Adapters and Broadcast Receivers (9)
Lists and Adapters – Types of Adapters – Example using Adapters - Loading the Data - Custom Logic via View Binder - Details View.
Menus: Types and Creation - Broadcast Receivers: About Broadcast Receivers –Broadcasting Intends and their related API - Boot Receiver - Alarms and system services – Examples on alarms and services.

UNIT– 5: Applications Widgets- Networking- Web Overview- Interaction and Sensors (9)
App Widgets: Content Providers through Widgets - Networking and Web Overview: HTTP API - Apache HTTP Client - Http URL Connection.
Interaction and Animation: Live Wallpaper and Handlers - Sensors: Sensor API in Android - Motion Sensor - Position Sensor- Environmental Sensor- Sensor Values- Sensor Manager Class - Sensor Class - Sensor Event class - Sensor Event Listener interface - Compass Accelerometer and orientation Sensors - Sensor Examples

Course Outcomes:

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On successful completion of this course the students should be able to:

Course Outcomes		POs related to Cos
CO1	Recollect the essential concepts of java and get familiar with android basics and installation.	PO1, PO2
CO2	Create User Interfaces with various Layouts and views using android building blocks.	PO1, PO2, PO4
CO3	Write programs on fragments - intents	PO1, PO2, PO3
CO4	Use the applicability of lists based on adapters and broadcast receivers.	PO1, PO2, PO3, PO5
CO5	Develop widgets - wall paper and sensor programs for android application development	PO1, PO2, PO3,

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	3	-	-	-	-	-	-	-	-
CO3	3	3	3	-	-	-	-	-	-	-	-	-
CO4	3	3	3	-	3	-	-	-	-	-	-	-
CO5	3	3	3	-	-	-	-	-	-	-	-	-
CO*	**3**	**3**	**3**	**3**	**3**	-	-	-	-	-	-	-

Text books:

1. Learning Android: Develop Mobile Apps Using Java and Eclipse, Marko Gargenta& Masumi Nakamura, O'Reilly - II Edition
2. Android Programming for Beginners, John Horton, PACKT publishers

Reference Books:

1. Android application Development, Black Book,PradeepKothari,Dreamtech
2. Head First Android Development: A Brain-Friendly Guide, 2/e, Dawn Griffiths and David Griffiths, O'Reilly.
3. Android System Programming, Roger Ye, PACKT publishers
4. Programming Android, ZigurdMednieks,LairdDornin,G.BlakeMeike& Masumi Nakamura, O'Reilly
5. Android Application Development All in One for Dummies,2nd Edition, Barry Burd, Wiley.

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IV B. TECH I-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	3	**0**	**0**	**3**

18CSE414A COMPUTER GRAPHICS AND MULTIMEDIA (CORE ELECTIVE-I)

Course Educational Objectives:

The student should be made to:

CEO1: To acquire knowledge about graphics hardware devices and software used and Design algorithms to generate points, lines, and polygons.
CEO2: To analyze Transformations for 2-D & 3D Objects.
CEO3: To understand Viewing transformations in 2D & 3D Objects and Clipping algorithms for 2-D & 3D Objects
CEO4: To gain insight information about appropriate techniques and tools for surface detection and rendering methods.
CEO5: To gain Knowledge in Multimedia applications and their compression methods

Unit-1: Introduction and Output Primitives (9)

Overview of graphics systems - Video display devices - Raster scan systems - Random scan systems - Input devices - Points and lines - Line drawing algorithms - Mid point circle and ellipse algorithms - Scan line polygon fill algorithm - Boundary fill and flood fill algorithms

Unit-2: 2-D and 3-D Geometrical Transforms (9)

2D Translation - Rotation - Scaling - Matrix representations and homogeneous coordinates - Composite transforms - Reflection and shear transformations - Transformations between coordinate systems - 3D Translation - Rotation – Scaling - Reflection and shear transformations - Composite transformations

Unit-3: 2-Dimensional Viewing (9)

The viewing pipeline - Viewing coordinate reference frame - Window to view-port coordinate transformation - 2-D viewing functions - Cohen Sutherland - Liang - Polygon Clipping-Sutherland Hodgeman polygon clipping algorithm, Weiler - Atherton Polygon Clipping Algorithm - Curve Clipping - Text Clipping - Exterior Clipping

Unit-4: Visible Surface Detection Methods & Introduction to Multimedia (9)

Classification of visible surface detection algorithms - Back face detection - Depth buffer method - A buffer method - Scan line method - Depth sorting method - BSP-tree method - Area sub-division and Octree methods - Ray Casting Method - Introduction to Multimedia - Graphics and Image Data Representations - Color Models in Image and Vide

Unit-5: Multimedia Compression Algorithms (9)

Multimedia Data Compression –Lossless Compression Algorithms-Run Length coding-VLC-Shanno – fano Algorithm- Huffman Coding-Adaptive Huffman Coding-Dictionary Based Coding-Image

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Compression Standards- JPEG Standard- MPEG Video Coding I MPEG-1. CASE STUDY: BLENDER GRAPHICS Blender Fundamentals – Drawing Basic Shapes – Modelling – Shading & Textures

Course Outcomes:
On successful completion of the course the student will be able to,

Course Outcomes		POs related to COs
CO1	Apply design algorithms to generate different objects.	PO1, PO2
CO2	Develop two dimensional transformations and design three dimensional graphics	PO1, PO2, PO4
CO3	Use viewing and clipping techniques to graphics	PO1, PO2, PO3, PO5
CO4	Perform Illumination , color models and visible detection methods to graphics	PO1, PO2, PO4
CO5	Design animation sequences and implementing various compression techniques in multimedia	PO1, PO2

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	3	-	-	-	-	-	-	-	-
CO3	3	3	3	-	3	-	-	-	-	-	-	-
CO4	3	3	-	3	-	-	-	-	-	-	-	-
CO5	3	3	-	-	-	-	-	-	-	-	-	-
CO*	**3**	**3**	**3**	**3**	**3**	-	-	-	-	-	-	-

Text Books:

1. Computer Graphics *C version*, 2/e, Donald Hearn and M.Pauline Baker, 2013, Pearson Education, New Delhi, India.
2. Fundamentals of Multimedia, 5/e, Ze-NIan Li, Mark S. Drew, 2009, Pearson Education, New Delhi, India.

Reference Books:

1. Computer Graphics *C version*, 2/e, Donald Hearn and M.Pauline Baker, 1997,Pearson Education, New Delhi, India.

2. Computer Graphics, 2/e, Donald Hearn and M.Pauline Baker, 1994,PHI/Pearson Education, New Delhi, India.
3. Computer Graphics Principles & Practice in C, 2/e, Foley, VanDam, Feiner and Hughes, 1995,Pearson Education, New Delhi, India.
4. Computer Graphics, 2/e, Zhigand Xiang, Roy Plastock, Schaum's outlines, 1998,Tata McGraw Hill, Hyderabad, India.
5. Computer Graphics, 3/e, Steven Harrington, 1987,TMH, New Delhi, India.
6. Interactive Computer Graphics: A Top-Down Approach with Shader-Based OpenGL 1/e, Edward Angel, Addison Wesley Longman, 2011,New York, USA.
7. Fundamentals of Computer Graphics, 3/e, Peter Shirley, Michael Ashikhmin and Steve Marschner, 2009,New York, USA.

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IV B. TECH I-SEMESTER	**L**	**T**	**P**	**C**
	2	**1**	**0**	**3**

18CSE414B PRINCIPLES OF PROGRAMMING LANGUAGES (CORE ELECTIVE-I)

Course Educational objectives:

CEO1: To gain knowledge about programming paradigms, principles and techniques involved in design and implementation of modern programming languages.
CEO2: To describe syntax and semantics of programming languages.
CEO3: To analyze and explain behavior of simple programs in imperative languages using concepts such as binding, scope, control structures, subprograms and parameter passing mechanisms.
CEO4: To analyze the concepts of ADT and object oriented programming for large scale software development.
CEO5: To understand the concurrency control and exception handling mechanisms.

UNIT - 1: Preliminaries (9)

Reasons for studying concepts of programming languages - Programming domains - Language evaluation criteria - Influences on language design - Language categories - Language design tradeoffs - Implementation methods - Programming environments

UNIT - 2: Describing Syntax and Semantics, Names, Bindings, Type Checking, and Scopes (9)

Introduction - General problem of describing syntax - Formal methods of describing syntax - Attribute grammars - Describing the meanings of programs - Names - Variables - The concept of binding - Type checking - Strong typing - Type compatibility - Scope - Scope and life time -Referencing environments - Named constants

UNIT - 3: Data Types, Expressions, Assignment Statements, Control Structures (9)

Introduction - Primitive data types - Character string types - User defined ordinal types - Array types - Arithmetic expressions - Overloaded operators - Type conversions - Relational and boolean expressions - Short circuit evaluation - Assignment statements - Mixed mode assignment - Selection statements - Iterative statements - Unconditional branching - Guarded commands

UNIT - 4: Subprograms, Abstract Data Types and Encapsulation Constructs (9)

Introduction - Fundamentals of subprograms - Design issues for subprograms - Local referencing environments - Parameter passing methods - Parameters that are subprogram names - Overloaded subprograms - Generic subprograms - Design issues for functions - User defined overloaded operators - Coroutines - The concept of abstraction - Introduction to data abstraction - Design issues for abstract data types - Language examples - Parameterized abstract data types - Encapsulation constructs - Naming encapsulations

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UNIT -5: Concurrency, Case Study:Java (9)

Why concurrency - Programs and processes - Problems with concurrency - Process interactions - Concurency primitives - Concurrent control abstractions - Object oriented programing - Key concepts - Pragmatics - Case study: Java

Course Outcomes:

On successful completion of the course the student will be able to,

Course Outcomes		POs related to COs
CO1	Identify the various programming language and its syntax.	PO1, PO2
CO2	Design the context free grammars using parse trees, recursive descent parsing, printing, and interpretation.	PO1, PO2, PO4
CO3	Develop programing using Data Types, Expressions, Assignment Statements, and Control Structures.	PO1, PO2, PO3, PO5
CO4	Analyze semantic issues associated with function implementations, Including variable binding, scoping rules, parameter passing, and exception handling.	PO1, PO2, PO4
CO5	Familiar with language abstraction of classes, interfaces, packages, implementation of object oriented languages and procedures.	PO1, PO2

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	2	3		3	-	-	-	-	-	-	-	-
CO3	3	3	3		2	-	-	-	-	-	-	-
CO4	3	3	-	3	-	-	-	-	-	-	-	-
CO5	2	3		-	-	-	-	-	-	-	-	-
CO*	**2.6**	**3**	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Text Books:

1. Concepts of Programming Languages, 11/e , Robert W. Sebesta, Pearson Education, 2016.
2. Programming Language Design Concepts, 1/e, D. A. Watt, Wiley Dreamtech, rp - 2007.

Reference Books:

1. Programming Languages, 2/e, A.B. Tucker, R.E. Noonan, Tata McGraw Hill,2002.
2. Programming Languages, 2/e , K. C.Louden, Thomson, 2003.
3. LISP, 3/e, Patric Henry Winston and Paul Horn, Pearson Education, 2000.
4. Programming in Prolog, 5/e , W.F. Clocksin and C.S.Mellish, Springer,2001.
5. Programming Python, 3/e ,M.Lutz and O'reilly, SPD, rp - 2007.
6. Core Python Programming, 3/e , Chun, Pearson Education, 2007.
7. Guide to Programming with Python, 2/e, Michael Dawson, Thomson, 2008.

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IV B. TECH I-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	3	**0**	**0**	**3**

18CSE414C DESIGN PATTERNS (CORE ELECTIVE-I)

Course Educational Objectives:

CEO1: To understand the concepts of Design patterns to solve the design problems.
CEO2: To analyze and Apply the Knowledge of Design Patterns to develop a Document Editor.
CEO3: To study the creational patterns for developing the model.
CEO4: To Evaluate the structural patterns.
CEO5: To Manage the operational and extension patterns.

UNIT 1: Introduction (9)

What is a design pattern - Design patterns in small talk MVC - Describing design patterns - Catalog of design patterns - Organizing the catalog – How design patterns solve design problems – How to select a design pattern – How to use a design pattern

UNIT 2: A Case Study: Designing a Document Editor (9)

Design problems - Document structure - Formatting - Embellishing the user interface - Supporting multiple look and feel standards - Supporting multiple window systems - User operations - Spelling checking and hyphenation

UNIT 3: Creational Patterns (9)

Abstract factory - Builder – Factory method - Prototype - Singleton

UNIT 4: Structural Patterns (9)

Adapter - Bridge - Composite - Decorator - Façade – Flyweight - Proxy

UNIT 5: Operational and Extension Patterns (9)

Introducing operations - Template method - State - Strategy - Command – Interpreter - Iterator - Visitor - Mediator - Memento – Observer – Business Delegate Pattern – Composite Entity Pattern – Data Access Object Pattern – Front Controller Pattern – Intercepting Filter Pattern – Service Locator Pattern – Transfer Object Pattern

Course Outcomes:

On successful completion of this course, the students should be able to:

Course Outcomes		**POs related to Cos**
CO1	Describe solutions to programming problems using design patterns.	PO1, PO2

CO2	Develop and maintain programs using common design patterns and Frameworks.	PO1, PO2
CO3	Identify and implement appropriate solutions to recurring programming problems by consulting technical documentation and specifications, including design pattern catalogs and existing source code.	PO1, PO2, PO3, PO4
CO4	Evaluate the advantages and disadvantages of using design pattern variants.	PO1, PO2, PO3, PO4
CO5	Implement the design patterns such as Creational patterns (Singleton, Factory, Abstract Factory), Structural patterns (Adapter, Composite, Façade), Behavioral patterns (Iterator, Observer), etc.	PO1, PO2, PO3, PO4

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-
CO3	3	3	2	2	-	-	-	-	-	-	-	-
CO4	3	2	2	2	-	-	-	-	-	-	-	-
CO5	3	3	2	2	-	-	-	-	-	-	-	-
CO*	**3**	**2.4**	**2**	**2**	-	-	-	-	-	-	-	-

Text Books:

1. Design Patterns: Elements of Reusable Object Oriented Software, 1/e, Gamma, Belm, Johnson, 2012, Pearson Education, New Delhi, India.
2. Design patterns in java: Software Patterns Series, 1/e, Steven John Metsker, William C. Wake, 2006, Pearson Education, New Delhi.

References Books:

1. Design Patterns: Elements of Reusable Object Oriented Software, 1/e, Gamma, Belm, Johnson, 2008, Pearson Education, New Delhi, India.
2. Object Oriented Design and Patterns, 2/e, Horstmann, Wiley, 2012, Wiley India Pvt Ltd India.
3. Object Oriented Systems Development, 1/e, Ali Bahrami, 1999, McGrawHill, Hyderabad, India.
4. Applying UML Patterns, 3/e, Larman, 2008, Pearson Education, New Delhi, India.
5. Programming in the Large with Design Patterns, 3/e, Eddie Burris, 2012, Pretty Print Press, Leawood Kansas, Usa.

6. Head First Design Patterns, 3/e, Eric Freeman, Oreilly, 2004,SPD, Motilal UK Books, New Delhi, India.
7. Java Design Patterns, 1/e, Cooper, 2000, Pearson Education, New Delhi, India

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IV B. TECH I-SEMESTER (CSE)

L	T	P	C
3	0	0	3

18CSE414D FUZZY LOGIC AND NEURAL NETWORKS (CORE ELECTIVE-I)

Course Educational Objectives:

CEO1: To understand the concepts of fuzzy sets, knowledge representation using fuzzy rules, approximate reasoning, fuzzy inference systems.
CEO2: To learn fuzzy logic control and other machine intelligence applications of fuzzy logic.
CEO3: To understand the fundamental theory and concepts of neural networks, neuro modeling, several neural network paradigms and its applications.
CEO4: To learn various ANN architectures and its real-time applications.
CEO5: To understand the basics of an evolutionary computing paradigm known as genetic algorithms and its application to engineering optimization problems.

UNIT-1: INTRODUCTION TO FUZZY LOGIC PRINCIPLES (9)
Introduction to classical sets – properties - operations and relations; fuzzy sets - member ship - uncertainty - operations - properties - fuzzy relations - cardinalities - membership functions.
Fuzzification- member ship value assignment - development of rule base and decision making system - Defuzzification to crisp sets - Defuzzification methods.

UNIT-2: ADVANCED FUZZY LOGIC APPLICATIONS (9)
Fuzzy logic controllers – principles – review of control systems theory – various industrial applications of FLC adaptive fuzzy systems – fuzzy decision making – Multiobjective decision making – fuzzy classification – means clustering – fuzzy pattern recognition – image processing applications – systactic recognition – fuzzy optimization.

UNIT-3: INTRODUCTION TO ARTIFICIAL NEURAL NETWORKS (9)
Fundamentals of neural networks – model of an artificial neuron – neural network architectures – Learning methods – Taxonomy of Neural network architectures – Standard back propagation algorithms – selection of various parameters – variations Applications of back propagation algorithms.

UNIT-4: OTHER ANN ARCHITECTURES (9)
Associative memory – exponential BAM – Associative memory for real coded pattern pairs – Applications adaptive reasonance theory – introduction – ART 1 – ART2 – Applications – neural networks based on competition – kohenenself organizing maps – learning vector quantization – counter propagation networks – industrial applications.

UNIT-5: RECENT OPTIMIZATION TECHNIQUES (9)
Fundamentals of genetic algorithms – genetic modeling – hybrid systems – integration of fuzzy logic, neural networks and genetic algorithms – non traditional optimization techniques like ant colony optimization – Particle swarm optimization and artificial immune systems – applications in design and manufacturing.

Course Outcomes:

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On successful Completion of this course, students will be able to:

Course Outcomes		POs related to COs
CO1	Know the concepts of Fuzzy Logic.	PO1, PO2
CO2	Understand the concepts of Fuzzy Logic Implementation	PO1, PO2, PO3, PO4
CO3	Understand importance of soft computing.	PO1, PO5
CO4	Understand different soft computing techniques like, Fuzzy Logic, Neural Networks and their combination.	PO1, PO2, PO3, PO4
CO5	Implement recent optimization algorithms based on soft computing.	PO1, PO2, PO3, PO5

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	2	3	2	-	-	-	-	-	-	-	-
CO3	3	-	-	-	3	-	-	-	-	-	-	-
CO4	3	2	3	2	-	-	-	-	-	-	-	-
CO5	3	3	3	-	3	-	-	-	-	-	-	-
CO*	**3**	**2**	**3**	**2**	**3**	-	-	-	-	-	-	-

TEXT BOOKS:

1. Rajasekaran. S..VijayalakshmiPai. G.A. "Neural Networks, Fuzzy Logic and Genetic Algorithms", Prentice Hall of India Private Limited, 2003
2. Timothy J.Ross, "Fuzzy logic with Engineering Applications", McGraw Hill, 1995
3. Zurada J.M. "Introduction to Artificial Neural Systems", Jaico publishing house, 1994.

REFERENCE BOOKS:

1. Principles of- soft computing,2/e, S. N. Sivanandam and S.N.Deepa - Wiley indiapvt ltd-new Delhi.
2. Neural Networks and Learning Machines ,3/e,2009, Simon Haykin Phi Learning ,New delhi.
3. Soft Computing & Intelligent Systems ,1/e,Madan M Gupta ,Naresh K Sinha ,2007, Elsevier India Pvt Ltd, New delhi.

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IV B. TECH I-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	3	**0**	**0**	**3**

18CSE414E NETWORK MANAGEMENTSYSTEMS (CORE ELECTIVE-I)

Course Educational Objectives:

CEO1: To understand the principles of network management, different standards and protocols used in managing complex networks.
CEO2: To understand the Network Management concepts and practical issues related To SNMPv1.
CEO3: To analyze the Remote network monitoring by using new mechanisms.
CEO4: To demonstrate the working procedure of SNMPv2 for protocol operations.
CEO5: To study about the telecommunication management network

UNIT – 1: Data Communications and Network Management Overview (9)

Analogy of telephone network management – Data and telecommunication network – Distributed computing environments – TCP/ IP based networks - Communications protocols and standards - Case histories of networking and management - Network management: Goals – Organization - Functions - Network and system management

UNIT – 2: SNMPv1 (9)

SNMP network management concepts – Background – Basic concepts - SNMP management information – Structure of management information – Practical issues – Standard MIBs – MIB II – Ethernet interface MIB

UNIT – 3: RMON (9)

Remote network monitoring: statistics collection – Basic concepts – Statistics group – History group – Host group – Host TopN group – Matrix group – Token ring extensions to RMON – Remote network monitoring: alarms and filters – Alarm group – Filter group – Packet capture group – Event group – RMON2 – Overview – Protocol directory group – Protocol distribution group – Address map group – RMON2 host groups – RMON2 matrix groups – User history collection group – Probe configuration group – Extensions to RMON1 for RMON2 devices

UNIT – 4: SNMPv2 (9)

Management Information – Background – Structure of management information – Protocol – Protocol operations – Transport mappings – Coexistence with SNMPv1 – MIBS and conformance – SNMPv2 management information base – Conformance statements – Evolution of the interfaces group of MIB II

UNIT – 5: Telecommunications Management Network (9)

Why TMN? - Operations System - TMN Conceptual Model - TMN Standards - TMN Architecture - TMN Management Service Architecture - An Integrated View of TMN -Implementation Issues.

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Course Outcomes:

On successful completion of this course, the students should be able to:

Course Outcomes		POs related to COs
CO1	Acquire the knowledge about network management standards (OSI and TCP/IP)	PO1, PO2
CO2	Manage various network management protocols and the skills to use them in monitoring a network	PO1, PO2
CO3	Analyze the challenges faced by Network managers in remote network monitoring.	PO1, PO4
CO4	Evaluate various commercial network management systems and open network management systems.	PO1, PO2, PO4
CO5	Obtain knowledge about the telecommunication management network	PO1, PO2, PO12

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-
CO3	3	-	-	3	-	-	-	-	-	-	-	-
CO4	3	3	-	3	-	-	-	-	-	-	-	-
CO5	3	3	-	-	-	-	-	-	-	-	-	3
CO*	**3**	**3**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**

Text Books:

1. Network Management Principles and Practice, 2/e, Mani Subramanian, Addison Wesley, December, 2010, New York, USA.
2. SNMP SNMPv2 SNMPv3 and RMON 1 and 2, 3/e,William Stallings, Addison Wesley, 2006 New York, USA.

References Books:

1. Network Management Principles and Practice, 1/e, Mani Subramanian, Addison Wesley, December, 1999, New York, USA.
2. Practical Guide to SNMPv3 and Network Management, 1/e, David Zeltserman, May 1999 Prentice Hall, New Delhi, India.

3. Network Security and Management, 3/e, Brijendra Singh, 2012, PHI, New Delhi, India.
4. Network management, 1/e, Morris–2010, Pearson Education, New Delhi, India.
5. Principles of Network System Administration, 2/e, Mark Burges, Wiley Dreamtech, December 2003, India.
6. Distributed Network Management, 1/e,Paul, John Wiley Dreamtech ,September 1994, India.

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IV B. TECH I-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	3	**0**	**0**	**3**

18CSE415A SOFTWARE PROJECT MANAGEMENT (CORE ELECTIVE-II)

Course Educational Objectives:

CEO1: To Understand the fundamental principles of Software Project management & will also have good knowledge of responsibilities of project manager and how to handle these.
CEO2: To plan and manage projects at each stage of the software development life cycle (SDLC).
CEO3: To identify the steps of project planning, management, quality assurance and their relationships.
CEO4: To develop their skills for tracking, controlling software deliverables with in schedule and budget.
CEO5: To identify and develop the good knowledge of the issues and challenges faced while doing the software project.

UNIT 1: Understand the Basics (9)
Manage your people – Managing project culture – Managing good people – Making good people- better – Leading good people – Implement your process – Putting a process in place – implementing a process – Adopting an agile process – Assessing a process – Leverage your tools – Choosing tools –Training to use tools – Leveraging tools – Use your measurements – Selecting measurements –Planning measurement – Leveraging measurement.

UNIT 2: Project Life Cycle And Effort Estimation (9)
Software process and Process Models – Choice of Process models - Rapid Application development – Agile methods – Dynamic System Development Method – Extreme Programming– Managing interactive processes – Basics of Software estimation – Effort and Cost estimation techniques – COSMIC Full function points - COCOMO II - a Parametric Productivity Model.

UNIT 3: Artifacts of the Process and Model based Software Architectures (9)
The artifact sets - Management artifacts - Engineering artifacts - Programmatic artifacts – Model based software architectures - A management perspective and technical perspective - Workflows of the process - Software process workflows - Iteration workflows - Checkpoints of the process – Major milestones - Minor milestones - Periodic status assessments.

UNIT 4: **Iterative process planning- Project Organizations and Responsibilities (9)**
Work break down structures - Planning guidelines – The cost and schedule estimating process – The iteration planning process - Pragmatic planning -Line of business organizations - Project organizations - Evolution of organizations – Process automation - Automation building blocks - The project environment.

UNIT 5: Project Control and Process Instrumentation (9)
The seven core metrics - Management indicators - Quality indicators - Life cycle expectations -pragmatic software metrics - Metrics automation - Tailoring the process - Process discriminates-Example.

Course Outcomes:

On successful completion of this course, the students should be able to:

Course Outcomes		**POs related to COs**
CO1	Implement a project to manage project schedule, expenses and	PO1, PO2,PO3,PO4

	resources of application.	
CO2	Obtain adequate knowledge about software process models and software effort estimation techniques.	PO1, PO2
CO3	Design and develop project plans to address real-world management challenges.	PO1, PO2, PO3
CO4	Aware of project management theories, tools, techniques and methods to manage the software projects at each stage of software development life cycle.	PO1, PO2,PO3 PO4, PO5
CO5	Understand modern software project management principles as a member and leader in a team to manage the projects.	PO1, PO2

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	3	3	-	-	-	-	-	-	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-
CO3	3	3	3	-	-	-	-	-	-	-	-	-
CO4	3	3	3	3	2	-	-	-	-	-	-	-
CO5	2	2	-	-	-	-	-	-	-	-	-	-
CO*	**2.8**	**2.8**	**3**	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Text Books:

1. Software Project Management, 1/e, Walker Rayce, 1998, PEA, New Delhi.
2. Software Project Management, 2/e, Henrey, 2009, Pearson Education, New Delhi.

Reference Books:

1. Software Engineering Project Management, 2/e, Richard H. Thayer, 1997, IEEE Computer Society, US.
2. Software Engineering and Management, 2/e, Shere K. D 1998, PHI, New Delhi.
3. Software Project Management: A Concise Study, 2/e, S. A. Kelkar ,2009 , PHI, New Delhi.
4. Software Project Management, 5/e, Hughes Cotterell, 2011, TMH, India.
5. Software Project Management, 1/e, Mohapatra S 2011, Penguin Books Ltd, London, UK.
6. Bob Hughes, Mike Cotterell and Rajib Mall: Software Project Management – Fifth Edition, Tata McGraw Hill, New Delhi, 2012.
7. Robert K. Wysocki ―Effective Software Project Management‖ – Wiley Publication, 2011.

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IV B. TECH I-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	3	**1**	**0**	**3**

18CSE415B ADVANCED COMPUTER ARCHITECTURE (Core Elective-II)

Course Educational Objectives:

CEO1: To gain knowledge on different types of modern and high performance computers.
CEO2: To describe the types of Memory and the Processor Performance Principles.
CEO3: To understand the designs of Multiprocessor and Multi computer Architectures.
CEO4: To know the principles of Vector Processors and Multi-threading concepts.
CEO5: To analyze Instruction Level Parallelism in Parallel computers.

UNIT – 1: Parallel Computer Models - Program and Networks Properties (9)

The state of computing - Multiprocessors and multi computers- Multi vector and SIMD computers - PRAM and VLSI models - Architectural development tracks - Conditions of parallelism - Program partitioning and scheduling - Program flow mechanisms - System interconnect architectures

UNIT – 2: Principles of Scalable Performance- Processors and Memory Hierarchy (9)

Performance metrics and measures - Parallel processing applications - Speedup performance laws - Scalability analysis and approaches - Advanced processor technology - Superscalar and vector processors - Memory hierarchy technology

UNIT – 3: Bus- Cache - Shared Memory - Multiprocessors and Multicomputer (9)

Bus systems - Cache memory organizations - Shared memory organizations - Pipelining and super scalar techniques - Linear pipeline processors - Nonlinear pipeline processors - Instruction pipeline design - Arithmetic pipeline design - Multiprocessor system interconnects - cache coherence and synchronization mechanisms - Message passing mechanisms

UNIT – 4: Multi Vector and SIMD Computers (9)

Vector processing principles - Multi vector multiprocessors - Compound vector processing - SIMD Computer organizations - Scalable multithreaded and dataflow architectures - Latency hiding techniques - Principles of multithreading - Fine grain multi computers - Scalable and multithreaded architectures - Dataflow and hybrid architectures

UNIT – 5: Instruction Level Parallelism and its Dynamic Exploitation (9)

Concepts and challenges – Overcoming data hazards with dynamic scheduling - Dynamic scheduling – Reducing branch costs with dynamic hardware prediction – Advantages and Limitations of ILP – CPU GPU Integration.

Course Outcomes:

On successful completion of this course, the students should be able to:

Course Outcomes	**POs related to COs**

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CO1	Have knowledge on different types of Parallel computers.	PO1, PO2
CO2	Understand the Basic Concepts Used in Advanced Computers.	PO1, PO2, PO4
CO3	Understand the designs of Super Computer Architectures.	PO1, PO2, PO3
CO4	Analyze how computer performance can increase using Vector Processors and Multi-threading concepts.	PO1, PO2, PO3
CO5	Analyze the Instruction Level Parallelism in Parallel computers to increase speed.	PO1, PO2, PO3

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	3	-	-	-	-	-	-	-	-
CO3	3	3	3	-	-	-	-	-	-	-	-	-
CO4	3	3	3	-	-	-	-	-	-	-	-	-
CO5	3	3	3	-	-	-	-	-	-	-	-	-
CO*	**3**	**3**	**3**	**3**	-	-	-	-	-	-	-	-

Text Books:

1. Advanced Computer Architecture, 3/e, Kai Hwang and Jotwani, 2016, McGraw-Hill Publications,India.
2. Computer Architecture A quantitative approach, 5/e, JohnL.Hennessy and David A. Patterson, Morgan Kufmann Publication, 2012 (An Imprint of Elsevier).

Reference Books:

1. Advanced Computer Architecture, 2/e, Kai Hwang and Jotwani, 2010, McGraw-Hill Publications,India.
2. Advanced Computer Architecture, 1/e,D.Sima, T.Fountain, P.Kacsuk, 2010, Pearson Education, New Delhi.
3. Advanced Computer Architecture, 1/e, R.C.Dubey, 2010, Chand& Co Ltd,New Delhi, India.
3. Computer Architecture and Parallel Processing, 1/e,Hwang and Briggs, 1986, TMH, India.
4. Advanced Computer Architecture, 1/e, Amith Kumar Mishra, S K Kataria and Sons, 2012, New Delhi, India.
5. Advanced Computer Architectures. 1/e, Sajjan G. Shiva , 2005, CRC Press , US.

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IV B. TECH I-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	3	**0**	**0**	**3**

18CSE415C SOFT COMPUTING (CORE ELECTIVE-II)

Course Educational Objectives:

CEO 1: To learn the Basics of Artificial Neural Networks and Learning Algorithms.
CEO 2: To Understand appropriate learning rules for each of the architectures and learn several neural network paradigms.
CEO 3: To introduce the fuzzy logic concepts, fuzzy principles and relations.
CEO 4: To learn the Genetic Algorithm and its applications in soft computing.
CEO 5:.To study the Techniques of Hybrid Soft Computing and its Applications

UNIT - 1: Introduction to Artificial Neural Networks (ANN) (9)

Introduction - Fundamental concept - Basic models of ANN - Terminologies of ANN – MCCullochpitts neuron - Linear separability - Hebb network - Supervised learning network - Perception networks - Adaptive linear neuron - Back propagation network

UNIT - 2: Associative Memory Networks (9)

Training algorithms for pattern association - Auto associative memory network – BAM - Hopfield networks - Unsupervised learning network - Fixed weight competitive nets - Kohonenself organizing feature maps - Learning vector quantization - Counter propagation network - Adaptive Resonance theory network

UNIT – 3: Introduction to Fuzzy Logic (9)

Fuzzy sets - Classical relations and fuzzy relations - Cartesian product of relations - Classical relation - Fuzzy relations - Tolerance and equivalence relations - Membership functions - Features of the membership function – Fuzzification - Methods of membership value assignments - Defuzzification methods - Fuzzy arithmetic and fuzzy measures -Fuzzy rule base and approximate reasoning.

UNIT – 4: Genetic Algorithm and Applications (9)

Introduction - Biological background - Traditional optimization and search techniques - Genetic algorithm and search space - Terminologies in genetic algorithm - General genetic algorithm - Operators in genetic algorithm - Problem solving using genetic algorithm.

Advanced applications: Printed character recognization - Inverse kinematics problems - Automobile MPG prediction - Genetic algorithms in game playing

UNIT - 5: Hybrid Soft Computing Techniques & Applications (9)

Neuro-fuzzy hybrid systems – genetic neuro hybrid systems – genetic fuzzy hybrid and fuzzy genetic hybrid systems – simplified fuzzy ARTMAP
Applications: A fusion approach of multispectral images with SAR, optimization of traveling salesman problem using genetic algorithm approach, soft computing based hybrid fuzzy controllers.

Course Outcomes:

On successful completion of the course the student will be able to,

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Course Outcomes		POs related to COs
CO1	To understand the fundamental theory and concepts of neural networks, Identify different neural network architectures, algorithms, applications and their limitations	PO1, PO2
CO2	Understand appropriate learning rules for each of the architectures and learn several neural network paradigms and its applications	PO1, PO2, PO3, PO4
CO3	Comprehend the fuzzy logic and the concept of fuzziness involved in various systems and fuzzy set theory	PO1, PO2
CO4	List the facts and outline the different process carried out in Genetic Algorithms and their applications	PO1, PO3, PO5
CO5	Understand the concepts of Hybrid Soft Computing Techniques and its Applications	PO1, PO2, PO4, PO5

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	3	3	-	-	-	-	-	-	-	-
CO3	3	3	-	-	-	-	-	-	-	-	-	-
CO4	3	3	-	-	3	-	-	-	-	-	-	-
CO5	3	3	-	3	3	-	-	-	-	-	-	-
CO*	**3**	**3**	**3**	**3**	**3**	-	-	-	-	-	-	-

Text Books:

1. Principles of Soft Computing, 3/e , S.N. Sivanandam and S.N. Deepa, 2018 Wiley India Ltd, First Indian Edition, India.
2. Neuro-Fuzzy and Soft Computing, 1/e, Jyh-Shing Roger Jang, Chuen, Tsai Sun, EijiMizutani,2003, Prentice-Hall of India,India.

Reference Books:

1. Principles of Soft Computing, 1/e , S.N. Sivanandam and S.N. Deepa, 2007 Wiley India Ltd, First Indian Edition, India.
2. Neural Networks Algorithms Applications, and Programming Techniques, James A. Freeman and David M. Skapura, 2003, PearsonEdition, India.
3. Fuzzy Sets and Fuzzy Logic-Theory and Applications, George J. Klir and Bo Yuan, 1995, Prentice Hall, India.
4. Artificial Intelligence and Soft Computing, AmitKonar, 2000, CRC Press, First Edition, India.
5. Neural Networks: A Comprehensive Foundation, 2/e, Simon Haykin, 2008, Pearson Education, New Delhi, India.
6. Soft Computing and Intelligent System Design, 1/e,Fakhreddine O. Karry Clarence de Silva2009, Pearson Education, New Delhi, India.

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IV B. TECH I-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	2	**1**	**0**	**3**

18CSE415D SYSTEM MODELING AND SIMULATION (CORE ELECTIVE-II)

Course Educational Outcomes:

CEO1: To gain knowledge about the system and principles used for modeling.
CEO2: To understand different random number generation techniques for evaluating the system.
CEO3: To analyze numerical computation techniques for continuous and discrete models.
CEO4: To study System Dynamics and Probability Concepts in Simulation.
CEO5: To perform Discrete System Simulation for real time scenarios

UNIT – 1: Introduction to Simulation and System Models (9)

The concepts of a system - System environment - Stochastic activities - Continuous and discrete systems - System modeling - Types of models - Static and dynamic physical models - Static and dynamic mathematical models - Principles used in modeling - Advantages and disadvantages of simulation - Areas of application - Systems and system environment - Discrete event system simulation - Steps in a simulation study

UNIT – 2: Random Numbers (9)

Random number generation - Properties of random numbers - Generation of pseudo random numbers - Techniques of generating random numbers - Linear congruential method - Tests for random numbers - Random variate generation - Inverse transform technique - Exponential distribution - Uniform distribution - Weibull distribution - Empirical continuous distribution – Direct transformation for normal distribution – Convolution method - Erlang distribution - Acceptance-rejection technique

UNIT – 3: System Simulation and Continuous System Simulation (9)

Types of system simulation - Monte carlo method - Comparison of simulation and analytical methods - Numerical computation techniques for continuous and discrete models - Distributed lag models - Cobweb model - Continuous system models - Analog and hybrid computers - Digital analog simulators - Continuous system simulation languages - Hybrid simulation - Real time simulations

UNIT – 4: System Dynamics and Probability Concepts in Simulation (9)

Exponential growth and decay models - Logistic curves - Generalization of growth models - System dynamics diagrams - Multi segment models - Representation of time delays - Discrete and continuous probability functions - Continuous uniformly distributed random numbers

UNIT – 5: Arrival Patterns and Discrete System Simulation (9)

Poisson arrival patterns - Exponential distribution - Hyper exponential distribution - Service times – The normal distribution - Queuing disciplines – Measures of queues – Discrete events – Representation of time – Generation of arrival patterns – Simulation of a telephone system – Delayed calls – Simulation

programming tasks – Gathering statistics – Counters and summary statistics – Measuring utilization and occupancy – Recording distribution and transit times – Discrete simulation languages

Course Outcomes:

On successful completion of this course, the students should be able to:

Course Outcomes		POs related to COs
CO1	Acquire the knowledge about system and principles used for modeling.	PO1, PO2
CO2	Use random number generation techniques to solve the issues in system.	PO1, PO2, PO5
CO3	Analyze the hybrid and real time simulations using continuous system simulation.	PO1, PO2
CO4	Understand the System Dynamics and Probability Concepts in Simulation.	PO1, PO2, PO4
CO5	Develop the simulation for real time scenarios	PO1, PO2, PO3, PO4, PO5

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	-	3	-	-	-	-	-	-	-
CO3	3	3	-	-	-	-	-	-	-	-	-	-
CO4	3	3	-	3	-	-	-	-	-	-	-	-
CO5	3	3	3	3	3	-	-	-	-	-	-	-
CO*	**3**	**3**	**3**	**3**	**3**	-	-	-	-	-	-	-

Text Books:

1. System simulation, 2/e, GeoffreyGorden, 2006,Prentice Hall of India, New Delhi,India.
2. Discrete Event System Simulation, 2/e, Jerry Banks,John Carson, Barry L.Nelson and David Nicol -2000, Prentice Hall Inc, New Delhi , India.

Reference Books:

1. Simulation Modeling, 1/e,Seila ,Cengage Learning,2003, New Delhi, India.
2. Simulation Modeling and Analysis, 3/e, Law, 2000 McGraw-Hill, Hyderabad, India.
3. System Simulation with Digital Computer, 2/e, Deo, 1983 PHI, NewDelhi, India.
4. Simulation Modeling Methods, 1/e, Harrington, 2000,McGraw-Hill, Hyderabad, India.
5. System Modeling and Simulation, 1/e, Severance,2001,WileyPublications,New Delhi, India

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IV B. TECH I-SEMESTER (CSE)

L	T	P	C
3	0	0	3

18CSE415E IMAGE PROCESSING (CORE ELECTIVE-II)

Course Educational Objectives:

CEO1 : To understand the fundamentals of Digital imaging
CEO2 : To understand the Image Processing techniques
CEO3 : To understand the image enhancement techniques
CEO4 : To be familiar with image compression
CEO5 : To be familiar with image segmentation

Unit – I **(9)**

Introduction: Fundamentals of Image Processing, Applications of Image Processing, Human Visual Perception, Introduction to Image Formation, Sampling and Quantization, Binary Image, Three-Dimensional Imaging, Image file formats. Color and Color Imagery: Perception of Colors.

Unit – II **(9)**

Image Transformation: Fourier Transforms, Discrete Cosine Transform, Walsh-adamard Transform, Karhaunen-Loeve Transform or PCA. Discrete Wavelet Transform: Wavelet Transform, Extension to 2D Signals, Lifting Implementation of the Discrete Wave Transforms.

Unit – III **(9)**

Image Enhancement and Restoration : Introduction, Distinction between image enhancement and restoration, Histrogram-based Contrast Enhancement, Frequency Domain Methods of Image Enhancement, Noise Modeling, Image Restoration, Image Reconstruction, Image Segmentation.

Unit – IV **(9)**

Recognition of Image Patterns : Introduction, Decision Theoretic Pattern Classification, Baesian Decision Theory, Nonparametric Classification, Linear Discriminant Analysis, Unsupervised Classification Strategies-clustering, K-means clustering algorithm, Syntactic Pattern Classification, Syntactic Inference, Symbolic Projection method. Texture and Shape Analysis.

Unit – V **(9)**

Fuzzy Set Theory in Image Processing : Introduction, Use of Fuzzy Image, Preliminaries and Background, Image as a Fuzzy Set, Fuzzy Methods of Contrast Enhancement, Image Segmentation using Fuzzy Methods, Fuzzy Approaches to Pixel Classification, Fuzzy c-Means Algorithm, Fusion of Fuzzy logic with neural network. Image mining and Content-Based Retrieval.

Course Outcomes:

Course Outcomes		**POs related to COs**
CO1	Understand the design and apply image enhancement and restoration	PO1,PO2

	techniques	
CO2	Ability to design and develop image processing techniques for assisting digital forensics	PO1,PO2,PO7
CO3	Understand the different image restoration techniques	PO5,PO7
CO4	Ability to apply image compression Techniques	PO2,PO3,PO4
CO5	Ability to apply segmentation Techniques	PO2,PO3,PO4

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	-	-	-	3	-	-	-	-	-
CO3	-	-	-	-	3	-	3	-	-	-	-	-
CO4	-	3	3	3	-	-	-	-	-	-	-	-
CO5	-	3	3	3	-	-	-	-	-	-	-	-
CO*	**3**	**3**	**3**	**3**	**3**	-	**3**	-	-	-	-	-

Text Book

1. Maria Petrou and Costas Petrou , “Image Processing the Fundamentals”, John-Wiley and Sons Publishers, 2nd edition, 2010
2. Rafael C. Gonzalez , Richard E. Woods, Steven L. Eddins, "Digital Image Processing Using MATLAB", 2nd edition, Gatesmark Publishing, 2009
3. TinkuAcharya and Ajoy K. Ray, “Image Processing Principles and Applications”, John Wiley & Sons publishers, 2005

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IV B.Tech I Semester

L	T	P	C
3	0	0	3

18OSAH411 GRAPH THEORY WITH APPLICATIONS
(OPEN ELECTIVE-II)

Course Educational Objectives:

1. The course is designed to equip the students with the necessary mathematical skills and techniques that are essential for an engineering course.
2. To learn the representation of graphs and understanding the Graph Isomorphism, Sub graph-Vertex degrees, Walk, Paths, Cycles-graph connection, Bipartite graphs.
3. To understand the Trees concepts, digraphs, binary relations, Shortest path algorithms and to familiarize the knowledge of graph theory
4. To understand the matrix representation of graphs, designing incidence matrix, Adjacency matrix and circuit matrix
5. To explore the use of graphs in various applications in Switching and Coding Theory. Also, to identify the important graph based real time applications of electrical networks such as RLC Networks with Independent sources, LOOP circuits

UNIT – 1: GRAPH THEORY INTRODUCTION (9)

Graph and simple graphs (Complete graphs, Complement of graph) - Graph isomorphism–Sub graph-Vertex degrees, walk, paths, cycles-graph connection and components-Bipartite graphs.

UNIT – 2: DIRECTED GRAPHS AND SHORTEST PATH ALGORITHMS (9)

Trees – Cut edges- Cut vertices-Blocks , Directed graphs types of directed graphs - digraphs and binary relations – directed paths and connectedness - Dijkstra's shortest path algorithm, Floyd-Warshall shortest path algorithm

UNIT – 3: MATRIX REPRESENTATION OF GRAPHS (9)

Introduction - Adjacency matrix -Applications of Adjacency matrix-sufficient condition for isomorphism of graphs-power of an adjacency matrix-Adjacency matrix of a digraph-incidence matrix-circuit matrix-cut set matrix.

UNIT – 4: GRAPHS IN SWITCHING AND CODING THEORY (9)

Contact Networks – Analysis of Contact Networks – Synthesis of Contact Networks – Sequential Switching Networks – Unit Cube and its Graph – Graphs in Coding Theory.

UNIT – 5: ELECTRICAL NETWORK ANALYSIS BY GRAPH THEORY (9)

Introduction - Kirchhoff's current and Voltage laws-Loop currents and Node Voltages- RLC Networks with Independent sources: Nodal analysis, Loop analysis.

TOTAL: 45 HOURS

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
(AUTONOMOUS)
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Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to COs**
CO1	Demonstrate knowledge in reading and writing rigorous mathematical proofs involving introductory aspects of graphs and develop analytical skills in solving graph theoretic problems	**PO1,PO2,PO3 PO4**
CO2	Demonstrate knowledge in Trees concepts, digraphs, binary relations, and Develop analytical skills in solving problems involving directed graphs and shortest path algorithm	**PO1,PO2,PO3 PO4**
CO3	Demonstrate knowledge in matrix representation of graphs, designing incidencematrix, Adjacency matrix and circuit matrix and explore analytical skills in solving problems involving adjacency matrix and incidence matrix	**PO1,PO2,PO3 PO4**
CO4	Demonstrate knowledge in significant practical applications of graphs in Switching and Coding Theory; explore analytical skills in solving practical problems using graph theory concepts and Develop skills in designing Mathematical models for real time applications in coding theory.	**PO1,PO2,PO3 PO4**
CO5	Demonstrate knowledge in significant real time applications of electrical networks such as RLC Networks Independent sources; explore analytical skills in solving practical problems involving using graph theory concepts and Develop skills in designing Mathematical models for real time electrical networks.	**PO1,PO2,PO3 PO4**

Text Books:

1. Discrete mathematical structures with applications to computer science. J.P.Trimblay and R.Manohar , 27/e, Tata Mc Graw Hill Publications , 2006, New Delhi.
2. Graph Theory with applications to engineering and computer Science, NarasinghDeo, 25/e, Printice – Hall of India Private Limited, 2003, New Delhi

Reference Books:

1. Clark J. And Holton D.A., " A first look at Graph theory", Allied Publishers, 1990.
2. R.B.Bapat , Graphs and Matrices, Springer, London Dordrecht Heidelberg, New York, 2010
3. Gary Haggard John Schlipf, Sue Whitesides, Discrete Mathematics for Computer Science, 4/e, 2007, Thomson Publication, 2008, New Delhi.
4. S.D Sharma ,KedarNath Ram Nath Operation Research & Co, Meerut . 2007.
5. J.A.Bonday and U.S.R. Murty, Graph Theory with application (2nd Edition), North Holland, 1976 .

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	3	3	3	2	-	-	-	-	-	-	-	-
CO.2	3	3	3	2	-	-	-	-	-	-	-	-
CO.3	3	3	3	2	-	-	-	-	-	-	-	-
CO.4	3	3	3	2	-	-	-	-	-	-	-	-

CO.5	3	3	3	2	-	-	-	-	-	-	-	-
CO*	**3**	**3**	**3**	2	-	-	-	-	-	-	-	-

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IV B.Tech I Semester

L	T	P	C
3	0	0	3

18OSAH412 BANKING AND INSURANCE
(OPEN ELECTIVE-II)

Course Educational Objectives:

1. To introduce students to the banking sector and its operations.
2. To provide elaborate knowledge on functions of banking
3. To enable students to understand the digital technology in banking
4. To provide an understanding of insurance and risk management
5. To enable students to gain knowledge on various insurance organizations.

UNIT – 1: INTRODUCTION TO BANKING (9)

Meaning and functions of banking, importance of banking, Reserve Bank of India- Functions.

UNIT – 2: BANK-CUSTOMER RELATIONSHIP (9)

Debtor-creditor relationship, deposit products or services, payment and collection of cheques. Accounts – Types of accounts, procedure for opening and closing an account. Loans and Advances- Principles of lending, Types of loans.

UNIT – 3: BUSINESS MODELS & ELECTRONIC PAYMENT SYSTEM (9)

Features, types of e-payment system, e-cash, NEFT, RTGS, Credit cards, Electronic Wallet and Debit cards. Business models- B2B, B2C, C2C, and B2G.

UNIT – 4: INTRODUCTION TO RISK AND INSURANCE (9)

Concept of risk, risk Vs uncertainty. Insurance definition, Insurance as risk mitigation mechanism, elements of insurance.

UNIT – 5: INSURANCE OVERVIEW (9)

Principles of insurance, insurance types, LIC & GIC, insurance - functions, IRDA, Insurance Players in India.

TOTAL: 45 HOURS

Course Outcomes:

On successful completion of the course, Students will be able to		POs related to COs
CO1	Demonstrate Knowledge in Tools and concepts of Banking.	**PO11, PO12**
CO2	Explain the operations and functions of banking towards customers	**PO7, PO11**
CO3	Apply skills in providing solutions for Online banking and e payment	**PO7,PO11, PO12**
CO4	Employ the risk management practices especially the insurance mechanism.	**PO9,PO11**
CO5	Classify the various types of Insurance and understand the principles behind insurance	**PO7, PO11**

Text Book:

1. A.V. Ranganadha Chary, R.R. Paul, Banking and Financial System, Kalyani Publisher, New Delhi, 2nd Edition.
2. P.K.Gupta, Insurance and Risk Management, Himalaya Publishing House, New Delhi.

Reference Books:

1. Diwan, Praq and Sunil Sharma, Electronic Commerce- A Manager's Guide to E-Business, Vanity Books International, Delhi, 2002.
2. Kalakota Ravi and Whinston Andrew B, Frontiers of Electronic Commerce, Pearson Education India, 1996 New Delhi.
3. Schneider, Gr ey P, Ele ctron ic Com merce , Cou rse Technology, Cengage Learning, 8th Edition, New Delhi, 2008.

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	-	-	-	-	-	-	-	-	-	-	2	2
CO.2	-	-	-	-	-	-	2	-	-	-	3	-
CO.3	-	-	-	-	-	-	3	-	-	-	3	2
CO.4	-	-	-	-	-	-	-	-	2	-	3	-
CO.5	-	-	-	-	-	-	2	-	-	-	3	-
CO*	**-**	**-**	**-**	**-**	**-**	**-**	**2.33**	**-**	**2**	**-**	**2.8**	**2**

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IV B.Tech I Semester

L	T	P	C
3	0	0	3

18OSAH413 MANAGING INNOVATION AND ENTREPRENEURSHIP
(OPEN ELECTIVE-II)

Course Educational Objectives:

1. To enable students understand the importance of innovation in business practices
2. To enable students to innovate new methods and practices in business using innovation approaches
3. To provide knowledge on raising finance for starting new business
4. To enable students to protect their innovation through patent and copyright
5. To motivate students to become successful entrepreneurs through constant innovation

UNIT – 1: CREATIVITY AND INNOVATION (9)

Introduction, Levels of Innovation, the Sources of Innovative Opportunity, The Innovation Process, Innovative Strategies, Creativity – Inbound, Outbound; Context and Process of New Product Development.

UNIT – 2: PARADIGMS OF INNOVATION (9)

Innovation in the Context of Developed Economies and Emerging Economies, Performance gap, Infrastructure gap, Sustainability gap, Regulatory gap, Preference gap.

UNIT – 3: INTELLECTUAL PROPERTY INNOVATION AND ENTREPRENEURSHIP (9)

Introduction to Entrepreneurship, Managerial and Entrepreneurial Competencies, Entrepreneurial Growth and Development, Intellectual Property – Forms of IP, Patents, Trademarks, Design Registration, Copy Rights, and Patent Process in India.

UNIT – 4: OPEN INNOVATION FRAMEWORK & PROBLEM SOLVING (9)

Concept of Open Innovation Approach, Limitations and Opportunities of Open Innovation Framework, Global Context of Strategic Alliance, Problem Identification and Problem Solving, Innovation and Diversification.

UNIT – 5: SOURCES OF FINANCE AND VENTURE CAPITAL (9)

Importance of Finance, Strategies of Venture Funding, Investment Process, Advantages and Disadvantages of Venture Capital, Venture Capital Developments in India.

TOTAL: 45 HOURS

Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to COs**
CO1	Demonstrate the principles of business innovation and entrepreneurship for establishing industrial ventures..	**PO9,PO11**
CO2	Apply the approaches to innovation for developing successful ventures	**PO9, PO11**
CO3	Develop a comprehensive and well planned acquisition of finance for a	**PO9,PO10,PO11**

	new venture	
CO4	Exhibit entrepreneurial competencies and protect the innovations	**PO9,PO11**
CO5	Apply ethics in constructive innovation framework.	**PO8, PO11,PO12**

Text Books:

1. Vi nn ie Ja uha ri , S ud han sh u B hu sha n, I nn ov at ionManagement, Oxford University Press, 1st Edition, 2014.
2. Drucker, P. F., Innovation and Entrepreneurship, Taylor & Francis, 2nd Edition, 2007.

Reference Books:

1. Robert D Hisrich, Claudine Kearney, Managing Innovation and Entrepreneurship, Sage Publications, 1st Edition, 2014.
2. V.K.Narayanan, Managing Technology and Innovation for Competitive Advantage, Pearson India, 1st Edition, 2002.

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	-	-	-	-	-	-	-	-	-	-	1
CO.2	3	-	-	-	-	-	-	-	-	-	-	1
CO.3	3	-	-	-	-	-	-	-	-	-	-	1
CO.4	3	-	-	-	-	-	-	-	-	-	-	1
CO.5	3	-	-	-	-	-	-	-	-	-	-	1
CO*	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	1

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IV B.Tech I Semester

L	T	P	C
3	0	0	3

18OCIV411 TRANSPORT AND ENVIRONMENT
(OPEN ELECTIVE-II)

Course Educational Objectives:

1. The objective of this course is to create an awareness / overview of the impact of Transportation Projects on the environment and society.
2. To improve the environmental impact predictions
3. To study the water, air, land and noise assessment
4. To study the environmental mitigation.
5. To study the environmental case studies

UNIT – 1: INTRODUCTION (9)

Environmental inventory, environmental assessment, environmental impact assessment (EIA), environmental impact of transportation projects, need for EIA, EIA guidelines fortransportation project, historical development.

UNIT – 2: METHODOLOGIES (9)

Elements of EIA – Screening and scoping – Methods of impact analysis – Applications –appropriate methodology.

UNIT – 3: ENVIRONMENTAL IMPACT, PREDICTION AND ASSESSMENT (9)

Prediction and assessment of impact of transportation project at various stages on water, air, noise, land acquisition and resettlement, socio economic impact, indigenous people, aesthetics, health and safety, energy studies, IRC guidelines.

UNIT – 4: ENVIRONMENTAL MITIGATION AND MANAGEMENT PLAN (9)

Mitigation of the impact on natural and man-made environment, health, water, land, noise, air, public participation, environmental management plan, energy conservation, methods to reduce global warming.

UNIT – 5: NETWORK INTRUSION DETECTION AND PREVENTION SYSTEMS (9)

EIA case studies on highway, railway, airways and waterways projects.

TOTAL: 45 HOURS

Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to COs**
CO1	Explain the impact of transportation projects on the environment	**PO1, PO2**
CO2	Demonstrate the impact of environmental laws on transportation projects	**PO1, PO2 ,**
CO3	Demonstrate the impact of transportation project on the water, air, land and noise	**PO1, PO2**
CO4	Explain the environmental mitigation	**PO1**
CO5	Analyses the environmental case studies	**PO1, PO2 ,**

Text Books:

1. Environmental Impact Assessment, Canter, L.R., 1996, McGraw Hill, New Delhi.
2. Indian Road Congress (IRC), Environmental Impact of Highway Projects, IRC, 1998, Delhi.
3. Elements of Environmental Science and Engineering, P. Meenakshi, 2006, Prentice Hall of India, New Delhi.
4. Introduction to Environmental Science and Management, Thirumurthy A.M., 2005, Shroff Publishers, Bombay.

Reference Books:

1. John G.Rau and David, C.Hooten, Environmental Impact Analysis Handbook, McGraw Hill Book Company, 1995.
2. James H.Banks, Introduction to Transportation Engineering, McGraw Hill Book Company, 2000.
3. A Handbook on Roads and Environment, World Bank, Vol.I and II, 1997, Washington DC.
4. International Encyclopedia of Ecology and Environment – EIA, Indian Institute of Ecology and Environment, Priya Ranjan Trivedi, 1998, New Delhi, Hyderabad: Indian Green Building Council.

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	2	3	-	-	-	-	-	-	-	-	-	-
CO.2	1	2	-	-	-	-	-	-	-	-	-	-
CO.3	2	2	-	-	-	-	-	-	-	-	-	-
CO.4	3	-	-	-	-	-	-	-	-	-	-	-
CO.5	2	3	-	-	-	-	-	-	-	-	-	-
CO*	**2**	**2**	-	-	-	-	-	-	-	-	-	-

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IV B.Tech I Semester

L	T	P	C
3	0	0	3

18OCIV412 DISASTER MANAGEMENT
(OPEN ELECTIVE-II)

Course Educational Objectives:

1. To explain disasters, their significance and types.
2. To demonstrate the disaster prevention and risk reduction methods.
3. To gain a preliminary understanding of approaches of Disaster Risk Reduction (DRR).
4. To enhance awareness of institutional processes in the country.
5. To explain the disaster management case studies

UNIT – 1: INTRODUCTION TO DISASTERS (9)

Definition: Disaster, hazard, vulnerability, resilience, risks – Disasters: types of disasters –Earthquake, landslide, flood, drought, fire etc – Classification, causes, impacts including social, economic, political, environmental, health, psychosocial, etc. – Differential impacts in terms of caste, class, gender, age, location, disability – Global trends in disasters: urban disasters, pandemics, complex emergencies, climate change – Dos and don'ts during various types of disasters.

UNIT – 2: APPROACHES TO DISASTER RISK REDUCTION (DRR) (9)

Disaster cycle – Phases, culture of safety, prevention, mitigation and preparedness communitybased DRR, structural – Nonstructural measures, roles and responsibilities of community,panchayat raj institutions/urban local bodies (PRIs/ULBs), states, centre, and other stakeholders – Institutional processes and framework at state and central level – State disaster management authority (SDMA) – Early warning system – Advisories from appropriate agencies.

UNIT – 3: INTER-RELATIONSHIP BETWEEN DISASTERS AND DEVELOPMENT (9)

Factors affecting vulnerabilities, differential impacts, impact of development projects such as dams, embankments, changes in land use etc. – Climate change adaptation – IPCC scenario and scenarios in the context of India – Relevance of indigenous knowledge, appropriate technology and local resources.

UNIT – 4: DISASTER RISK MANAGEMENT IN INDIA (9)

Hazard and vulnerability profile of India, components of disaster relief: water, food, sanitation, shelter, health, waste management, institutional arrangements (mitigation, response and preparedness, disaster management act and policy – Other related policies, plans, programs and legislation – Role of GIS and information technology components in preparedness, risk assessment, response and recovery phases of disaster – Disaster damage assessment.

UNIT – 5: DISASTER MANAGEMENT: APPLICATIONS, CASE STUDIES &FIELD WORK (9)

Landslide hazard zonation: case studies, earthquake vulnerability assessment of buildings and infrastructure: case studies, drought assessment: case studies, coastal flooding: storm surge assessment, floods: fluvial and pluvial flooding: case studies; forest fire: case studies, man-made disasters: case studies, space based inputs for disaster mitigation and management and field works related to disaster management.

TOTAL: 45 HOURS

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Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to COs**
CO1	Differentiate the types of disasters, causes and their impact on environment and society	**PO1, PO2**
CO2	Assess vulnerability and various methods of risk reduction measures as well as mitigation	**PO1, PO2**
CO3	Draw the hazard and vulnerability profile of India, Scenarious in the Indian context, Disaster damage assessment and management	**PO1, PO2**
CO4	To analyse the disaster management techniques	**PO1, PO2 ,PO3**
CO5	To describe the situations of disaster management case studies	**PO1, PO2 ,**

Text Books:

1. Disaster Management, Singhal J.P. 2010, Laxmi Publications, ISBN-10: 9380386427; ISBN-13: 978-9380386423
2. Disaster Science and Management, Tushar Bhattacharya, 2012, McGraw Hill India Education Pvt. Ltd., ISBN-10: 1259007367, ISBN-13: 978-1259007361

Reference Books:

1. Govt. of India: Disaster Management Act, Government of India, 2005, New Delhi.
2. Government of India, National Disaster Management Policy, 2009.
3. Environmental Knowledge for Disaster Risk Management, NIDM, Gupta Anil K, Sreeja S. Nair. 2011, New Delhi.
4. Vulnerable India: A Geographical Study of Disasters, KapurAnu 2010, IIAS and Sage Publishers, New Delhi.

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	2	2	-	-	-	-	-	-	-	-	-	-
CO.2	1	3	-	-	-	-	-	-	-	-	-	-
CO.3	2	2	-	-	-	-	-	-	-	-	-	-
CO.4	1	1	3	3	-	-	-	-	-	-	-	-
CO.5	2	3	-	-	-	-	-	-	-	-	-	-
CO*	**1.6**	**2.6**	**3**	**3**	-	-	-	-	-	-	-	-

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
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IV B.Tech I Semester

L	T	P	C
3	0	0	3

18OCIV413 AIR POLLUTION AND CONTROL
(OPEN ELECTIVE-II)

Course Educational Objectives:

1. To impart knowledge on the principle and design of control of indoor.
2. To study about meteorology.
3. To learn about particulate/ gaseous air pollutant and its emerging trends.
4. An understanding of the nature and characteristics of air pollutants, noise pollution and basic concepts of air quality management
5. Ability to identify, formulate and solve air and noise pollution problems

UNIT – 1: INTRODUCTION (9)

Structure and composition of atmosphere – Definition, scope and scales of air pollution –Sources and classification of air pollutants and their effect on human health, vegetation, animals, property, aesthetic value and visibility – Ambient air quality and emission standards – Ambient and stack sampling and analysis of particulate and gaseous pollutants.

UNIT – 2: METEOROLOGY (9)

Effects of meteorology on air pollution – Fundamentals, atmospheric stability, inversion, wind profiles and stack plume patterns – Atmospheric diffusion theories – Dispersion models, plume rise.

UNIT – 3: CONTROL OF PARTICULATE CONTAMINANTS (9)

Factors affecting selection of control equipment – Gas particle interaction – Working principle, design and performance equations of gravity separators, centrifugal separators fabric filters, particulate scrubbers, electrostatic precipitators – Operational considerations.

UNIT – 4: CONTROL OF GASEOUS CONTAMINANTS (9)

Factors affecting selection of control equipment – Working principle, design and performance equations of absorption, adsorption, condensation, incineration, bio scrubbers, bio filters – Process control and monitoring – Operational considerations.

UNIT – 5: INDOOR AIR QUALITY MANAGEMENT (9)

Sources types and control of indoor air pollutants, sick building syndrome types – Radon pollution and its control – Sources and effects of noise pollution – Measurement – Standards– Control and preventive measures

TOTAL: 45 HOURS

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
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Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to COs**
CO1	To impart knowledge on the principle and design of control of indoor.	**PO1, PO2**
CO2	To study about meteorology.	**PO1, PO2**
CO3	To learn about particulate/ gaseous air pollutant and its emerging trends.	**PO1, PO2**
CO4	An understanding of the nature and characteristics of air pollutants, noise pollution and basic concepts of air quality management	**PO1, PO2 ,PO3,PO4**
CO5	Ability to identify, formulate and solve air and noise pollution problems	**PO1, PO2 ,**

Text Books:

1. Air Pollution Control Engineering, Lawrence K. Wang, Norman C. Pareira, Yung Tse Hung, 2004, Tokyo.
2. Air Pollution and Control Technologies, Anjaneyulu. Y, 2002, Allied Publishers (P) Ltd., India.

Reference Books:

1. Air Pollution, David H.F. Liu, Bela G. Liptak, 2000, Lweis Publishers.
2. Air Pollution (Vol.I – Vol.VIII), Arthur C.Stern, 2006, Academic Press.
3. Air Pollution Engineering Manual, Wayne T.Davis, 2000, John Wiley & Sons, Inc.
4. Air Pollution Control Engineering, Noel de Nevers, 1995, McGraw Hill, New York.

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	2	3	-	-	-	-	-	-	-	-	-	-
CO.2	1	3	-	-	-	-	-	-	-	-	-	-
CO.3	2	3	-	-	-	-	-	-	-	-	-	-
CO.4	1	1	3	3	-	-	-	-	-	-	-	-
CO.5	2	3	-	-	-	-	-	-	-	-	-	-
CO*	**1.6**	**2.6**	**3**	**3**	-	-	-	-	-	-	-	-

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IV B.Tech I Semester

L	T	P	C
3	0	0	3

18OEEE411 WIND ENERGY CONVERSION SYSTEMS
(OPEN ELECTIVE-II)

Course Educational Objectives:

1. To make the student know various methods of measuring wind speed and facilities available for storage of such data.
2. To train the students to design the blade of a wind turbines.
3. To make the student understand methods for sitting a wind farm.
4. To make the student understand economics of establishing wind system.
5. To make the student know the applications of wind turbine.

UNIT – 1: INTRODUCTION (9)

Modern wind turbines, wind resources, wind vs. traditional electricity generation, technology advancements, material Usage. Applications: grid connected power, industrial applications, stand-alone system, water pumping, offshore prospects Introduction of Wind Resource Assessment , spatial variation, time variations, seasonal and monthly variability, diurnal variations. Characteristics of steady wind: turbulence, types of turbulence models, turbulence intensity.

UNIT – 2: WIND MEASUREMENT (9)

Vertical profiles of the steady wind. Wind speed measurement parameters, Monitoring station instrumentation, cup anemometer, propeller anemometer, Ultrasound anemometer, wind vane, data loggers, remote wind speed sensing techniques- Sodar, Lidar, SAR, LWS, Satellite remote sensing, Aerofoil, two dimensional airfoil theory, relative wind velocity. Wind flow models, wind flow pattern. Axial momentum theory, Momentum theory, blade element theory. Wind machine characteristics.

UNIT – 3: WIND TURBINES (9)

Historical development. Classification of wind turbines. Turbine components. Wind turbine design of Wind turbine, rotor torque and power, Power control, braking systems. Turbine blade design. Blade material, SERI blade sections. Transmission and generation efficiency, Energy production and capacity factor, Torque at constant speeds, Drive train oscillations.

UNIT – 4: ELECTRICAL AND CONTROL SYSTEMS (9)

Introduction to electricity and magnetism. Classification of generators, AC circuits, Synchronous generators, Induction generators, Variable speed generators. Control systems. Power Collection system. Power quality, wind farm and generation protection, interface protection, losses in generation. Asynchronous Load: Piston water pumps, Centrifugal pumps, Paddle wheel heaters, Batteries.

UNIT – 5: WIND FARM DESIGN (9)

Introduction, wind flow modeling, use of capacity factor for wind farm design, planning of wind farm. Siting of wind turbines, ecological indicators, layout of wind farm, initial site selection, micrositing, wake model. Economics of Wind Systems: Cost calculation, annual energy output, time value of money, capital recovery factor, depreciation. Cost of wind energy, present value of annual costs, value of wind generated electricity.

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
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TOTAL: 45 HOURS

Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to COs**
CO1	Choose a method for measuring wind speed.	**PO1,PO2,,PO3**
CO2	Identify ideal wind site for wind farm	**PO1,PO2,PO3,PO4**
CO3	Understand the Design the wind turbine	**PO1,PO2,PO3**
CO4	Use the turbine for a particular application,	**PO1,PO2,PO3**
CO5	Capable to Start a wind turbine farm.	**PO1,PO3,PO4**

Text Books:

1. SirajAhmed:"Wind Energy-Theory and Practice" Second Edition, PHI Learning Pvt. Ltd, New Delhi, 2011.

Reference Books:

1. Garg L Johnson: "Wind Energy Systems" Prentice Hall. Inc, New Jersey, 1985

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	3	2	2	-	-	-	-	-	-	-	-	-
CO.2	3	2	2	1	-	-	-	-	-	-	-	-
CO.3	3	2	2	-	-	-	-	-	-	-	-	-
CO.4	3	2	2	-	-	-	-	-	-	-	-	-
CO.5	3	2	-	1	-	-	-	-	-	-	-	-
CO*	**3**	**2**	**2**	**1**	-	-	-	-	-	-	-	-

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
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IV B.Tech I Semester

L	T	P	C
3	0	0	3

18OEEE412 FUNDAMENTALS OF ENERGY AUDITING
(OPEN ELECTIVE-II)

Course Educational Objectives:

1. Learn about energy scenario
2. Learn about fundaments of Energy Auditing.
3. Learn about concept Energy Consumption.
4. Understand the Energy efficient motors and power factor improvement.
5. Know the concept Energy Measuring Instruments.

UNIT – 1: ENERGY SCENARIO (9)

Primary and Secondary Energy, Conventional and non-conventional energy, Energy Security, Energy Conservation and its importance, Energy conservation Act., Thermal Energy basics, Energy Audit its definition & methodology.

UNIT – 2: FUNDAMENTALS OF ENERGY AUDIT (9)

Energy Situation – World and India, Energy Audit Instruments, Benchmarking for energy performance, Energy Action Planning, Duties and responsibilities of Energy Manager; Energy financial management, Project Management, Energy monitoring and targeting, pinch technology.

UNIT – 3: ENERGY CONSUMPTION (9)

Energy Consumption, Conservation, Codes, Standards and Legislation. Energy Audit- Definitions, Concept, Types of Audit, Energy Index, Cost Index, Pie Charts, Sankey Diagrams, Load Profiles, Energy Conservation Schemes. Measurements in Energy Audits, Presentation of Energy Audit Results.

UNIT – 4: ENERGY EFFICIENT MOTORS AND POWER FACTOR IMPROVEMENT (9)

Energy Efficient Motors , Factors Affecting Efficiency, Loss Distribution , Constructional Details , Characteristics - Variable Speed , Variable Duty Cycle Systems, RMS Hp-Voltage Variation-Voltage Unbalance- Over Motoring- Motor Energy Audit. Power Factor– Methods of Improvement, Power factor With Non Linear Loads

UNIT – 5: LIGHTING AND ENERGY INSTRUMENTS FOR AUDIT (9)

Good Lighting System Design and Practice, Lighting Control, Lighting Energy Audit -Energy Instruments- Watt Meter, Data Loggers, Thermocouples, Pyrometers, Lux Meters, Tong Testers, Application of PLCs.

TOTAL: 45 HOURS

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Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to COs**
CO1	Understand the concept basic energy scenario.	**PO1, PO2.**
CO2	Demonstrate knowledge on energy auditing and evaluate energy audit results.	**PO1,PO2**
CO3	Analyze demand side management concepts through case study	**PO1,PO2**
CO4	Acquire knowledge on motor energy audit.	**PO1,PO2**
CO5	Acquire knowledge on energy instruments.	**PO1,PO2**

Text Books:

1. Industrial Energy Management Systems, Arry C. White, Philip S. Schmidt, David R. Brown, Hemisphere Publishing Corporation, New York, 1994.
2. Fundamentals of Energy Engineering - Albert Thumann, Prentice Hall Inc,Englewood Cliffs, New Jersey, 1984.

Reference Books:

1. Economic Analysis of Demand Side Programs and Projects – California Standard Practice Manual, June 2002 – Free download available online http://www.calmac.org/events/spm_9_20_02.pdf
2. Energy management by W.R. Murphy & G. Mckay Butter worth, Heinemann Publications, 2007.
3. Energy management by Paul o‟ Callaghan, Mc-graw Hill Book company-1st edition, 1998
4. Energy efficient electric motors by John .C. Andreas, Marcel Dekker Inc Ltd- 2nd edition, 1995.

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	3	2	-	-	-	-	-	-	-	-	-	-
CO.2	2	3	-	-	-	-	-	-	-	-	-	-
CO.3	3	2	-	-	-	-	-	-	-	-	-	-
CO.4	3	3	-	-	-	-	-	-	-	-	-	-
CO.5	3	3	-	-	-	-	-	-	-	-	-	-
CO*	**2.8**	**2.6**	-	-	-	-	-	-	-	-	-	-

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
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IV B.Tech I Semester

L	T	P	C
3	0	0	3

18OEEE413 INTRODUCTION TO POWER QUALITY
(OPEN ELECTIVE-II)

Course Educational Objectives:

1. To introduce the fundamental of electric power quality phenomena.
2. To make students learn the voltage variations.
3. To provide detailed analysis of Transients.
4. To make students learn about Harmonics.
5. To learn the power quality conditioners.

UNIT – 1: INTRODUCTION (9)

What is power quality? Power quality – voltage quality - why are we concerned about power quality? - the power quality Evaluation procedure - Terms and Definitions - Transients - Long-duration voltage variations - short-voltage variations - voltage imbalance - wave form distortion - voltage fluctuation - power frequency variations - power quality terms CBEMA and ITI curves.

UNIT – 2: VOLTAGE SAGS AND INTERRUPTIONS (9)

Sources of sags and interruptions - Estimating voltage sag performance - fundamental principles of protection - solutions at the end-use level - Motor-starting sags - utility system fault-clearing issues.

UNIT – 3: TRANSIENT OVER VOLTAGES (9)

Sources of over voltages - principles of over voltage protection - devices for over voltage protection - utility capacitor-switching transients - utility system lightning protection.

UNIT – 4: FUNDAMENTALS OF HARMONICS& APPLIED HARMONICS (9)

Harmonic Distortion - Voltage versus current distortion - Harmonics versus Transients - power system qualities under non sinusoidal conditions - Harmonic indices - Harmonic sources from commercial loads - Harmonic sources from Industrial loads Effects of Harmonics - Harmonic distortion evaluations – Principles of Controlling Harmonics - Devices for Controlling Harmonic Distortion.

UNIT – 5: POWER QUALITY BENCH MARKING AND MONITORING (9)

Benchmarking process, Power Quality Contracts. Monitoring considerations - power quality measurement equipment, assessment of power quality measurement data, application of intelligent systems, - Power quality Monitoring standards.

TOTAL: 45 HOURS

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Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to Cos**
CO1	Able to understand voltage sag, swell, long and short duration voltage variations.	**PO1,PO2,,PO4,PO12**
CO2	Able to understand the sources, principle of protection of voltage sag and interruption.	**PO1,PO2,PO3,PO4,,PO12**
CO3	Able to understand the concept of capacitor switching and lightning.	**PO1,PO2,PO4,PO12**
CO4	Able to understand the controlling of harmonic distortion.	**PO1,PO2,PO3,PO4, ,PO12**
CO5	Able to understand various power quality monitoring equipment and benchmarking process.	**PO1,PO3,PO4,PO12**

Text Books:

1. Electrical Power Systems Quality - Roger C. Dugan - Mark F. McGranaghan - Surya Santoso - H.Wayne Beaty - 2nd Edition - TMH Education Pvt. Ptd.

Reference Books:

1. Electrical systems quality Assessment by J. Arrillaga - N.R. Watson - S. Chen - John Wiley & Sons
2. Understanding Power quality problems by Math H. J. Bollen IEEE Press

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	2	2	-	3	-	-	-	-	-	-	-	3
CO.2	2	2	3	3	-	-	-	-	-	-	-	3
CO.3	2	2	-	3	-	-	-	-	-	-	-	3
CO.4	2	2	3	3	-	-	-	-	-	-	-	3
CO.5	2	-	3	3	-	-	-	-	-	-	-	3
CO*	**2**	**2**	**3**	**3**								**3**

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IV B.Tech I Semester

L	T	P	C
3	0	0	3

18OECE411 FUNDAMENTALS OF ARTIFICIAL INTELLIGENCE
(OPEN ELECTIVE-II)

Course Educational Objectives:

1. To study the concepts of Artificial Intelligence.
2. To understand the search strategies and Problem solving using Artificial Intelligence.
3. To gain insight information about Logical Agents and Reasoning patterns in propositional logic
4. To study the Uncertain Knowledge and Reasoning
5. To study the Application of Robotics and predictive analytics using Rapid Miner

UNIT – 1: INTRODUCTION TO ARTIFICIAL INTELLIGENCE, PROBLEMS, PROBLEM SPACES AND SEARCH (9)

The AI Problems - The underlying assumption - The AI technique - The levels of the model - Criteria of success - Some general references - One final word and beyond - Defining the problem as a State space search - Production systems - Problem characteristics - Production system characteristics - Issues in the design of search programs.

UNIT – 2: PROBLEM SOLVING, UN-INFORMED SEARCH STRATEGIES, INFORMED SEARCH AND EXPLORATION (9)

Uninformed search strategies - Avoiding repeated states - Informed (Heuristic) search strategies - Heuristic functions - Local search algorithms and optimization problems - Local search in continuous spaces - Backtracking search for CSPs.

UNIT – 3: KNOWLEDGE AND REASONING (9)

Logical agents – Knowledge based agents - The wumpus world – Logic - Propositional logic - a very simple logic - Reasoning patterns in propositional logic - Effective propositional inference - Agents based on propositional logic.

UNIT – 4: UNCERTAIN KNOWLEDGE AND REASONING, LEARNING (9)

Uncertainty - Acting under uncertainty - Baye's rule and its use - Learning from observations - Forms of learning - Inductive learning - Learning decision trees.

UNIT – 5: ROBOTICS AND PREDICTIVE ANALYTICS (9)

Robotics: Introduction-Robot hardware - Robotic perception - Planning to move-Robotic software Architectures - Application Domains.
Case Study1: Medical Data Analysis using Rapid Miner Tool
Case Study2: Agriculture Data Analysis using Rapid Miner Tool

TOTAL: 45 HOURS

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
(AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to COs**
CO1	Gain the basic Knowledge about AI technique and Production systems	**PO1**
CO2	Comprehend the Un informed and Informed Search Strategies.	**PO1, PO3**
CO3	Analyze and Implement Reasoning patterns in propositional logic	**PO1, PO2**
CO4	Formulate the Knowledge and Reasoning techniques in solving problems	**PO1, PO4**
CO5	Apply Robotics to Solve Real world Problems and use rapid miner applications	**PO1, PO2, PO4, PO9**

Text Books:

1. Artificial Intelligence A Modern Approach, 2/e, Stuart Russell and Peter Norvig, 2003, Pearson Education, New Delhi, India.
2. Artificial Intelligence, 3/e, Elaine Rich, Kevin Knight and Shiva Shankar B Nair, 2004, Tata McGraw Hill, Hyderabad, India.

Reference Books:

1. Artificial Intelligence Structures and Strategies for Complex Problem Solving, 5/e, George F. Luther, 2005, Pearson Education, New Delhi, India.
2. Introduction to Artificial Intelligence, 1/e, Eugene Charniak and Drew McDermott, 1985, Pearson Education, New Delhi, India.
3. Artificial Intelligence: The Basics, 1/e, Kevin Warwick, 2012, Wearset ltd, Boldon.
4. Introduction to Artificial Intelligence, 2/e, Philip C. Jackson, 1985, Dover Publications, New York, USA.
5. Our Final Invention: Artificial Intelligence and the End of the Human Era, 1/e, James Barrat, 2013, Thomas Dunne Books, New York, USA.

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	2	-	-	-	-	-	-	-	-	-	-	-
CO.2	2	-	3	-	-	-	-	-	-	-	-	-
CO.3	2	2	-	-	-	-	-	-	-	-	-	-
CO.4	2	-	-	2	-	-	-	-	-	-	-	-
CO.5	2	2	-	2	-	-	-	-	1	-	-	-
CO*	**2**	**2**	**3**	**2**	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**-**

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IV B.Tech I Semester

L	T	P	C
3	0	0	3

18OECE412 FUNDAMENTALS OF EMBEDDED SYSTEMS
(OPEN ELECTIVE-II)

Course Educational Objectives:

1. To provide a basic knowledge like characteristics, classification and Application areas of Embedded Systems.
2. Students learn the Architecture, Memory Interfacing and Interrupt Structures of 8051.
3. By learning instruction sets we can write the Assembly Language Programs and get knowledge in interfacing techniques.
4. Students will learn the Real time operating systems.
5. To learn Communication and Interfacing Techniques and its buses.

UNIT – 1: INTRODUCTION (9)

History of Embedded Systems-Classification of Embedded systems-Purpose of Embedded system-Characteristics of Embedded systems- Major Application Areas of Embedded Systems- Core of the Embedded System- Sensors and Actuators- Embedded Firmware, Applications- Washing Machine.

UNIT – 2: THE 8051 ARCHITECTURE (9)

Introduction- 8051 Micro controller Hardware- Register set of 8051-Input/Output Ports and Circuits-External Memory- memory and I/O interfacing of 8051Counter and Timers- Serial data Input/Output-Interrupt structure of 8051.

UNIT – 3: BASIC ASSEMBLY LANGUAGE PROGRAMMING CONCEPTS (9)

The Assembly Language Programming Process- Programming Tools and Techniques- Programming the 8051. Data Transfer and Logical Instructions. Arithmetic Operations- Decimal Arithmetic. Jump and Call Instructions. Applications: Interfacing with Keyboards- Displays- D/A and A/D Conversions- Multiple Interrupts

UNIT – 4: REAL-TIME OPERATING SYSTEMS (RTOS) (9)

Operating System Basics- Types of Operating Systems- Tasks- Process and Threads-Multiprocessing and Multitasking- Task Scheduling- Threads- Processes and Scheduling: Putting them Altogether- Task Communication- Task Synchronization- Device Drivers- How to Choose an RTOS.

UNIT – 5: COMMUNICATION INTERFACE AND COMMUNICATION BUSES (9)

Communication interface- (Board level communication interfaces- Product level communication interfaces)- Timing -and Counting Devices- Watchdog Timer- Real Time Clock- Networked Embedded Systems- Serial Bus Communication Protocols- Parallel Bus Device Protocols- Parallel Communication Network Using ISA- PCI- PCI-X and Advanced Buses.

TOTAL: 45 HOURS

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Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to COs**
CO1	Understanding and designing of embedded systems	**P01, P02, P03, P04,P06**
CO2	Learning the Architecture and its functions	**PO1,P02,P03,P06**
CO3	Knowledge to write the programs in Assembly Language Programs	**P01, P02, P03, P04**
CO4	Knowledge in real time operating systems	**P01, P03,P04,P05,P06**
CO5	Understanding the transmissions through different types of buses	**P01, PO2,P03,P04,P05,P06**

Text Books:

1. Introduction to Embedded System-2nd edition- 2003-Shibu KV- Mc-Graw Hill -New Delhi.
2. The 8051 Microcontroller-3rd Edition-2007- Kenneth J.Ayala- Thomson Delmar Learning-New Delhi.
3. Embedded system architecture- programming and design-sixthreprint- 2005- Rajkamal-TMH- New Delhi.

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	3	3	3	2	-	2	-	-	-	-	--	-
CO.2	3	2	2	-	-	3	-	-	-	-	--	-
CO.3	3	3	3	2	-	-	-	-	-	-	--	-
CO.4	3	-	3	3	2	2	-	-	-	-	--	-
CO.5	3	3	3	3	2	2	-	-	-	-	--	-
CO*	**3**	**2.75**	**2.8**	**2.5**	**2**	**2.25**	-	-	-	-	--	-

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IV B.Tech I Semester

L	T	P	C
3	0	0	3

18OECE413 DATA COMMUNICATION AND NETWORKS
(OPEN ELECTIVE-II)

Course Educational Objectives:

1. Build an understanding of the fundamental concepts of computer networking.
2. Familiarize the student with the basic taxonomy and terminology of the computer networking area.
3. Introduce the student to advanced networking concepts.
4. Preparing the student for entry Advanced courses in computer networking.
5. Allow the student to gain expertise in some specific areas of networking.

UNIT – 1: INTRODUCTION TO DATA COMMUNICATION (9)

Introduction: Network Topologies, Protocols & Standards, Layered Architecture LAN, WAN, MAN. OSI Reference Model, TCP/IP Reference Model, Guided and Unguided Media.

UNIT – 2: DATA LINK LAYER (9)

Data Link Layer: Design Issues, Framing – Error Control – Flow Control, Error Detection and Correction, Elementary Data Link Protocols, Sliding Window Protocols, ARQ schemes, HDLC. PPP. Ethernet- IEEE 802.3,4,5 Protocols, Wireless LAN- the 802.11 Architecture and Protocol Stack-The 802.11 Physical Layer- The802.11 MAC Sub layer Protocol-The 805.11 Frame Structure-Services.

UNIT – 3: MAC LAYER AND ROUTING ALGORITHM (9)

The Medium Access Control Sub layer-The Channel Allocation Problem-Static Channel Allocation-Assumptions for Dynamic Channel Allocation, Multiple Access Protocols-Aloha-CSMA Protocols-Collision-Free Protocols, Need for Internetworking, Design Issues, Addressing, Internet Protocol (IPv4/IPv6), Virtual Circuit and Datagram Networks, Routing Algorithms, Congestion Control Algorithms.

UNIT – 4: TRANSPORT LAYER (9)

Transport layer: UDP, TCP, Congestion Control mechanisms, QOS, Techniques to improve QOS.

UNIT – 5: COMMUNICATION INTERFACE AND COMMUNICATION BUSES (9)

Application Layer: Cryptography and network security, DNS, Electronic Mail, FTP, HTTP, SNMP, DHCP.

TOTAL: 45 HOURS

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to COs**
CO1	Independently understand basic computer network technology	**PO1, PO2,PO3**
CO2	Understand and explain Data Communications System and its components.	**PO1, PO2, PO3,PO4**
CO3	Analysis the different types of network topologies and protocols. And Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer	**PO1, PO2,PO3,**
CO4	Identify the different types of network devices and their functions within a network.	**PO1, PO2,PO4**
CO5	Familiarity with the basic protocols of computer networks, and how they can be used to assist in network design and implementation.	**PO1,PO2,PO4**

Text Books:

1. Computer Networks, Tanenbaum and David J Wetherall, 5th Edition, Pearson Edu, 2010
2. Computer Networks: A Top Down Approach, Behrouz A. Forouzan, FirouzMosharraf, McGraw Hill Education.

Reference Books:

1. Larry L. Peterson and Bruce S. Davie, “Computer Networks - A Systems Approach” (5th ed), Morgan Kaufmann/ Elsevier, 2011
2. William Stallings, “Data & Computer Communication”, Pearson Education India, 10th Edition, 2014.
3. James F. Kurose, Keith W. Ross, “Computer Networking: A Top–Down Approach Featuring the Internet”, Pearson Education, 6th Edition, 2013.

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	3	3	3	-	-	-	-	-	-	-	-	-
CO.2	2	3	2	3	-	-	-	-	-	-	-	-
CO.3	3	3	2	-	-	-	-	-	-	-	-	-
CO.4	3	2	-	3	-	-	-	-	-	-	-	-
CO.5	3	2	-	3	-	-	-	-	-	-	-	-
CO*	**2.8**	**2.6**	**2.3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

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IV B.Tech I Semester

L	T	P	C
3	0	0	3

18OMEC411 QUALITY CONTROL AND RELIABILITY ENGINEERING
(OPEN ELECTIVE-II)

Course Educational Objectives:

1. To understand the concepts of quality, TQM, and statistical process control
2. To learn TQM principles and impact in continuous process improvement.
3. To study the online quality control system in an organization
4. To learn the concepts of offline quality control systems in an organization.
5. To study concepts of Reliability and Estimation

UNIT – 1: QUALITY CONCEPTS AND STATISTICAL PROCESS CONTROL (9)

Quality Concepts: Need for quality – Evolution of quality – Definition of quality – Dimensions of quality – Basic concepts and definition of TQM – Contributions of Deming, Juran and Crosby. **Statistical Process Control:** Inspection – Quality Control – Quality assurance – Customer orientation – Internal & External Customer – Life cycle Quality cost – The seven traditional tools of quality – New management tools

UNIT – 2: QUALITY PRINCIPLES AND TOOLS (9)

Leadership – Strategic quality planning – Quality statements – Customer focus, customer orientation, customer satisfaction, customer complaints and customer retention – Employee involvement – Motivation – Empowerment – Team and teamwork – Recognition and reward – Performance appraisal – Continuous process improvement – PDSA cycle, 5s, Kaizen – Supplier partnership – Partnering, supplier selection and supplier rating – Six-sigma concepts – Bench marking – TPM concepts.

UNIT – 3: ONLINE QUALITY CONTROL (9)

Control chart for attributes – Control chart for non-conforming – *p* chart and *np* chart – Control chart for nonconformities: C and U charts – Control chart for variables: X chart, R chart and σ chart – State of control and process out of control identification in charts – Pattern study – Process capability studies.

UNIT – 4: OFFLINE QUALITY CONTROL (9)

Lot by lot sampling – Types – Probability of acceptance in single, double, multiple sampling techniques – O.C. curves – Producers risk and consumers risk – AQL – LTPD – AOQL concepts – Standard sampling plans for AQL and LTPD – Uses of standard sampling plans.

UNIT – 5: RELIABLITY CONCEPTS AND ESTIMATION (9)

Reliability Concepts: Reliability engineering – Fundamentals – Failure data analysis – Mean failure rate, Mortality curves concept of burn in period – Useful life and wear out phase of a system – Mean time to failure – Meantime between failure – Hazard rate – Failure density and conditional reliability – Maintainability and availability – simple problems. **Reliability Estimation:** Series, parallel and mixed configurations – Reliability improvement techniques – Use of pareto analysis – Design for reliability – redundancy unit and standby redundancy – Fault tree analysis – Optimization in reliability.

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TOTAL: 45 HOURS

Course Outcomes:

On successful completion of the course, Students will be able to		POs related to COs
CO1	Illustrate the quality concepts of statistical process control, and contributions TQM Gurus in quality management	**PO1,PO11, PO12**
CO2	Recognize the quality principles and impact of 5s, Kaizen, PDSA cycles in continuous process improvement.	**PO1,PO11, PO12**
CO3	Demonstrate the basic need of online quality control and process control in an organization	**PO1,PO2, PO3, PO11, PO12**
CO4	Explain the basic need of offline quality control and process control in an organization	**PO1,PO2, PO3, PO11, PO12**
CO5	Realize the concepts of Reliability and Estimation	**PO1, PO2,PO11, PO12**

Text Books:

1. Quality Control, Besterfield D.H., 8/e, 2009, Pearson Education, India.
2. Reliability Engineering, E Balagurusamy, 2017, McGraw Hill India

Reference Books:

1. Introduction to Statistical Quality Control, Douglas.C. Montgomery, 7/e, 2013, John Wiley.
2. Statistical Methods for Quality, Reliability and Maintainability, K.Muralidharan and A Syamsundar, 2012, PHI Learning.
3. Statistical Quality Control, Monohar Mahajan, 2001, Dhanpat Rai &and Sons.
4. Reliability, Maintainability and Risk, David J Smith, 8/e, 2011, Butterworth-Heinemann, Elsevier Ltd.
5. Fundamentals of Quality Control and Improvement, Amitava Mitra, 4/e, 2016, JohnWiley&Sons,Inc.
6. Reliability Engineering, Kailash C. Kapur and Michael Pecht, 2014, John Wiley & Sons, Inc.

Codes/Tables: Use of approved statistical table permitted in the examination.

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	-	-	-	-	-	-	-	-	-	1	2
CO.2	3	-	-	-	-	-	-	-	-	-	1	2
CO.3	3	2	1	-	-	-	-	-	-	-	1	2
CO.4	3	2	1	-	-	-	-	-	-	-	1	2
CO.5	3	2	-	-	-	-	-	-	-	-	1	2
CO*	**3**	**2**	**1**	-	-	-	-	-	-	-	**1**	**2**

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

IV B.Tech I Semester

L	T	P	C
3	0	0	3

18OMEC412 INDUSTRIAL ENGINEERING AND PSYCHOLOGY (OPEN ELECTIVE-II)

Course Educational Objectives:

1. To learn the concepts of management and characteristics of personnel management and organization
2. To understand the organizational structures and plant layout for productivity improvements
3. To know the productivity, planning and control of a product
4. To discover the material handling techniques and Inventory control of manufacturing a product
5. To learn the industrial psychology and work study in an industry

UNIT – 1: CONCEPTS OF MANAGEMENT (9)

Management: Importance of administration and organization – Managerial skills, policies, goals and objectives – Scientific management – Contribution of FW Taylor, Henry Foyal and Gilberth – Principles, types, process, levels and functions of management – Management chart – Basic concepts in project management and MIS – Industrial ownership – Responsibilities of supervisor/foreman – Leadership concepts. **Personnel Management:** Recruitment, selection, training, job evaluation and merit rating – Wage plans and incentives – Welfare measures – Promotion, lay-off, transfer and discharge.

UNIT – 2: ORGANIZATIONAL STRUCTURES AND PLANT LAYOUT (9)

Organization: Concept, importance, characteristics, elements, and process of organization – Organization theory, principle, structure, chart and committees – Project, matrix and informal organization – Departmentation – Authority and delegation – Group dynamics – Organizational change, development and conflict – Managerial leadership and communication system. **Plant Layout:** Types – Flow pattern – Work station – Storage space – Layout procedure – Consideration in factory design.

UNIT – 3: PRODUCTION PLANNING AND CONTROL (9)

Productivity: Input output model – Factors affecting the productivity – Productivity resources and measures. **Production Planning:** Continuous and intermittent production – Job, open and closed job shop – One time large projects – Forecasting – Process planning – Economical batch quantity – Tool control – Control of production – Loading, scheduling, dispatching and routing – Progress and flow control.

UNIT – 4: MATERIALS MANAGEMENT AND INVENTORY CONTROL (9)

Materials Management: Concepts – Procurement – Purchase and order – Buying techniques. **Inventory Control:** Classification – Objectives – Functions – Economic order quantity (EOQ) – Inventory models – ABC analysis – Material requirements planning (MRP) – Manufacturing resource planning (MRP-II).

UNIT – 5: WORK STUDY AND INDUSTRIAL PSYCHOLOGY (9)

Work study: Ergonomics principles – Method study – Process chart symbols – Flow process and multiple activity chart – Flow and string diagram – Operation analysis – Analysis of motion – Design of work place – Therbligs – SIMO chart – Time study – Standard data – Analytical estimating – Performance rating – Allowances – PMTS. **Industrial Psychology:** Concept – Individual and group – Motivation theories – Hawthorne experiment – Morale and motivation – Working and environmental condition – Industrial fatigue.

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TOTAL: 45 HOURS

Course Outcomes:

On successful completion of the course, Students will be able to		POs related to COs
CO1	Understand the concepts of management and characteristics of personnel management and organization	**PO1, PO11, PO12**
CO2	Explain the organizational structures and plant layout for productivity improvements	**PO1,PO2, PO11, PO12**
CO3	Describe the productivity, planning and control of a product	**PO1,PO2, PO11, PO12**
CO4	Explain the material handling techniques and Inventory control of manufacturing a product	**PO1,PO2, PO11, PO12**
CO5	Demonstrate the industrial psychology and work study in an industry	**PO1,PO2, PO11, PO12**

Text books:

1. Industrial Engineering and Management, 17/e, 2010, O.P. Khanna, Dhanpat Rai Publishing Company (P) Ltd., New Delhi.
2. Industrial Engineering and Management, Pravin Kumar, 1/e, 2015, Pearson Education, New Delhi.

Reference books:

1. Production and Operations Management, S. N. Chary, 6/e, 2019, Tata McGraw-Hill Education Pvt. Ltd., Noida.
2. Operations Management, William J Stevenson, 12/e, 2018, Tata McGraw-Hill Education Pvt. Ltd., Noida.
3. Production and Operations Management, Shailendra Kale, 1/e, 2013, Tata McGraw-Hill Education Pvt. Ltd., Noida.
4. Production and Operations Management, Kanishka Bedi, 3/e, 2013, Oxford University Press, India.
5. Manufacturing Organization and Management, 6/e, 2004, Harold T Amrine, John A Ritchey, Colin L Moodie and Joseph F Kmec, Pearson Education, New Delhi.
6. Industrial Engineering and Production Management, Martand T Telsang, 3/e, 2018, S.Chand Publications, New Delhi.

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	2	-	-	-	-	-	-	-	-	-	1	1
CO.2	2	2	-	-	-	-	-	-	-	-	1	1
CO.3	2	2	-	-	-	-	-	-	-	-	1	1
CO.4	2	2	-	-	-	-	-	-	-	-	1	1
CO.5	2	2	-	-	-	-	-	-	-	-	1	1
CO*	**2**	2	-	-	-	-	-	-	-	-	1	1

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IV B.Tech I Semester

L	T	P	C
3	0	0	3

18OMEC413 3D PRINTING AND DESIGN (OPEN ELECTIVE-II)

Course Educational Objectives:

1. To know the need and development of additive manufacturing technology.
2. To study the design for additive manufacturing and tool design
3. To recognize the parameters of photo polymerization and LOP
4. To explain powder bed fusion processes, binder and material jetting process
5. To know the post processes technique and applications of additive manufacturing process

UNIT – 1: OVERVIEW OF ADDITIVE MANUFACTURING (AM) (7)

Overview – Fundaments of Rapid Prototyping (RPT) – Additive V/s Conventional Manufacturing – Generic AM process – Development of AM technology – Use of layers – Classification of AM process – AM process chain – Basic steps for AM process – Differentiation between photopolymer system, powder based system, molten material system, solid sheets and metal system.

UNIT – 2: CAD MODELING AND DESIGN FOR ADDITIVE MANUFACTURING (11)

CAD Modeling: Preparation of CAD models – Data processing – STL format – Model slicing – Tool path generation – Data translation and loss – Customized design and fabrication for medical applications. **DFAM:** AM unique capabilities – DFAM concepts for complex geometry, integrated assemblies, customized geometry, multifunctional design and constraints – Part consolidation, redesign, structures and industrial applications – Light weight structure, optimization methods and topology. **Printing Processes:** Droplet formation technologies – Continuous mode – Drop on demand mode – Bioplotter.

UNIT – 3: LIQUID AND SOLID BASED ADDITIVE MANUFACTURING PROCESS (9)

Stereo lithography (SLA): Polymerization materials – Process – Patterns – Vat photo polymerization process – Benefits – Applications. **Fused Deposition Modeling (FDM**): Principle – Materials – Limitations – Benefits – Applications. **Laminated Object Manufacturing (LOM):** Bonding process – Adhesive bonding and thermal bonding – Materials – Limitation – Application.

UNIT – 4: POWDER BASED ADDITIVE MANUFACTURING PROCESS (9)

Selective Laser Sintering (SLS): Process – Materials – Powder fusion mechanism – Powder handling – Applications. **Selective Laser Melting (SLM) and Electron Beam Melting (EBM):** Principle – Materials – Process – Benefits – Applications. **Laser Engineered Net Shaping (LENS):** Materials – Material delivery – Process parameters – Benefits – Applications. **Binder Jetting:** Materials – Process – Benefits. **Material Jetting:** Materials – Process – Multijet modeling – Benefits.

UNIT – 5: POST PROCESSINGTECHNIQUES AND APPLICATIONS (9)

Product Quality: Material removal – Surface texture improvements – Accuracy improvements – Aesthetic improvements – Preparation for use of pattern – Property enhancement using thermal and non thermal techniques – Inspection and testing – Defects and their causes. **Applications:** Additive Manufacturing application of aerospace, electronics, healthcare, defense, automotive, construction, food processing, machine tool – Business opportunities and future directions of AM.

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TOTAL: 45 HOURS

Course Outcomes:

On successful completion of the course, Students will be able to		**POs related to COs**
CO1	Understand the need and development of additive manufacturing technology	**PO1, PO2, PO3**
CO2	Explain the design for additive manufacturing and tool design	**PO1, PO2, PO3**
CO3	Illustrate the parameters of photo polymerization and Laminated Object Manufacturing	**PO1, PO2, PO3, PO5**
CO4	Explain powder bed fusion processes, binder and material jetting process	**PO1, PO2, PO3, PO5**
CO5	Summarize the post processes technique and applications of additive manufacturing process	**PO1, PO2, PO3, PO5**

Text Books:

1. Additive Manufacturing Technologies: 3D Printing, Rapid Prototyping and Direct Digital Manufacturing, Ian Gibson, David W.Rosen and Brent Stucker, 2/e, 2015, Springer.
2. Rapid Prototyping: Principles and Applications, Chee Kai Chua, Kah Fai Leong and Chu Sing Lim 3/e, 2010, World Scientific Publishers.

Reference Books:

1. Additive manufacturing: Innovations, Advances, and Applications, T.S. Srivatsan and T.S. Sudarshan, Taylor & Francis Group, LLC.
2. Additive Manufacturing of Emerging Materials, Bandar AlMangour, 2018, Springer.
3. 3D Printing and Additive Manufacturing Technologies, L. Jyothish Kumar, Pulak M. Pandey and David Ian Wimpenny, 2019, Springer Nature Singapore Pte Ltd.
4. 3D Printing: Technology, Applications, and Selection, Rafiq Noorani, 2018, CRC Press, Taylor & Francis Group.
5. Design for Additive Manufacturing, Martin Leary, 2019, Elsevier.
6. Additive Manufacturing Handbook: Product Development for the Defense Industry, Adedeji B. Badiru, Vhance V. Valencia, and David Liu, 2017, CRC Press, Taylor & Francis Group.

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	3	2	1	-	-	-	-	-	-	-	-	-
CO.2	3	2	1	-	-	-	-	-	-	-	-	-
CO.3	3	2	1	-	2	-	-	-	-	-	-	-
CO.4	3	2	1	-	2	-	-	-	-	-	-	-
CO.5	3	2	1	-	2	-	-	-	-	-	-	-
CO*	**3**	**2**	**1**	-	**2**	-	-	-	-	-	-	-

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IV B. TECH I-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	0	**0**	**3**	**2**

18CSE416 **BIG DATA ANALYTICS LAB**

Course Educational Objectives:

CEO1: To provide an overview of an exciting growing field of Big Data analytics.
CEO2: To introduce the tools required to manage and analyze big data like Hadoop, MapReduce.
CEO3: To teach the fundamental techniques and principles in achieving big data analytics with scalability and streaming capability.
CEO4: To enable students to have skills that will help them to solve complex real-world problems in for decision support.
CEO5: To gain knowledge on PIG Latin and HIVE.

Task 1:

a) Understanding the Hortonworks Sandbox for Hadoop.
b) Installing Hortonworks Sandbox – VMware Player on Windows

Task 2:

Understanding and Working with basic HDFS operations such as:

- Starting HDFS,
- Listing files in HDFS.
- Adding files and directories.
- Retrieving files.
- Deleting files.
- Shutting down the HDFS.

Task 3:

Understanding and Working with Ambari for provision, manage and monitor a Hadoop cluster, and also to integrate Hadoop with the existing enterprise infrastructure.

Task 4:

Write a java map-reduce program for counting the number of occurrences of each word in a text file.

Task 5:

Write a java map-reduce program for mines healthcare data and perform various analysis on healthcare dataset.

Task 6:

Working with PIG Latin scripts in Script mode and Grunt shell.

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Task 7:

Write Pig Latin scripts to illustrate Load, Store, Describe, Dump operators

Task 8:

Write Pig Latin scripts to illustrate Group, Co-group, Join, Filter, Union, and Split Operators.

Task 9:

Develop a Map-reduce programming with Hive to create, alter, and drop databases, tables, views, functions, and indexes.

Task 10:

Illustrate unstructured data into NoSQL data and perform various operations

Course Outcomes:

After the successful completion of this course, the students should be able to:

Course Outcomes		**POs related to COs**
CO1	Explain the motivation for big data systems and identify the main sources of Big Data in the real world.	PO1, PO2,
CO2	Demonstrate an ability to use frameworks like Hadoop to efficiently store retrieve and process Big Data for Analytics.	PO1, PO2,
CO3	Implement several Data Intensive tasks using the Map Reduce Paradigm	PO1, PO2, PO3, PO4
CO4	Apply several newer algorithms for Clustering Classifying and finding associations in Big Data	PO1, PO2, PO3,
CO5	Design and implement successful Recommendation engines for enterprises.	PO1, PO2, PO3, PO4, PO5

CO-PO Mapping

PO / CO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-

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PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO5	-	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	3	-	-	-
CO8	-	-	-	-	-	-	-	-	-	3	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO*	**3**	**3**	**3**	**3**	3	-	-	3	3	**3**	**-**	**3**

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IV B. TECH I-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	0	**0**	**2**	**1**

18CSE417 MOBILE APPLICATION DEVELOPMENT LAB

Course Educational Objectives:

CEO1: To know the components and structure of mobile application development frameworks for Android and windows OS based mobiles.
CEO2: To understand how to work with various mobile application development frameworks.
CEO3: To learn the basic and important design concepts and issues of development of mobile applications.
CEO4: To understand the capabilities and limitations of mobile devices.
CEO5: To develop the data base connectivity to the android platform.

LIST OF EXPERIMENTS

1. Study of Android Installation
2. Study of Tools for Developing Mobile Applications.
3. Develop an android application to display a simple text in the emulator
4. Develop an android application to display the internal keyboard in the emulator
5. i. Write an android program to display a message in the toast
   ii. Write an android program to input a text through a text and the same must be displayed in the toast when a button is clicked on the screen
6. Develop an application to perform 5 arithmetic operations: Addition - Subtraction - Multiplication - Division and Modulo operation with necessary user interface creation
7. Write an android application to create a calculator
8. Create an android UI that consists of Different Departments of a company namely Production- Finance - Marketing and HR. If the user clicks on any department it should show details of that department. Use indents.
9. Design an android application to display a list of items on the android screen. If the user clicks any one of the list items a dialogue box should show that the user has clicked that particular item (Use array adopters)
10. Develop an android application to show some categories such as education - entertainment - health - provisions etc. - If the user clicks on any one of the items it should show the sub categories of the category and if is again clicked it should the details of those items. (Use indents and lists)
11. Design an android application to create a service that shows the service is running in the background in the form of a toast
12. Develop an android application to demonstrate the concept of Fragments in Android
13. Develop an android application to demonstrate the database connectivity with the SQLite database to post and retrieve data through the User Interface
    (Example: Student mark list processing- Email Registration and Login - Products and sales)

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Course Outcomes:

After the successful completion of this course, the students should be able to:

Course Outcomes		POs related to COs
CO1	Build a native application using GUI components and Mobile application development framework.	PO1, PO2, PO3, PO4, PO5
CO2	Develop an application using basic graphical primitives and databases.	PO1, PO2, PO3, PO4, PO5
CO3	Construct an application using multi-threading.	PO1, PO2, PO3, PO4, PO5
CO4	Develop an android application using the concept of Fragments.	PO1, PO2, PO3, PO4, PO5
CO5	Develop an application using the database connectivity with the SQLite database to post and retrieve data through the User Interface	PO1, PO2, PO3, PO4, PO5
CO6	Follow the ethical principles in implementing the programs	PO8
CO7	Do experiments effectively as an individual and as a team member in a group	PO9
CO8	Communicate verbally and in written form, the understanding about the experiments	PO10
CO9	Continue updating their skills related to develop mobile application and implementing programs in future	PO12

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	3	-	-	-
CO8	-	-	-	-	-	-	-	-	-	3	-	-

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO*	**3**	**3**	**3**	**3**	3	-	-	3	3	**3**	**-**	**3**

REFERENCES:

1. Android Developer Fundamentals Course, Learn to develop Android Applications, Practical Workbook, Developed by Google Developer Training Team
2. Android Developer Fundamentals Course, Learn to develop Android Applications, Concept Reference, Developed by Google Developer Training Team
3. Android System Programming, Roger Ye, PACKT publishers
4. Programming Android, ZigurdMednieks, Laird Dornin, G.BlakeMeike& Masumi Nakamura, O'Reilly
5. Android application Development-Black Book, Pradeep Kothari, Dreamtech
6. Android Programming, 3rd Edition, The Big Nerd Ranch Guide, Bill Philips, Christ Stewart, Kristin Mariscano, Big Nerd Ranch publishers
7. Android Programming for Beginners, John Horton, PACKT publishers

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18AUD411 **PROFESSIONAL ETHICS**

(Common to all Branches)

(No credits and No examination but attendance will be reckoned)

OBJECTIVE

CEO1: To create an awareness on engineering ethics and human Values
CEO2: To understand social responsibility of an engineer.
CEO3: To appreciate ethic al dilemma while discharging duties in professional life.

UNIT-1: Human Values

Morals-Values and ethics – integrity - work ethic – Honesty- courage – empathy – Self Confidence – Character.

Unit-2: Engineering Ethics

Senses of Engineering Ethics- Varieties of moral issues- Types of inquiry – Moral dilemma – Moral autonomy – Kohlberg's theory – Gilligan's theory – Consensus and Controversy - Models of professional roles - Theories about right action - Self –interest - Customs and religion – Uses of ethical theories- Valuing Time - Co-operation and Commitment

UNIT-3: Engineering as Social Experimentation:

Engineers as Responsible experimenters – Codes of ethics – A balanced outlook on law – The challenger case study.

UNIT-4: Safety Responsibility and Rights

Safety and Risk - Assessment of safety and risk – Risk benefit analysis – The Three Mile Island and Chernobyl Case studies.

UNIT-5: Global Issues

Multinational Corporations – Environmental Ethics - Computer Ethics – Weapons Development – Engineers as Managers – Engineers as expert witness and advisors - Moral leadership.

On successful completion of this course, students should be able to

COURSE OUTCOMES		**POs related to COs**
CO1	Understand the various human values	PO1, PO2, PO7, PO8, PO12
CO2	Analyze usage of engineering ethics	PO1, PO2, PO4, PO6, PO7, PO8, PO12
CO3	Analyze the principles involved in engineering as social experimentation	PO1, PO2, PO4, PO6, PO7, PO8, PO12
CO4	Analyze various principles involved with regard to safety, responsibilities and rights of engineers	PO1, PO2, PO4, PO6, PO7, PO8, PO12
CO5	Analyze the basic principles engaged in study of global issues with regard to engineering ethics	PO1, PO2, PO4, PO6, PO7, PO8, PO12

CO-PO Mapping

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PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	2	-	-	-	-	3	3	-	-	-	3
CO2	3	2	-	2	-	2	3	3	-	-	-	3
CO3	3	2	-	2	-	3	3	3	-	-	-	3
CO4	3	2	-	2	-	3	3	3	-	-	-	3
CO5	3	2	-	2	-	3	3	3	-	-	-	3
CO*	3	2	-	2	-	2.75	3	3	-	-	-	3

Textbooks:

1. A text book on professional ethics and Human Values.1/e 2006,NaagarazanR.S.,New Age International (p)Ltd, Publishers, New Delhi.
2. Professional ethics and Human Values,S.DineshBabu, Laxmi Publications(P)Ltd, New Delhi.

Reference Books:

1. Engineering Ethics ,2004,M.Govindarajan, S Natarajan, V.S. Senthil Kumar, Prentice Hall of India,Pvt. Ltd. New Delhi.
2. EngneeringEthics ,2004, CharlesD.Fleddermann,Pearson Education/Prentice-Hall ,New jersey(Indian Reprint now available).
3. Engineering Ethics – Concepts and Cases -2000,CharlesEHarris,MichaelS.Prtchard and Michael J Rabins ,Wadsworth Thompson LeaningUnited states (Indian reprint now available).
4. Ethics in Engineering ,Mike Marine and Roland Schinzinger, Tata McGraw-hill Education,PvtLtd,.Noida.
5. Ethics and the Conduct of Business,2003, John R.Boatright, Pearson Education,NewDelhi.Fundamentals of Ethics for Scientists and Engineers, 2001, Edmund G Seebauer and Robert L.Barry,Oxford University Press, Oxford.

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IV B. TECH II-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	3	**0**	**0**	**3**

18CSE421 **INTERNET OF THINGS**

Course Educational Objectives:

CEO1: To understand the fundamentals of Internet of Things.
CEO2: To learn about Building state of the art architecture in IoT.
CEO3: To learn about basis of IOT protocols.
CEO4: To build a small low cost embedded system using Raspberry Pi and ARDUINO,
CEO5: To apply the concept of Internet of Things in the real world scenario.

UNIT I: Introduction To IoT **(9)**

Introduction to Internet of Things –Definition and Characteristics of IoT, Physical Design of IOT- IoT Protocols -Logical Design of IoT - IoT communication models - IoT Communication APIs - IoT enabled Technologies- Wireless Sensor Networks - Cloud Computing - Big data analytics - Communication protocols - Embedded Systems.

UNIT II: M2M and IoT Architecture **(9)**

The Vision - Introduction - From M2M to IoT. M2M high-level ETSI architecture - IETF architecture for IoT - OGC architecture - IoT reference model - Domain model - information model - functional model - communication model - IoT reference architecture.

UNIT III: IoT Protocols **(9)**

Protocol Standardization for IoT – Efforts – M2M and WSN Protocols – SCADA and RFID Protocols – Unified Data Standards – Protocols – IEEE 802.15.4 – BACNet Protocol – Modbus– Zigbee Architecture – Network layer – 6LowPAN - CoAP - Security

UNIT IV: Building IotWith Raspberry Pi &Arduino **(9)**

Building IOT with RASPERRY PI- IoT Systems - Logical Design using Python – IoT Physical Devices & Endpoints - IoT Device -Building blocks -Raspberry Pi -Board - Linux on Raspberry Pi - Raspberry Pi Interfaces -Programming Raspberry Pi with Python - Other IoT Platforms - Arduino

UNIT V : Case Studies And Real-World Applications **(9)**

Real world design constraints - Applications - Asset management, Industrial automation, smart grid, Commercial building automation, Smart cities - participatory sensing - Data Analytics for IoT – Software & Management Tools for IoT Cloud Storage Models & Communication APIs - Cloud for IoT - Amazon Web Services for IoT.

Course Outcomes:

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After the successful completion of this course, the students should be able to:

Course Outcomes		POs related to COs
CO1	Demonstrate knowledge on fundamentals of Internet of Things and its functionalities.	PO1, PO2
CO2	Demonstrate knowledge on Building state of the art architecture in IoT.	PO1, PO2
CO3	Analyze various protocols for IoT	PO1, PO2,
CO4	Design a portable IoT using Rasperry Pi	PO1, PO2, PO3, PO4
CO5	Deploy an IoT application and connect to the cloud using Raspberry Pi & ARDUINO and apply the concept of Internet of Things in the real world scenario.	PO1, PO2, PO3, PO4, PO5

CO – PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	2		-	-	-	-	-	-	-	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-
CO3	2	2	3	3	-	-	-	-	-	-	-	-
CO4	2	2	3	3	-	-	-	-	-	-	-	-
CO5	3	3	2	2	3	-	-	-	-	-	-	-
CO*	2.6	2.4	2.6	2	3	-	-	-	-	-	-	-

Text Books:

1. Internet of Things – A hands-on approach, ArshdeepBahga, Vijay Madisetti, 2015, Universities Press.
2. From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence, 1st Edition, Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, StamatisKarnouskos, David Boyle, 2014, Academic Press.

References:

1. Internet of Things (A Hands-on-Approach), 1stEdition, Vijay Madisetti and ArshdeepBahga, 2014,VPT.
2. Rethinking the Internet of Things: A Scalable Approach to Connecting Everything, 1st Edition, Francis daCosta, Apress Publications, 2013

3. Architecting the Internet of Things, Bernd Scholz-Reiter, Florian Michahelles, ISBN 978- 3842-19156-5, Springer.
4. The Internet of Things Key Applications and Protocols, Olivier Hersent, David Boswarthick, Omar Elloumi, ISBN 978-1-119-99435-0, Wiley Publications.
5. The Internet of Things in the Cloud: A Middleware Perspective, HonboZhou , 2012, CRC Press .

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IV B. TECH II-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	3	**0**	**0**	**3**

18CSE422 INTERNETWORKING WITH TCP/IP

Course Educational Objectives:

CEO1: To study the standards of TCP / IP protocol and addressing types.
CEO2: To understand various protocols like ARP, RARP, UDP, ICMP, IGMP.
CEO3: To gain knowledge on TCP and UDP protocols.
CEO4: To learn about the TELNET and SSH- TELNET.
CEO5: To experience the IPv6 version in the network.

UNIT – 1: OSI Model and TCP/IP Protocol Suite (9)

TCP/IP protocol suite - Addressing- Internet protocol version 4 (IPv4) - Datagrams - Fragmentation - Options - Checksum - IPv4 addresses - Introduction - Classful addressing - Classless addressing - Special addresses - NAT

UNIT – 2: Address Resolution Protocol (ARP) (9)

Address mapping - The ARP protocol - ATMARP - ARP package - Internet control message protocol Version 4 - Introduction - Messages - Debugging tools - ICMP package - Unicast routing protocols (RIP, OSPE and BGP) - Introduction - Intra and inter domain routing - Distance vector routing - RIP - Link state routing - OSPF - Path vector routing - BGP

UNIT – 3: User Datagram Protocol (UDP) (9)

Introduction - User datagram - UDP services - UDP applications - UDP package - Transmission control protocol (TCP) - TCP services - TCP features - Segment - A TCP connection-Windows in TCP - Flow control - Error control - Congestion control - TCP timers - Options - TCP package

UNIT – 4: Remote Login (9)

TELNET and SSH- TELNET - Secure shell (SSH) - File transfer - FTP - TFTP

UNIT – 5: Internet Protocol Version 6 (9)

Introduction - Advantages of IPv6 - IPv6 addressing format - IPv6 header - IPv6 extension headers - ICMPv6

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Course Outcomes:

On successful completion of the course the student will be able to,

Course Outcomes		POs related to COs
CO1	Independently understand basic computer network technology.	PO1, PO2
CO2	Understand and explain ARP, RARP, UDP, ICMP, IGMP protocols.	PO1, PO4
CO3	Identify the differences between TCP and UDP	PO1, PO2
CO4	Understand and building the skills of sub netting and routing mechanisms.	PO1, PO2, PO3
CO5	Familiar with IPv6 protocol in communication networks.	PO1, PO2

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	-	-	2	-	-	-	-	-	-	-	-
CO3	3	3	-	-	-	-	-	-	-	-	-	-
CO4	2	2	2	-	-	-	-	-	-	-	-	-
CO5	3	3	-	-	-	-	-	-	-	-	-	-
CO*	**2.8**	**2.75**	**2.0**	**2.0**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Text Books:

1. TCP/IP Protocol Suite, 4/e, BehrouzA.Forouzan, April 2009, Tata McGrawHill, Hyderabad, India.
2. Introduction to Data Communications and Networking, 3/e, Wayne Tomasi, May 1998, Pearson Education, New Delhi, India.

References Books:

1. Internetworking with TCP/IP, 2/e, Douglas E. Comer, Stevens, 2006, PHI, New Delhi, India.
2. TCP/IP Network Administration, 3/e, Craig Hunt, O'Reilly, August 1992, New Delhi, India.
3. TCP/IP Illustrated, Volume 1: The Protocols, 2/e, Kevin R. Fall, W. Richard Stevens, 2011, Pearson Education, New Delhi, India.
4. The TCP/IP Guide:A Comprehensive, Illustrated Internet Protocols Reference, 1/e, Charles M. Kozierok, William Pollock, 2005, San Francisco, Usa.
5. TCP/IP Sockets in C: Practical Guide for Programmers, 1/e, Michael J. Donahoo, Kenneth L. Calvert, Morgan Kaufmann, 2001, San Francisco, Usa.

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IV B. TECH II-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	3	**0**	**0**	**3**

18CSE423A CLOUD COMPUTING (CORE ELECTIVE-III)

Course Educational Objectives:

CEO1: To provide knowledge on different types of Computing Systems and types of Cloud Computing Basics.
CEO2: To describe the different services of cloud
CEO3: To describe the Privacy and security aspects of cloud.
CEO4: To know common standards for Cloud
CEO5: To develop skill to setup our own private cloud and to Know various applications of Cloud.

UNIT – 1: Introductory concepts and overview (9)

Distributed systems - High performance cluster computing - Grid computing - Virtualization - Meaning of the terms cloud and cloud computing - cloud based service offerings - Grid computing versus Cloud computing - Benefits of cloud model - limitations - legal issues - Key characteristics of cloud computing - Challenges for the cloud - Public cloud – Private cloud – Hybrid cloud.

UNIT – 2: Cloud Web Services, Building cloud Networks (9)

Infrastructure as a service - Platform-as-a-service - Software-as-a-Service - Building cloud networks - Evolution from the MSP model to cloud computing and software-as-a-Service - The cloud data center - SOA as step toward cloud computing - Basic approach to a data center based SOA

UNIT – 3: Federation, Presence, Identity, Privacy and Security in the cloud (9)

Federation in the cloud - Presence in the cloud - Privacy and its relation to cloud based information system - Security in the Cloud - Cloud security challenges - Software-as-a-Service security

UNIT – 4: Common Standards in Cloud Computing - End user access to cloud computing (9)

The open cloud consortium - The distributed management task force - Standards for application developers - Standards for messaging - Standards for security - YouTube - Zimbra - Facebook - Zoho - DimDim collaboration - Smartphone - Mobile operating systems for smart phones - Mobile platform virtualization - Future trends.

UNIT – 5: Case Study (9)

Case studies:1 - Amazon EC2 - Amazon simple DB - Amazon S3 - Amazon cloud front.

Case studies:2 - Google App Engine - Google web tool kit - Microsoft Azure Services platform - Microsoft dynamic CRM

Case studies:3 - Setting up your own private cloud using open source tools.

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Course Outcomes:

On successful completion of this course, the students should be able to:

Course Outcomes		POs related to Cos
CO1	Demonstrate Different types of Computing Systems, Cloud Computing Basics, Types of Cloud Computing	PO1, PO2
CO2	Understand the different services of cloud.	PO1, PO2
CO3	Understand the Privacy and security aspects of cloud.	PO1, PO8
CO4	Demonstrate knowledge on common standards for Cloud	PO1, PO6
CO5	Develop skill to setup our own private cloud and to Know various applications of Cloud.	PO1, PO2, PO3, PO5, PO9, PO12

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-
CO3	3	-	-	-	-	-	-	3	-	-	-	-
CO4	3	-	-	-	-	2	-	-	-	-	-	-
CO5	**3**	3	3	-	**2**	-	-	-	**2**	-	-	3
CO*	**3**	**3**	**3**	**-**	**2**	**2**	**-**	**3**	**2**	**-**	**-**	**3**

Text Books:

1. Cloud Computing implementation- management and security, 1/e, John W. Rittinghouse, James F. Ransome ,2009, CRC Press, Taylor & Francis group, US.
2. Cloud Computing: A practical approach, 1/e, Anthony T.velte, TobyJ.velte Robert Elsenpeter–2009, Tata McGraw Hill edition, India.

Reference Books:

1. Cloud Computing: Principles and Paradigms , 1/e, RajkumarBuyya, James Broberg and AndrzejGoscinski, 2013, Wiley Pvt. Ltd, India.
2. Cloud Computing: Concepts, Technology& Architecture, 1/e , Thomas Erl, Ricardo Puttini and ZaighamMahmood, 2013, PH, New Delhi.
3. Cloud Application Architectures,1/e, George Reese, 2009 Oreillypublishers, California.
4. Cloud Computing and SOA convergence in your enterprise, 1/e, David S. Linthicum, Addison, Wesley, Boston, 2010,US.
5. Cloud Computing: SaaS -PaaS - IaaS- Virtualization- Business Models- Mobile, Security and More, 1/e, Kris Jamsa, Jones& Bartlett Learning, Massachusetts, 2013, US.

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IV B. TECH II-SEMESTER (CSE)

L	T	P	C
3	0	0	3

18CSE423B MACHINE LEARNING (CORE ELECTIVE-III)

Course Educational Objectives:

CEO1: To learn the concept learning and Decision Tree Learning algorithms.
CEO2: To understand Appropriate Problem for Neural Networks and Genetic algorithms.
CEO3: To learn Bayesian Belief Networks and sample complexity.
CEO4: To learn Instance-based Techniques
CEO5: To understand Advanced Learning Algorithms

UNIT – 1: INTRODUCTION (9)

Problems – Perspectives and Issues – Concept Learning – Version Spaces and Candidate Eliminations – Inductive bias – Decision Tree learning – Representation – Algorithm – Heuristic Space Search.

UNIT – 2: NEURAL NETWORKS AND GENETIC ALGORITHMS (9)

Network Representation – Problems – Perceptrons – Multilayer Networks and Back Propagation Algorithms – Advanced Topics – Genetic Algorithms – Hypothesis Space Search – Genetic Programming – Models of Evaluation and Learning.

UNIT – 3: BAYESIAN AND COMPUTATIONAL LEARNING (9)

Bayes Theorem – Concept Learning – Maximum Likelihood – Minimum Description Length Principle – Bayes Optimal Classifier – Gibbs Algorithm – Naïve Bayes Classifier – Bayesian Belief Network – EM Algorithm – Probability Learning – Sample Complexity – Finite and Infinite Hypothesis Spaces – Mistake Bound Model.

U**NIT – 4: Instance-based Techniques (9)**

K- Nearest Neighbour Learning – Locally weighted Regression – Radial Basis Functions – Case Based Learning.

UNIT – 5: ADVANCED LEARNING (9)

Learning Sets of Rules – Sequential Covering Algorithm – Learning Rule Set – First Order Rules – Sets of First Order Rules – Induction on Inverted Deduction – Inverting Resolution – Analytical Learning – Perfect Domain Theories – Explanation Base Learning – FOCL Algorithm – Reinforcement Learning – Task – Q-Learning – Temporal Difference Learning

Course Outcomes:

On successful completion of this course, the student will able to

Course Outcomes		POs related to COs
CO1	Formulate the Concept learning and Decision Tree Learning algorithms	PO1, PO2

CO2	Understand Neural networks and Genetic algorithms	PO1, PO2
CO3	Analyze Bayesian theory, to solve real life problems	PO1, PO2, PO3, PO4
CO4	Demonstrate K nearest algorithm for generalization of objects in learning.	PO1, PO2, PO3, PO4
CO5	Analyze the Advanced Learning algorithms.	PO1, PO2, PO3, PO4

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-
CO3	3	3	3	3	-	-	-	-	-	-	-	-
CO4	3	3	3	3	-	-	-	-	-	-	-	-
CO5	3	3	3	3	-	-	-	-	-	-	-	-
CO*	3	3	3	3	-	-	-	-	-	-	-	-

Text Books

1. Tom M. Mitchell, ―"Machine Learning", McGraw-Hill Education (India) Private Limited, 2013.

Reference Books

1. EthemAlpaydin, ―"Introduction to Machine Learning (Adaptive Computation and Machine Learning)", The MIT Press 2004.
2. Stephen Marsland, ―"Machine Learning: An Algorithmic Perspective‖", CRC Press, 2009.

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IV B. TECH II-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	3	**0**	**0**	**3**

18CSE423C DISTRIBUTED SYSTEMS (CORE ELECTIVE-III)

Course Educational Objectives:

CEO1: To understand basics of distributed systems, Networking, Inter process communication.
CEO2: To create an awareness of Distributed Objects and Remote Invocation.
CEO3: To gain the knowledge about the concepts related to Distributed Systems like Name Services and Concurrency Control.
CEO4: To analyze the key issues related to Distributed Transactions.
CEO5: To manage the distributed transactions in real time databases.

UNIT – 1: Characterization of Distributed Systems and System Models (9)

Introduction - Examples of distributed systems - Resource sharing and the web - Challenges - Architectural and fundamental models.

Networking and internetworking: Types of Network – Network Principles.

Inter process communication: The API for the Internet Protocols – External Data Representation and Marshalling – Client Server Communication – Group Communication.

UNIT – 2: Distributed objects and Remote Invocation (9)

Introduction - Communication between distributed objects – Remote procedure call - Events and notifications.

Operating System Support: OS layer - Protection - Processes and Threads - Communication and invocation - Operating system architecture.

UNIT – 3: Name Services (9)

Introduction - Name services and the domain name system - Directory services - Case study of the global name service - Case study of the X.500 directory service

UNIT – 4: Concurrency Control (9)

Introduction - Transactions - Nested transactions - Locks - Optimistic concurrency control - Timestamp ordering - Comparison of methods for concurrency control - Mutual Exclusion.

UNIT – 5: Distributed Transactions (9)

Introduction – Flat and Nested distributed transactions - Atomic commit protocols – Concurrency control – Distributed Deadlocks – Transaction Recovery – Transactions with Replicated data.

Course Outcomes:

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On successful completion of this course, the students should be able to:

Course Outcomes		POs related to COs
CO1	Distinguish characteristics of distributes systems.	PO1, PO2
CO2	Gain knowledge about howthe Distributed objects are used for remote invocation	PO1, PO2
CO3	Analyze the directory services in distributed systems.	PO1, PO2, PO3, PO4
CO4	Manage the concurrency control in distributed systems.	PO1, PO2, PO3, PO5
CO5	Implement distributed transactions in real time data bases.	PO1, PO2, PO3, PO4

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-
CO3	3	3	3	3	-	-	-	-	-	-	-	-
CO4	3	3	3	3	-	-	-	-	-	-	-	-
CO5	3	3	3	3	-	-	-	-	-	-	-	-
CO*	3	3	3	3	-	-	-	-	-	-	-	-

Text Books:

1. Distributed Systems Concepts and Design, 5/e,GCoulouris, J Dollimore and T Kindberg , 2011, Pearson Education, New Delhi.
2. Distributed Systems,2/e, S.Ghosh, Chapman and Hall/CRC, Taylor & Francis Group, 2010, US.

Reference Books:

1. Distributed Computing, 2/e, S.Mahajan and S.Shah, 2013, Oxford University Press, US.
2. Distributed Operating Systems Concepts and Design, 1/e, PradeepK.Sinha, 1998, PHI, New Delhi.
3. Advanced Concepts in Operating Systems, 1/e, M Singhal, N G Shivarathri, 2001 Tata McGraw, Hill Edition, India.
4. Reliable Distributed Systems, 1/e ,K.P.Birman, Springer , 2005, New York.
5. Distributed Systems: Principles and Paradigms, 2/e, A.S. Tanenbaum and M.V. Steen, 2008 Pearson Education, New York.
6. Distributed Operating Systems and Algorithm Analysis, 5/e, R.Chow, T.Johnson,2009Pearson, New Delhi.
7. Distributed Operating Systems, 1/e, A.S.Tanenbaum, 2009, Pearson Education, New Delhi.

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IV B. TECH II-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	3	**0**	**0**	**3**

18CSE423D NETWORK PROGRAMMING AND MANAGEMENT (CORE ELECTIVE-III)

Course Educational Objectives:

CEO1: To analyze the concepts of Sockets and Elementary TCP Sockets
CEO2: To understand TCP Client server Models
CEO3: To gain knowledge about socket programming and usage of TCP and UDP sockets
CEO4: To manage how to build network applications with Advanced sockets
CEO5: Learn to develop Macros for including Objects in MIB Structure

UNIT 1: ELEMENTARY TCP SOCKETS (9)

Inter Process Communication - Introduction to Sockets – Socket address Structures – Byte ordering functions –Byte Manipulation Functions- inet_aton - inet_addr and inet_ntoa functions - inet_pton and inet_ntop functions - sock_ntop and related functions - readn - written and readline functions.
Elementary TCP Sockets – socket – connect – bind – listen – accept – read – write - close functions – Iterative Server – Concurrent Server

UNIT 2:TCP Client-Server Example (9)

Introduction- TCP Echo Server and TCP Echo Client – Posix Signal handling – Handling SIGCHLD Signals-Wait and Waitpid functions- connection Abort before accept returns-Termination of Server process- Crashing of Server host - Crashing and rebooting of server host- Shutdown of server host – I/O multiplexing – I/O Models – select function – shutdown function – TCP echo Server (with multiplexing) – poll function – TCP echo Client (with Multiplexing)

UNIT 3: SOCKET OPTIONS, ELEMENTARY UDP SOCKETS (9)

Socket options – getsocketopt and setsocketopt functions – generic socket options – IP socketoptions – ICMP socket options – TCP socket options – Elementary UDP sockets –recvfrom and sendtofuctions- UDP echo Server – UDP echo Client – Lost datagrams.

Elementary name and Address Conversion: Domain name system – gethostbyname function – Ipv6 support in DNS – gethostbyadr function –getservbyname and getservbyport functions.

UNIT 4: ADVANCED SOCKETS (9)

Ipv4 and Ipv6 interoperability – IPv4 client - IPv6 Server-IPv6 Client - IPv4 Server.

Raw sockets – raw socket creation – raw socket output – raw socket input – ping program – trace route program.

UNIT 5: SIMPLE NETWORK MANAGEMENT (9)

SNMP network management concepts – SNMPv1 – Management information – MIB Structure – Object syntax – Standard MIB‟s – MIB-II Groups – SNMPv1 protocol and Practical issues.

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Course Outcomes:

On successful Completion of this course, students will be able to:

Course Outcomes		POs related to COs
CO1	Understand Inter process communication and Gain Knowledge on Elementary TCP sockets	PO1, PO2
CO2	Analyze different TCP client-server models	PO1, PO2, PO3, PO4
CO3	Work with different Socket options and elementary UDP sockets	PO1, PO2
CO4	Build different network applications in Advanced sockets	PO1, PO2, PO3, PO4
CO5	Develop Macros for including Objects In MIB Structure	PO1, PO2, PO3, PO4

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	3	3	-	-	-	-	-	-	-	-
CO3	3	3	-	-	-	-	-	-	-	-	-	-
CO4	3	3	-	-	-	-	-	-	-	-	-	-
CO5	3	3	3	3	-	-	-	-	-	-	-	-
CO*	**3**	**3**	**3**	**3**	-	-	-	-	-	-	-	-

Text Books:

1. Unix Network Programming – The Sockets Networking API, 3rd edition, W. Richard Stevens, B. Fenner, A.M. Rudoff, 2004,Pearson.
2. Unix Network Programming-Interprocess communication, Vol-2, 2nd edition,W. Richard Stevens, Pentice Hall.
3. William Stallings, SNMP, SNMPv2, SNMPv3 and RMON 1 and 2, Third Edition, Pearson Edition, 2009.

Reference Books:

1. TCP/IP Illustrated Volumes 1,W. Richard Stevens, 1994, Published by Addison-Wesley.
2. UNIX Network Programming, The Sockets Networking API, Volumes 1,W Richard Stevens, Bill Fenner, Andrew M. Rudoff, Addison-Wesley

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IV B. TECH II-SEMESTER	**L**	**T**	**P**	**C**
	3	**0**	**0**	**3**

18CSE423E COMPUTATIONAL INTELLIGENCE (Core Elective-III)

Course Educational Objectives:

The student should be made to:

CEO1: To study the concepts of Computational Intelligence.
CEO2: To Understand the First order logic concepts.
CEO3: To gain insight information about Artificial Neural Networks
CEO4: To study the Deep learning concepts and their Applications
CEO5: To study the Natural language Processing techniques

UNIT -1: Introduction, Intelligent Agents (9)

Introduction to Computational Intelligence - Agents and Environments - The Concept of Rationality – The Nature of Environments – The Structure of Agents.

UNIT -2: First Order Logic, Inference in First Order Logic (9)

Syntax and semantic of first order logic - Using first order logic - Knowledge engineering in first order logic - Propositional vs. First order inference - Ontological engineering - Categories and objects - Actions - Situations and Events.

UNIT -3: Artificial Neural Networks (9)

Forms of Learning – Regression and Classification with Linear Models – Artificial Neural networks – Support Vector Machines – Reinforcement Learning

UNIT - 4: Deep Learning (9)

Deep Feed Forward Networks – Regularization – Optimization for Training deep Models – Convolution Networks – Applications.

UNIT - 5: Natural Language Processing (9)

Language Models – Text Classification – Phrase Structure Grammars - Syntactic Analysis – Augmented Grammars and Semantic Interpretations – Machine Translation – Speech Recognition

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Course Outcomes:

On Successful completion of this course the students will be able to:

Course Outcomes		POs related to COs
CO1	Gain the basic Knowledge about Computational Intelligence	PO1
CO2	Apply the First order logic for data representation	PO1, PO3
CO3	Analyze and Implement Artificial Neural Network methods	PO1, PO2
CO4	Formulate the Deep learning methods for solving problems	PO1, PO4
CO5	Apply Natural Language Processing techniques	PO1, PO2, PO4, PO9

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	3	-	3	-	-	-	-	-	-	-	-	-
CO3	3	3	-	-	-	-	-	-	-	-	-	-
CO4	3	3	-	-	-	-	-	-	-	-	-	-
CO5	3	3	-	3	-	-	-	-	**3**	-	-	-
CO*	**3**	**3**	**3**	**3**	-	-	-	-	**3**	-	-	-

Text Books:

1. Artificial Intelligence A Modern Approach, 4/e, Stuart Russell and Peter Norvig, 2019, Pearson Education, New Delhi, India.
2. Artificial Intelligence, 3/e, Elaine Rich, Kevin Knight and Shiva Shankar B Nair, 2004, Tata McGraw Hill, Hyderabad, India.

Reference Books:

1. Artificial Intelligence A Modern Approach, 4/e, Stuart Russell and Peter Norvig, 2010, Pearson Education, New Delhi, India
2. Artificial Intelligence Structures and Strategies for Complex Problem Solving, 5/e, George F. Luther, 2005, Pearson Education, New Delhi, India.
3. Introduction to Artificial Intelligence, 1/e, Eugene Charniak and Drew McDermott, 1985,Pearson Education, New Delhi, India.
4. Artificial Intelligence: The Basics, 1/e, Kevin Warwick, 2012, Wearset ltd, Boldon.
5. Introduction to Artificial Intelligence, 2/e, Philip C. Jackson, 1985, Dover Publications, New York, USA.
6. Our Final Invention: Artificial Intelligence and the End of the Human Era, 1/e, James Barrat, 2013,Thomas Dunne Books, New York, USA.
7. Machine Learning, Tom M. Mitchell,1997, McGraw-Hill Science.
8. https://rapidminer.com

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IV B. TECH II-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	3	**1**	**0**	**3**

18CSE424A DISTRIBUTED DATABASES (CORE ELECTIVE-IV)

Course Educational Objectives:

CEO1: To gain knowledge on distributed and central data bases.
CEO2: To introduce basic principles and implementation techniques of distributed database systems.
CEO3: To manage the distributed transactions using concurrency control techniques.
CEO4: To understand the concepts of concurrency control and deadlock.
CEO5: To study the basic concepts of reliability control mechanisms.

UNIT – 1: Distributed versus Centralized Databases (9)
Features of distributed versus centralized databases - Principles of distributed databases - Levels of distribution transparency - Reference architecture for distributed databases - Types of data fragmentation - Integrity constraints in distributed databases

UNIT – 2: Translation of Global Queries to Fragment Queries (9)
Translation of global queries to fragment queries - Equivalence transformations for queries - Transforming global queries into fragment queries - Distributed grouping and aggregate function evaluation - Parametric queries - Optimization of access strategies - A framework for query optimization - Join queries - General queries

UNIT – 3: Management of Distributed Transactions (9)
The management of distributed transactions - A framework for transaction management - Supporting atomicity of distributed transactions - Concurrency control for distributed transactions - Architectural aspects of distributed transactions

UNIT – 4: Distributed Concurrency Control (9)
Locking based concurrency control algorithm - Time based concurrency control algorithm – Optimistic concurrency control algorithm - Deadlock management

UNIT – 5: Reliability Control (9)
Reliability - Basic concepts – Non blocking commitment protocols - Reliability and concurrency control - Determining a consistent view of the network - Detection and resolution of inconsistency - Checkpoints and cold restart - Distributed database administration - Catalog management in distributed databases - Authorization and protection

Course Outcomes:
On successful completion of the course the student will be able to,

COURSE OUTCOMES		**POs related to Cos**
CO1	Get familiar with the currently available models, technologies for and approaches to building distributed database systems and services.	PO1, PO2

CO2	Apply practical skills in the use of Query models and approaches to be able to select appropriate methods for a particular case.	PO1, PO3, PO4
CO3	Manage the distributed transactions in the real time data.	PO1, PO2
CO4	Understand the lock based concurrency control algorithms.	PO1, PO2
CO5	Demonstrate the reliability control mechanisms for Detection and resolution of inconsistency.	PO1, PO2, PO4

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	-	2	2	-	-	-	-	-	-	-	-
CO3	3	2	-	-	-	-	-	-	-	-	-	-
CO4	3	2	-	-	-	-	-	-	-	-	-	-
CO5	3	2	-	2	-	-	-	-	-	-	-	-
CO*	**3**	**2**	**2**	**2**	-	-	-	-	-	-	-	-

Text Books:

1. Distributed Database Principles & Systems, 2/e, Stefano Ceri, Giuseppe Pelagatti, 2008, McGrawHill, Hyderabad, India.
2. Principles of Distributed Database Systems, 2/e, M.TamerOzsu, Patrick Valduriez, 2011,Pearson Education, New Delhi, India.

Reference Books:

1. Distributed Database Management Systems: A Practical Approach, 1/e, Saeed K. Rahimi, Frank S. Haug, 2010,Wiley Publications, New Delhi, India.
2. Distributed Database Systems, 1/e, Chhanda Ray, 2012, Pearson Education, New Delhi, India.
3. Distributed Database Systems, 1/e, David Bell, Jane Grimson, Addison Wesley, 1992, New York, Usa.
4. Distributed Databases, Cooperative Processing, and Networking, 1/e, ShakuAtre, 1992, McGrawHill, Hyderabad, India.
5. Distributed Systems: Vol. II: Distributed Data Base Systems, 1/e, Wesley W. Chu, Artechm, 1986, Print on Demand, New York, USA

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IV B. TECH II-SEMESTER (Core Elective-IV)	**L**	**T**	**P**	**C**
	3	**0**	**0**	**3**

18CSE424B DATA SCIENCE USING PYTHON(CORE ELECTIVE-IV)

Course Educational Objectives:

The student should be made to:

CEO1: To study the Python module concepts NumPy and Pandas.
CEO2: To Understand the statistical analysis in data science.
CEO3: To gain insight information about visualizing techniques in data science
CEO4: To study the concepts of Machine Learning
CEO5: To study the Text mining concepts for analyzing the unstructured data.

UNIT -1: NumPy, Pandas (9)

The World of Arrays with NumPy : Creating an Array – Mathematical Operations – Squaring an Array – Indexing and Slicing – Shape Manipulation.

Empowering data Analysis with Pandas : The Data Structures of Pandas – Inserting and Exporting data – Data Cleaning – Data operations.

UNIT -2: Inferential Statistics (9)

Various forms of Distribution – Z-Score – P-Value – Type 1 and Type 2 Errors – Confidence Interval - Correlation – Z-Test Vs T-Test – F-Distribution – Chi-Square Distribution

UNIT -3: Advanced Visualization (9)

Controlling the line Properties of a chart – Creating multiple plots – Playing with Text – Styling your plots – Box plots – Scatter Plots with histograms – 3D Plot of a surface.

UNIT - 4: Machine Learning (9)

Decision Trees – Linear Regression – Logistic regression – The Naïve Baye's Classifier – The k-means clustering – Hierarchical Clustering.

UNIT - 5: Analyzing unstructured data with Text Mining (9)

Preprocessing data – Creating a wordCloud – Word and Sentence Tokenization – Parts of Speech Tagging – Streaming and Lemmatization.**Case Study:** Performing Sentence Analysis on World Leaders using Twitter

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Course Outcomes:

On Successful completion of this course the students will be able to:

Course Outcomes		POs related to COs
CO1	Gain the basic Knowledge on advanced Python Concepts	PO1
CO2	Comprehend the various Inferential statistics	PO1, PO3
CO3	Analyze and Implement visualization techniques using Python	PO1, PO2
CO4	Apply the various machine learning techniques	PO1, PO4
CO5	Perform data analysis on the unstructured data and generate the results	PO1, PO2, PO4, PO9

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	3	-	3	-	-	-	-	-	-	-	-	-
CO3	3	3	-	-	-	-	-	-	-	-	-	-
CO4	3	-	-	3	-	-	-	-	-	-	-	-
CO5	3	3	-	3	-	-	-	-	3	-	-	-
CO*	**3**	**3**	**3**	**3**	-	-	-	-	**3**	-	-	-

Text Books:

1. Mastering Python for Data Science, 1/e, Samir Madhavan, 2015, Packt Publishing, Mumbai, India.
2. Hands on Data Analysis with NumPy and Pandas, 1/e, Curtis Miller, 2016, Packt Publishing, Mumbai, India.

Reference Books:

1. Hands on Data science and Python Machine Learning, 1/e, Frank Kane, 2017, Packt Publishing, Birmingham, U.K.
2. Python for Data Analysis, 2/e, Samuel Burns, Globaltech NTC, 2019, Amazon KindlePublishing.
3. https://www.amazon.com/Python-Data-Analysis-Step-Step-ebook/dp/B07PXFJGHT

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IV B. TECH II-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	3	**0**	**0**	**3**

18CSE424C SERVICE ORIENTED ARCHITECTURE (CORE ELECTIVE-IV)

Course Educational Objectives:

CEO1: To understand the basic concepts of SOA, comparison with existing architectures and principles of service orientation.
CEO2: To learn about web services, messaging with SOAP and different layers of SOA and to learn about advanced concepts such as Orchestration.
CEO3: To learn about web services and Contemporary SOA
CEO4: To Study about Web Services Security and Advanced Messaging.
CEO5: To Understand the Service Oriented Business Process Design.

UNIT – 1: Introduction and Evolution of SOA (9)

Fundamental SOA - Common characteristics of contemporary SOA – Common tangible benefits of SOA – Common pitfalls of adopting SOA - SOA timeline (from XML to web services to SOA) - The continuing evolution of SOA (standards organizations and contributing vendors) - The roots of SOA (comparing SOA to past architectures)

UNIT – 2: Principles of Service- Orientation and Service Layers (9)

Services-orientation and the enterprise - Anatomy of a service-oriented architecture - Common principles of service-orientation - Service orientation and object orientation - Service layer abstraction Application service layer - Business service layer - Orchestration service layer

UNIT – 3: Web Services and Contemporary SOA (9)

The web services framework - Services (as web services) - Service descriptions (with WSDL) - Messaging (with SOAP) – Message exchange patterns - Service activity - Coordination - Atomic transactions - Business activities - Orchestration - Choreography

UNIT – 4: Web Services Security and Advanced Messaging (9)

Message level security - Data level security - XML Encryption - XML Signature - Reliable Messaging - Notification - WS - Eventing - WS - Notification

UNIT – 5: Business Process Design (9)

WS - BPEL language basics - WS - Coordination overview – Service Oriented Business Process Design (a step-by-step process) - WS - Addressing language basics - WS - Reliable messaging language basics

Course Outcomes:

On successful completion of this course, the students should be able to:

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Course Outcomes		POs related to COs
CO1	Gained Knowledge on concepts of SOA and comparison with older architectures and principles of service orientation.	PO1
CO2	Understood the Principles of Service- Orientation and Service Layers	PO1, PO2, PO3,PO4
CO3	Gained knowledge on different Web Services and Contemporary SOA	PO1, PO2, PO3
CO4	Understood the concepts of Web Services Security and Advanced Messaging	PO1, PO3
CO5	Gained knowledge to Analyze complex business process critically in identifying appropriate service model logic.	PO1, PO2,PO3,PO4

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3		-	-	-	-	-	-	-	-	-	-
CO2	3	2	3	3	-	-	-	-	-	-	-	-
CO3	3	3	2	-	-	-	-	-	-	-	-	-
CO4	3	-	3		-	-	-	-	-	-	-	-
CO5	3	3	3	2	-	-	-	-	-	-	-	-
CO*	**3**	**2.6**	**2.75**	**2.5**		-	-	-	-	-	-	-

Text Books:

1. Service-Oriented Architecture Concepts and Technology and Design, 1/e, ThomasErl,2006, Pearson Education, New Delhi, India.
2. Understanding SOA with Web Services, 1/e, Eric Newcomer, Greg Lomow, December 2004, Pearson Education, New Delhi, India.

References Books:

1. Service-Oriented Architecture (SOA): A Planning and Implementation Guide for Business and Technology, 1/e, Eric A. Marks, Michael Bell, 2006, Wiley Publication, New Delhi, India.
2. Developing Enterprise Web Services An Architect's Guide, 2/e, SandeepChatterjee, James Webber, 2004, Pearson Education, New Delhi, India.
3. Service-Oriented Architecture (SOA) Compass: Business Value, Planning, and Enterprise Roadmap, 1/e, Norbert Bieberstein, Sanjay Bose, Marc Fiammante, Keith Jones, Rawn Shah, 2005, IBM Press, New Delhi, India.
4. SOA in Practice: The Art of Distributed System Design(Theory in Practice), 1/e, Nicolai M.Josuttis, O'Reilly, 2007, New York, Usa.

5. IT Architecture and Middleware Strategies for Building Large Integrated Systems, 1/e, Chris Britton, Addison Wesley, 2000, New Delhi, India

IV B. TECH II-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	3	**0**	**0**	**3**

18CSE424D MOBILE COMPUTING (CORE ELECTIVE-IV)

Course Objectives:

CEO1: To describe the basic concepts and principles in mobile computing.
CEO2: To understand the concepts of wireless networks and application software.
CEO3: To explain the structure and components for Mobile IP and Mobility Management.
CEO4: To analyze the different transaction models in mobile data management.
CEO5: To gain knowledge about different mobile platforms and application development.

UNIT 1: Introduction (9)

Wireless and Mobile Computing Architecture – Limitations of wireless and mobile communication – Wireless Telecommunication Networks: Digital cellular Systems - TDMA - CDMA – Wireless Networking Techniques – Mobility Bandwidth Tradeoffs – Portable Information Appliances.

UNIT 2: Emerging Wireless Network Standards (9)

3 G Wireless Networks – State of Industry – Mobility support Software – End User Client Application – Mobility Middleware –Middleware for Application Development - Adaptation and Agents - Service Discovery Middleware – Finding Needed Services - Interoperability and Standardization.

UNIT 3: Mobile Networking (9)

Virtual IP Protocols - Loose Source Routing Protocols - Mobile IP – CDPD – GPRS – UMTS Security and Authentication – Quality of Service – Mobile Access to the World Wide Web.

UNIT 4: Mobile Data Management (9)

Mobile Transactions - Reporting and Co Transactions –Kangaroo Transaction Model – Clustering Model –Isolation only transaction – 2 Tier Transaction Model – Semantic based nomadic transaction processing.

UNIT V: Mobile Platforms And Applications (9)

Mobile Device Operating Systems – Special Constraints & Requirements – Commercial Mobile Operating Systems – Software Development Kit: iOS, Android, BlackBerry, Windows Phone – MCommerce – Structure – Pros & Cons – Mobile Payment System – Security Issues

Course Outcomes:

On successful completion of the course the student will be able to,

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Course Outcomes		POs related to COs
CO1	Apply the fundamental design paradigms and technologies to mobile computing applications.	PO1, PO2, PO3
CO2	Understand the concepts of wireless networks and application software.	PO1, PO2
CO3	Use the skill to demonstrate the virtual IP and mobile IP.	PO1, PO2, PO4
CO4	Understand the mobile transactions for data management.	PO1, PO2,
CO5	Develop a mobile application using android/blackberry/ios/Windows SDK	PO1, PO2, PO5

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	3	-	-	-	-	-	-	-	-	-
CO2	3	2	-		-	-	-	-	-	-	-	-
CO3	3	3	-	3	-	-	-	-	-	-	-	-
CO4	2	2	-	-	-	-	-	-	-	-	-	-
CO5	3	3	-	-	3	-	-	-	-	-	-	-
CO*	**2.8**	**2.75**	**3.0**	**3.0**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Text Books:

1. Mobile Computing Principles, Reza B Fat and Roy.T. Fielding, 2005.Cambridge University Press.
2. Anytime, Anywhere Computing, Mobile Computing Concepts and Technology, Abdelsalam A Helal, Richard Brice, Bert Haskel, MarekRusinkiewicz, Jeffery L Caster andDarellWoelk, 2000. Springer International Series in Engineering and Computer Science.

Reference Books:

1. Fundamentals of Mobile and Pervasive Computing, Golden Richard, Frank Adelstein, Sandeep KS Gupta, Golden Richard and Loren Schwiebert, 2005, McGraw-Hill ,Professional Publishing.

2. Principles of Mobile Computing, UweHansmann, LotharMerk, Martin S. Nicklons and Thomas Stober,2003, Springer.

3. Android Developers :http://developer.android.com/index.html

4. Apple Developer : https://developer.apple.com/

5. Windows Phone DevCenter :http://developer.windowsphone.com

6. BlackBerry Developer: http://developer.blackberry.com

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IV B. TECH II-SEMESTER (CSE)

L	T	P	C
3	0	0	3

18CSE424E REAL TIME SYSTEMS (CORE ELECTIVE-IV)

Course Educational Objectives:

CEO1: To learn the features of Real time OS.
CEO2: To study the various Uniprocessor and Multiprocessor scheduling mechanisms.
CEO3: To learn about various real time communication protocols.
CEO4: To study the difference between traditional and real time databases
CEO5 : To learn about the different types of real time tools

Unit – I Introduction **(9)**
Introduction to real-time computing - Structure of a real-time system - Characterization of real-time systems and tasks - Performance measures

Unit – II Task Assignment and Scheduling **(9)**
Task Assignment and Scheduling - Uniprocessor scheduling algorithms - Task assignment - Mode changes - Fault tolerant scheduling.

Unit – III Real Time Communication **(9)**
Real-time Communication - Network topologies and architecture issues - Protocols - Contention-based, token-based, polled bus - Fault tolerant routing.

Unit – IV Real Time Databases **(9)**
Real-time Databases - Transaction priorities and aborts - Concurrency control issues - Scheduling algorithms - Two-phase approach to improve predictability.

Unit – V Programming Languages and Tools **(9)**
Programming Languages and Tools - Hierarchical decomposition - Run-time error handling - Overloading - Timing specification - Recent trends and development

Course Outcomes:

Course Outcomes		POs related to COs
CO1	Understand the features of Real Time System	PO1, PO2, PO4
CO2	Implement the different processor scheduling and Task assignment	PO1, PO4
CO3	Understand the various real time protocols	PO1, PO2, PO4
CO4	Analyze the difference between traditional and real time database	PO1, PO2
CO5	Demonstrate the function of real time system function using tools	PO1, PO2, PO3, PO4

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CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	3	-	-	-	-	-	-	-	-
CO2	3	-	-	3	-	-	-	-	-	-	-	-
CO3	3	3	-	3	-	-	-	-	-	-	-	-
CO4	3	3	-	-	-	-	-	-	-	-	-	-
CO5	3	3	3	3	-	-	-	-	-	-	-	-
CO*	**3**	**3**	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Text Book

1. C. M. Krishna and Kang G. Shin, "Real-Time Systems", International Edition, McGraw Hill Companies, Inc., New York, 1997

Reference Book

1. Rajib Mall, "Real-Time Systems: Theory and Practice", 1st edition, Pearson Education, 2012

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IV B.Tech II Semester

L	T	P	C
0	0	20	10

18CSE425 PROJECT WORK

Course Educational Objectives:

1. Discovering potential research areas in the field of Computer science and Engineering.
2. Comparing and contrast the several existing solutions for the problem identified.
3. Formulating and propose a plan for creating a solution for the research plan identified.
4. Conducting the experiments as a team and interpret the results.
5. Reporting and presenting the findings of the work conducted.

The aim of the project work is to deepen comprehension of principles by applying them to a new problem which may be the design / fabrication / analysis for a specific application, a research project with a focus on an application needed by the industry / society, a computer project, or a design and analysis project. A project topic must be selected by the students in consultation with their guides.

To train the students in preparing project reports and to face reviews and viva voce examination. The progress of the project is evaluated based on a minimum of three reviews. The review committee may be constituted by the Head of the Department. A project report is required at the end of the semester. The project work is evaluated jointly by external and internal examiners constituted by the Head of the Department based on oral presentation and the project report.

Course Outcomes:

On successful completion of course, the student will be able to		**POs related to COs**
CO1	Demonstrate in-depth knowledge on the project topic	**PO1**
CO2	Identify, analyze and formulate complex problem chosen for project work to attain substantiated conclusions.	**PO2**
CO3	Design solutions to the chosen project problem.	**PO3**
CO4	Undertake investigation of project problem to provide valid conclusions	**PO4**
CO5	Use the appropriate techniques, resources and modern engineering tools necessary for project work	**PO5**
CO6	Apply project results for sustainable development of the society.	**PO6**
CO7	Understand the impact of project results in the context of environmental sustainability.	**PO7**
CO8	Understand professional and ethical responsibilities while executing the project work.	**PO8**

CO9	Function effectively as individual and a member in the project team	**PO9**
CO10	Develop communication skills, both oral and written for preparing and presenting project report.	**PO10**
CO11	Demonstrate knowledge and understanding of cost and time analysis required for carrying out the project.	**PO11**
CO12	Engage in lifelong learning to improve knowledge and competence in the chosen area of the project.	**PO12**

Note: Refer project work manual for preparation and method of evaluation

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	-	-	-	-	-	-	-	-	-	-	-
CO.2	-	3	-	-	-	-	-	-	-	-	-	-
CO.3	-	-	3	-	-	-	-	-	-	-	-	-
CO.4	-	-	-	3	-	-	-	-	-	-	-	-
CO.5	-	-	-	-	3	-	-	-	-	-	-	-
CO.6	-	-	-	-	-	3	-	-	-	-	-	-
CO.7	-	-	-	-	-	-	3	-	-	-	-	-
CO.8	-	-	-	-	-	-	-	3	-	-	-	-
CO.9	-	-	-	-	-	-	-	-	3	-	-	-
CO.10	-	-	-	-	-	-	-	-	-	3	-	-
CO.11	-	-	-	-	-	-	-	-	-	-	3	-
CO.12	-	-	-	-	-	-	-	-	-	-	-	3
CO	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**