SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
AUTONOMOUS
DEPARTMENT OF ELECTRONICS AND COMMUNICATION 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 VISION

To become a centre of excellence in Electronics and Communication Engineering and provide necessary skills to the students to meet the challenges of industry and society.

DEPARTMENT MISSION

- Provide congenial academic ambience with necessary infrastructure and learning resources
- Inculcate confidence to face and experience new challenges from industry and society.
- Ignite the students to acquire self-reliance in State-of-the-Art Technologies
- Foster Enterprising spirit among students

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

After few years of graduation the, graduates of Electronics and Communication Engineering shall

PEO1: Have Professional competency through the application of knowledge gained from subjects like Mathematics, Physics, Chemistry, Inter-Disciplinary and core subjects like Signal Processing, VLSI, Embedded Systems, Communication and Automation.**(Professional Competency)**

PEO2: E*xcel in one's career by critical thinking towards successful services and growth of the organization or as an entrepreneur or through 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)**

PROGRAMME OUTCOMES (PO's)

On Successful completion, the graduate will be able to,

PO1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2. **Problem analysis**: Identify, formulate, research literature, and analyze 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 the public health and safety, and the 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**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6. **The engineer 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 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:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSO's)

On Successful completion, the graduate will be able to,

PSO1: Apply the knowledge obtained in core areas for the analysis and design of components in Signal Processing, VLSI, Embedded Systems, Communication and Automation.

PSO2:Adapt Innovation, Creativity and design to develop products which meet industrial and societal needs.

Sreenivasa Institute of Technology and Management Studies - Chittoor 517 127
(Autonomous)

Academic Regulations for B. Tech (Regular)
(Effective for the students admitted into I- year from the Academic Year 2013-14)

1. Eligibility for admission

Admissions shall be made strictly on the basis of merit rank obtained by the qualifying candidates in the EAMCET entrance test to be conducted or on the basis of any other order of merit prescribed by the Government of Andhra Pradesh.

2. Award of B.Tech degree

A candidate shall be eligible for the award of B.Tech degree, if he/ she satisfies the minimum academic requirements in every subject including the seminar, comprehensive examination and project work successfully in not less than the prescribed course work duration and not more than double the prescribed course work duration and he/ she has not involved in any sort of indisciplinary activities certified by the Principal.

For regular students

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

b. **Register** for 180 credits and secure all the 180 (44+44+44+48) credits in not more than eight academic years from the year of his/her admission.

For lateral entry students

a. Pursues a course of study for not less than three academic years and in not more than six academic years.
b. Register for 136 credits and secure all the 136 (44+44+48) credits in not more than six academic years from the year of his/her admission.

Students, who fail to fulfil all the above academic requirements, shall forfeit their seat in B.Tech course and their admission will stand cancelled.

3. Under-Graduate (B.Tech) Courses offered

S.No.	Branch
1.	Civil Engineering (CE)
2.	Computer Science and Engineering (CSE)
3.	Electrical and Electronics Engineering (EEE)
4.	Electronics and Communication Engineering (ECE)
5.	Mechanical Engineering (ME)
6.	Information Technology (IT)
7.	Electronics and Instrumentation Engineering (EIE)

4. Supplementary examinations

The student eligible to appear for the external examination in a subject, but was absent for it or failed in it can appear for that subject at the next supplementary examination. However for I-year and IV-II- semester students there will be an advanced supplementary examination.

5. Contact periods/ Credits and marks

Year/ Semester	I -Year		Semester	
Subject	Periods per week	Credits	Periods per week	Credits
Theory	03	05	03	03
	02	04	--	--
Practical	03	03/04	03	02
Drawing	05	05	06	03
Reasoning and Aptitude skills(I-year) - Self-study	03	03	--	--
Technical Case Study (III-I) - Self-study	--	--	04	03
Soft Skills Lab(III- I/II) – Self-study	--	--	03	02
Project Seminar (IV-I)	--	--	02	03
Comprehensive Examination (IV-II)	--	--	--	04
Project Work (IV-II)	--	--	18	10

Table 1: Contact periods/ Credits and marks for I - B.Tech

Theory/ Practical	Subjects	Periods per week	Tutorial classes	Credits	Internal marks	External marks	Total marks
Theory	English	02	--	04	30	70	100
	Engineering Physics	02	01	04	30	70	100
	Engineering Chemistry	02	01	04	30	70	100
	C Programming and Data Structures	03	01	05	30	70	100
	Mathematics – I	03	01	05	30	70	100
	Engineering Drawing	05	--	05	30	70	100
Practical	English Language and Communication Skills Laboratory	03	--	03	40	60	100
	Engineering Physics and Engineering Chemistry Laboratory	03	--	03	40	60	100
	C Programming and Data Structures Laboratory	03	--	04	40	60	100
	IT and Engineering Work Shop	03	--	04	40	60	100
Self-study	Reasoning and Aptitude	03	--	03	30	70	100
Total credits		32	04	44			
		36					

Table 2: Contact periods/ Credits and marks for II, III, IV- B.Tech

Subject	Semester				
	Periods per week	Credits	Internal marks	External marks	Total marks
Theory	04	03	30	70	100
Practical	03	02	40	60	100
Reasoning and Aptitude	03	03	30	70	100
Technical Case Study	04	03	40	60	100
Soft Skills Lab	03	02	40	60	100
Project Seminar	02	03	100	-	100
Comprehensive Exam	-	04	100	-	100
Project work	18	10	40	60	100

6. Self-study courses

Objectives

- To promote self-learning, analytical, presentation and discussion skills and to minimise teaching/ textbook/notes related memorization
- To create enthusiasm for learning
- To inculcate the spirit of team work
- To promote ability to work independently and confidently
- The following are the self-study subjects

6.1 Reasoning and Aptitude Skills (I - year)

- Mainly Online practice
- On the basis of intermediate knowledge
- The emphasis is on comprehensive understanding and application of analytical and logical reasoning.

6.2 Advanced Technical Study (II, III, & IV year B.Tech)

The Student will select one advanced topic beyond the text book material for each of the theory courses in the curriculum in that semester and appear for the examination along with the II-internal examination.

6.3 Technical Case Study (III – I- semester)

The student has to select technical project/ technical understanding the design and manufacturing aspects of the entity prepare a report, give a seminar and submit, and appear for a viva-voce examination.

6.4 Soft-skills Laboratory (III - I/II-semester)

Soft-skills laboratory is incorporated to develop the competencies among the young engineering graduates in the area of communication, creative and critical thinking, team work, program and project management, decision making and problem solving skills. The laboratory is mainly focused on enhancing the employability skills of the students.

7. Audit course

Professional Ethics (II-I or II/-II-semester)

No credits and **No** examination but attendance will be reckoned.

8. Attendance

- A student shall be eligible to appear for external examinations, if he/ she acquires a minimum of 75% of attendance in aggregate of all the subjects in a semester.
- **Shortage of attendance below 65% in aggregate shall in <u>NO</u> case be condoned.**
- Condonation of shortage of attendance in aggregate up to 10% (65% or above but below 75%) in each semester may be granted on valid reasons only.
- Students whose shortage of attendance is not condoned in any semester are not eligible to take their external examination of that class and their registration shall stand cancelled.
- A student will not be promoted to the next semester unless he/ she satisfies the attendance requirements of the present semester and can seek re-admission for that semester when offered next.
- A stipulated condonation fee shall be payable to the college towards the shortage of attendance.

9. Distribution and credence of marks

9.1 Evaluation of student's performance

The performance of a student in each semester/ I-year shall be evaluated subject-wise for a maximum of 100 marks for theory and 100 marks for practical subject. In addition, a seminar for 100 marks, project work for 100 marks and comprehensive examination for 100 marks shall be evaluated in IV-year.

9.2 Evaluation of internal marks

- In professional theory subjects, internal evaluation will be for 30 marks (25 marks for the two internal examinations and 5 marks for 'Advanced Technical Study').
- The external examination will be conducted for 70 marks.
- During the semester, there shall be **<u>two</u>** internal examinations. Each internal examination question paper consists of 5 short answer questions for 10 marks and 5 descriptive answer questions, out of which the student has to answer 3 questions for 20 marks for a total duration of 2 hours.
- I-internal examination will be conducted in units-1 and 2 of syllabus for 30 marks and evaluated for 10 marks.
- II- internal examination will be conducted in units-3, 4 and 5 of syllabus for 30 marks and evaluated for 15 marks.

- 'Advanced Technical Study' **(for II, III and IV- year)** internal examination will be conducted for 5 marks along with II-internal examination, in the topic selected by the student in consultation with the subject staff concerned.

- If there is any fraction in the marks secured by the student in the internal examinations, then it will be rounded off to the next nearest highest mark.

- The cumulative marks secured by the student in both the internal examinations and the 'Advanced Technical Study' internal examination for a maximum of 30 will be considered as internal marks.

- However, for the first year, there shall be three internal examinations as in the above pattern.

  The syllabus will be unit - 1 for I- internal examination, units - 2 and 3 for II- internal examination and units - 4 and 5 for III- internal examination. Each internal examination is conducted for 30 marks and evaluated for 10 marks.

  If there is any fraction in the marks secured by the student in the internal examinations, then it will be rounded off to the next nearest highest mark.

  The cumulative marks secured by the candidate in all **three** internal examinations for a maximum of 30 marks in each subject shall be considered internal marks.

  No 'Advanced Technical Study' in I-year.

9.3 Make-up examination

One make-up internal examination shall be conducted at the end of the semester but before the practical examinations to those students who are absent with prior written permission of the HOD/Principal for either one or both the internal examinations on medical grounds or with genuine valid reasons only.

For II, III and IV- year

- The examination will be conducted in all the **five** units and "Advanced Technical Study' irrespective of the examination(s)absent. If the candidate is absent for (a) I- internal examination, the make-up examination will be evaluated for a maximum of 10 marks (b) II- internal examination, then the make-up examination will be evaluated for a maximum of 15 marks and (c). both the internal examinations, then the make-up examination will be evaluated for a maximum of 25 marks.

- Make-up examination will be conducted for the absentees in 'Advanced Technical Study' for 5 marks.

  For I-year:

  The examination will be conducted in all the f**ive** units irrespective of the internal examination(s) absent.

  If the candidate is absent for (a) any **one** internal examination, then the make-up examination will be conducted for a maximum of 10 marks (b) any t**wo** internal examinations, then the make-up examination will be conducted for a maximum of 20 marks and (c). all the **three** internal examinations, then the make-up examination will be conducted for a maximum of 30 marks.

9.4 Evaluation of drawing subjects

For II, III and IV-year:

- For the semester subjects having Design and/ Drawing, such as Machine Drawing/ Building Drawing/ Irrigation Design and Drawing/ RCC Design/ Drawing and Estimation, the distribution shall be 30 marks for internal evaluation and 70 marks for external examination.
- Day-to- day work assessment in the class will be for 5 marks that shall be evaluated by the teacher concerned for the designs/drawings/reports submitted.
- There shall be two internal examinations in a semester. I- internal examination will be in units - 1 and 2 for 10 marks and II- internal examination will be in units- 3, 4 and 5 for 15 marks.
- The cumulative marks of the two examinations along with the day-to-day assessment marks secured by the candidate for a maximum of 30 will be considered internal marks.
- No advanced technical study for drawing subjects.

For I-year:

- I-internal examination will be conducted in unit - 1 and evaluated for 5 marks. II- internal examination will be conducted in units - 2 and 3 and evaluated for 10 marks. III-internal examination will be conducted in units - 4 and 5 and evaluated for 10 marks.
- Day-to- day work assessment in the class will be for 5 marks that shall be evaluated by the teacher concerned for the drawings submitted.

- The cumulative marks of the three examinations along with the day-to-day assessment marks secured by the candidate for a maximum of 30 will be considered internal marks.

- Engineering drawing will have university external examination.

9.5 Evaluation in practical subjects (common for all)

For practical subjects, there shall be a continuous evaluation during the semester for 40 internal marks and 60 external examination marks. Day-to-day work in the laboratory shall be evaluated for 40 marks by the laboratory teacher concerned. The external examination shall be conducted for 60 marks by the laboratory teacher and another examiner.

For I-year

- The students shall attend the Physics laboratory and Chemistry laboratory in alternate weeks. The external examination shall be conducted separately and the cumulative marks secured by the student in both the examinations will be considered.
- The students shall attend Engineering workshop and IT workshop as a single laboratory every week and the external examination is conducted as a single laboratory sharing the maximum marks and time for one task each from engineering workshop and IT workshop. The cumulative marks secured by the student shall be considered.

9.**6** Evaluation for 'Technical Case Study'

- A three member committee consisting of HOD/ HOD's nominee and two senior faculty members will evaluate the 'The Technical Case Study'.

- Day –to –day internal evaluation will be done for 40 marks by the teacher concerned.

- External evacuation will be done by the above committee for 60 marks based on the seminar to be given by the student and the report submitted.

- For the seminar, the student shall collect the information on a specialized topic of his/ her choice and prepare a technical report, showing his/her understanding over the topic, and submit the same to the department before presentation. The report and the presentation shall be evaluated by the above three member committee.

9.7 Comprehensive examination

Based on the GATE examination pattern for 100 marks at the beginning of IV- II semester will be evaluated internally by the department concerned.

9.8 Evaluation of Project Seminar

Project work seminar shall be conducted at the end of IV-I semester by a three member committee, consisting of HOD/HOD's nominee, co-ordinator and project supervisor

9.9 Evaluation of Project work

- Out of a total of 100 marks for the project work, 40 marks shall be for internal evaluation and 60 marks for the external examination (viva-voce).

- The internal evaluation shall be done by the Project Review Committee (PRC), consisting of HOD/HOD's nominee, co-ordinator and/ project supervisor on the basis of two seminars to be given by each student on the topic of his /her project.

- The viva-voce shall be conducted by a PRC and an external examiner.

- The evaluation of project work shall be conducted at the end of the IV- II-semester.

9.10 External examination: (for all the years)

The external examination question paper consists of short answer questions (without choice) for 20 marks and 5 descriptive answer questions of equal credence with internal choice for 50 marks for 3 hours duration.

9.11 Self-study courses

- Technical Case Study (for III-I) will be evaluated for 100 marks by the above said PRC based on the report submitted by the student to the committee.
- The Reasoning and Aptitude (I-year) will be evaluated for 100 marks similar to the theory examination. The internal evaluation will be for a maximum of 30 marks. Three internal examinations shall be conducted for 30 marks (30 - objective type questions, 45- minutes' duration) and each internal examination will be evaluated for 10 marks.

  The external examination shall be conducted for 70 marks for 2 hours duration.
- For **Soft-skills** laboratory **(III- I/ II),** there shall be a continuous evaluation of day-to-day work during the semester for 40 internal marks by the laboratory teacher concerned.
- The external examination shall be for 60 marks, out of which 40 marks will be for written examination and 20 marks for viva-voce.

10. Minimum academic requirements

10.1 Academic requirements to be satisfied besides the attendance mentioned in section-8**.**

- A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory, practical, design, drawing subject/ seminar/ comprehensive examination or project if he/ she secures a minimum of 40% of marks in the external examination (28 marks) and a total of 50% marks in the internal and external examinations put together for that particular subject.

10.2 Criteria for promotion to next academic year

- A student should get 50% of total credits in every academic year for promotion to the next academic year (Regular for 4 years or lateral entry for 3 years) i.e.
- A student shall be promoted from I-year to II-year only if he/ she fulfils the academic requirement of securing **22** credits.
- A student shall be promoted from II-year to III-year only if he/ she fulfils the academic requirement of securing **44** credits. For Lateral entry students to promote from II to III, he/ she should get 22 credits.
- A student shall be promoted from III-year to IV-year only if he/ she fulfils the academic requirements of securing **66 c**redits. For lateral entry students to promote from III-year to IV-year, he/ she should get 44 credits.
- Students of regular and lateral entry, who fail to satisfy minimum academic requirements given in clause-7 within eight academic years from the year of their admission shall forfeit their seat in B.Tech course and their admission, shall stand cancelled.

11. Re-admission

When a student is detained due to lack of credits/ shortage of attendance he/ she has to get re-admitted for that semester/ year after fulfilment of academic regulations, whereas he/ she continues to be in the academic regulations in which he/ she is admitted.

12. Class committee

12.1 Every class shall have a class committee consisting of teachers of the class concerned, student representatives and a Chairperson who does not teach that class. The overall goal of the class committee is to improve the teaching-learning process.

12.2 The functions of the class committee are to:

- Solve the problems experienced by students in the class room/the laboratories.
- Clarify the regulations of the degree programme and the details of rules therein.
- Inform the student representatives about the academic schedule, course structure including the dates of assessments and the syllabus coverage for each assessment.
- Enlighten the student representatives about the regulations regarding credence used for each assessment. In case of practical courses (laboratory/ project work/ seminar etc.) the breakup of marks for each experiment/ exercise/ module of work/ assignments and evaluation pattern should be clearly discussed in the class committee meeting and informed to the students.
- Analyze the performance of the students of the class after each test and final examinations, finding the ways and means for solving problems, if any (in the class committee held after the external examinations, the student representatives should not be present).
- Identify the weak students, if any, and request the teachers concerned to provide some additional help/ guidance/ coaching to them.

12.3 The class committee should be constituted by the HOD one week in advance before the commencement of class work for the semester.

12.4 The Chairperson may invite the faculty members and the HOD to the meeting of the class committee along with the students' representatives.

12.5 The Principal may participate in any class committee of the institution.

12.6 The Chairperson is required to prepare the minutes of every meeting and submit the same to the Principal within two days after the meeting is over and arrange to circulate it among the students and teachers concerned. If there are certain vital points in the minutes that require immediate action to be taken by the management, the same shall be brought to the notice of the Management by the Head of the Institution.

12.7 The first meeting of the class committee shall be held within one week from the date of commencement of the semester. Subsequently, two or three such meetings may be held in a semester at suitable and convenient dates.

12.8 The class committee Chairperson shall display the cumulative attendance particulars of each student on the notice board at the end of every such meeting to enable the students to know their attendance details.

12.9 During these meetings, the student members representing the entire class, shall significantly interact and express the opinions and suggestions of the other students of the class in order to improve the effectiveness of the teaching-learning process.

13. Transitory regulations

Candidates who have been detained due to lack of attendance or have not fulfilled academic requirements or failed after having undergone the course in the earlier regulations or 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 continue to be in the same academic regulations in which they are admitted.

14. Withhold of results

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

15. Award of letter grades

- All assessments of a course will be done on absolute marks basis. However, for the purpose of reporting the performance of a candidate, letter grades, each carrying certain number of points, will be awarded as per the range of total marks (out of 100) secured by the candidate in each subject as detailed below:

Letter grade	**Grade points**	**Marks range**
S	10	90 – 99
A	9	80 – 89
B	8	70 – 79
C	7	60 – 69
D	6	50 – 59
F	0	< 50 (Fail)
ABS	0	---------

- **Grade sheet**

After the results are declared, grade sheets will be issued to the student with the following details:

- The college in which the candidate has studied
- The list of courses enrolled during the semester and the grade scored
- The Grade Point Average (GPA) for the semester and
- The Cumulative Grade Point Average (CGPA) of all courses enrolled from first semester/ I-year onwards

GPA for a semester is the ratio of the sum of the products of the number of credits for courses acquired and the corresponding points to the sum of the number of credits for the courses acquired in the semester.

$$GPA = \frac{\text{Sum of [Credits acquired x Grade points]}}{\text{Sum of Credits acquired}}$$

CGPA will be calculated in a similar manner, considering all the courses registered from I-semester. "F" & "ABS", grades will be excluded for calculating GPA and CGPA.

$$CGPA = \frac{\sum_{i=1}^{n} C_i GP_i}{\sum_{i=1}^{n} C_i}$$

where Ci – is the credits assigned to the course
GPi – is the point corresponding to the grade obtained for each course
n – is the number of all courses successfully cleared during the particular semester in the case of GPA and during all the semesters in the case of CGPA.

- Whenever students, having arrear subjects, appear for the external semester examination during which there are no regular batch of students writing the same subjects, then, the letter grades for the arrears' subjects shall be awarded based on the range of marks approved by the class committee immediately preceding end semester examination in which regular students wrote.

- **Classification of successful candidates**
  Classification of performance of the students at the end of the course (after completing all the course requirements) will be based on CGPA (Cumulative Grade Point Average) as indicated below.

Classification	**CGPA**
First class with distinction	8.0 and above
First Class	6.5 to 7.99
Second Class	5.0 to 6.49

- A minimum of 5.0 CGPA is required for the award of the degree.

16. Revaluation and Improvement

- A candidate can apply for revaluation of his/ her external examination answer paper in a theory course, within two days from the date of declaration of results, on payment of a prescribed fee through proper application to the Controller of Examinations through the Head of the Institution. A candidate can apply for revaluation of answer scripts in not more than **5** subjects at a time**.** The Controller of Examination will arrange for the revaluation and the results will be intimated to the candidate concerned through the Principal.
- **No** revaluation for seminar, comprehensive Examination, practical and project work.
- A candidate can be allowed to apply for improvement only in theory subjects in the next supplementary examinations of that semester (not more than one chance per subject).

17. Number of instruction days

The minimum no. of instruction days including examinations will be 90 per semester and 180 per year.

18. Rules of discipline

- Any attempt by any student to influence the teachers, examiners, faculty and staff of controller of examination for undue favors in the exams, and bribing them for marks/ attendance will be treated as malpractice cases and the student will be debarred from the college.
- When the student absents himself/ herself, he/she is treated as to have appeared and obtained ZERO marks in that subject(s) and grading is done accordingly.
- When the performance of the student in any subject(s) is cancelled as a punishment for indiscipline, he/she will be awarded zero marks in that subject(s).
- When the student's answer book is confiscated for any kind of attempted or suspected malpractice the decision of the examiner is final.

19. General

- The academic regulations should be read as a whole for purpose of any interpretation.
- Malpractices rules- nature and punishments is appended.
- In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Vice-Chairman of the academic council will be final.
- The college may, from time to time, revise, amend or change the regulations, scheme of examinations and syllabi.

20. Disciplinary actions for malpractices / improper conduct in examinations

	Nature of Malpractices/ Improper conduct	**Punishment**
	If the candidate	
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	Expulsion from the examination hall and cancellation of the performance in that subject only.

	can be used as an aid in the subject of the examination)	
(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.
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 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 to appear for the remaining 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 practicals 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. If the imposter is an outsider, he/she will be handed over to the police and a case is registered against him/her.
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.	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 amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	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.
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 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.
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.	

Malpractices identified by squad or special invigilators

- Punishments to the candidates as per the above guidelines.
- Punishment for institutions : (if the squad reports that the college is also involved in encouraging malpractices)

  a. A show cause notice shall be issued to the college.

  b. Impose a suitable fine on the college.
- Shifting the examination centre from the college to another college for a specific period of not less than one year.

Note: All the above regulations will be also applicable for the other B.Tech courses that may be sanctioned to the institution in future.

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SREENIVASA INSTITUTE of TECHNOLOGY and MANAGEMENT STUDIES
(Autonomous)
Course structure for B.Tech (Regular) I- year (2013-14)
(Common for all branches)

S.No.	Subject code	Subject	Scheme of instructions Periods per week					Scheme of examination Maximum Marks		
			L	D	T	P	C	I	E	Total
1	13HAS 101	English	2	-	-	-	4	30	70	100
2	13HAS 102	Engineering Physics	2	-	1	-	4	30	70	100
3.	13HAS 103	Engineering Chemistry	2	-	1	-	4	30	70	100
4.	13HAS 104	Mathematics-I	3	-	1	-	5	30	70	100
5.	13HAS 105	Reasoning and Aptitude	3	-	-	-	3	30	70	100
6.	13CSE 101	C Programming and Data Structures	3	-	1	-	5	30	70	100
7.	13MEC 101	Engineering Drawing	-	5	-	-	5	30	70	100
8.	13HAS 106	Engineering Physics Lab and Engineering Chemistry Lab	-	-	-	3	3	40	60	100
9.	13HAS 107	English Language and Communication Skills Lab	-	-	-	3	3	40	60	100
10.	13CSE 102	C Programming and Data Structures Lab	-	-	-	3	4	40	60	100
11.	13MEC 102	Engineering and I.T. Workshop	-	-	-	3	4	40	60	100
Contact periods per week			15	5	4	12	-	-	-	-
Total periods per week			36				-	-	-	-
Total credits(7 Theory + 4 Labs)							44	-	-	-
Total Marks								370	730	1100

SREENIVASA INSTITUTE of TECHNOLOGY and MANAGEMENT STUDIES

(Autonomous)

Electronics & Communication Engineering (E.C.E.)

Course structure for B.Tech (Regular) II, III, IV year (2013-14)

B.Tech II-I Semester

S. No.	Course Code	Subject	Scheme of Instruction Periods per week			Scheme of Examination Maximum Marks		
			L	P	C	I	E	Total
1	13HAS 211	Mathematics II	4	-	3	30	70	100
2	13HAS 213	Environmental Science	4	-	3	30	70	100
3	13ECE 211	Electronic Devices and Circuits	4	-	3	30	70	100
4	13ECE 212	Signals & Systems	4	-	3	30	70	100
5	13ECE213	Switching Theory and Logic Design	4	-	3	30	70	100
6	13EEE 218	Principles of Electrical Engineering	4	-	3	30	70	100
7	13ECE 214	Electronic Devices and Circuits Lab	-	3	2	40	60	100
8	13EEE 219	Electrical Engineering Lab	-	3	2	40	60	100
9	13AUD 211	Professional Ethics	2	-	-	-	-	-
Contact periods per week			26	6				
Total periods per week			32					
Total (6 Theory + 2 Labs)					22			
Total marks						260	540	800

SREENIVASA INSTITUTE of TECHNOLOGY and MANAGEMENT STUDIES

(Autonomous)

B.Tech II-II Semester

S. No.	Course Code	Subject	Scheme of Instruction Periods per week			Scheme of Examination Maximum Marks		
			L	P	C	I	E	Total
1	13HAS 221	Mathematics III	4	-	3	30	70	100
2	13MBA 218	Business Management	4	-	3	30	70	100
3	13ECE 221	Electronic Circuit Analysis	4	-	3	30	70	100
4	13ECE 222	Pulse and Digital Circuits	4	-	3	30	70	100
5	13ECE 223	Probability Theory & Stochastic Process	4	-	3	30	70	100
6	13ECE 224	Electromagnetic Waves & Transmision Lines	4	-	3	30	70	100
7	13ECE 225	Electronic Circuit Analysis Lab	-	3	2	40	60	100
8	13ECE 226	Pulse and Digital Circuits Lab	-	3	2	40	60	100
ontact periods per week			24	6				
Total periods per week			30					
Total (6 Theory + 2 Labs)					22			
Total marks						260	540	800

SREENIVASA INSTITUTE of TECHNOLOGY and MANAGEMENT STUDIES

(Autonomous)

B.Tech III-I Semester

S. No.	Course Code	Subject	Scheme of Instruction Periods per week			Scheme of Examination Maximum Marks		
			L	P	C	I	E	Total
1	13ECE 311	Analog Communications	4	-	3	30	70	100
2	13ECE 312	Linear IC Applications	4	-	3	30	70	100
3	13ECE 313	Digital IC Applications	4	-	3	30	70	100
4	13ECE 314	Computer Organization	4	-	3	30	70	100
5	13EEE 314	Control Systems	4	-	3	30	70	100
6	13ECE 315	Technical Case Study	4	-	3	30	70	100
7	13ECE 316	IC Applications Lab	-	3	2	40	60	100
8	13MBA 311	Soft Skills Lab	-	3	2	40	60	100
Contact periods per week			24	6				
Total periods per week			30					
Total (6 Theory + 2 Labs)					22			
Total marks						260	540	800

SREENIVASA INSTITUTE of TECHNOLOGY and MANAGEMENT STUDIES

(Autonomous)

B.Tech III-II Semester

S. No.	Course Code	Subject	Scheme of Instruction Periods per week			Scheme of Examination Maximum Marks		
			L	P	C	I	E	Total
1	13ECE 321	Antennas &Wave Propagations	4	-	3	30	70	100
2	13ECE 322	Digital Communications	4	-	3	30	70	100
3	13ECE 323	Microprocessor and Interfacing	4	-	3	30	70	100
4	13ECE 324	Digital Signal Processing	4	-	3	30	70	100
5	13ECE 325	Electronic Measurements and Instrumentation	4	-	3	30	70	100
6	13ECE 326	VLSI Design	4	-	3	30	70	100
7	13ECE 327	Analog &Digital Communications Lab	-	3	2	40	60	100
8	13ECE 328	Microprocessor and Interfacing Lab	-	3	2	40	60	100
Contact periods per week			24	6				
Total periods per week			30					
Total (6 Theory + 2 Labs)					22			
Total marks						260	540	800

SREENIVASA INSTITUTE of TECHNOLOGY and MANAGEMENT STUDIES

(Autonomous)

B.Tech IV-I Semester

S. No.	Course Code	Subject	Scheme of Instruction Periods per week			Scheme of Examination Maximum Marks		
			L	P	C	I	E	Total
1	13ECE 411	Microwave Engineering	4	-	3	30	70	100
2	13CSE 311	Computer Networks	4	-	3	30	70	100
3	13ECE 412	Optical Fiber Communications	4	-	3	30	70	100
4	13ECE 413	Digital Image Processing	4	-	3	30	70	100
5	13ECE 414A 13ECE 414B 13ECE 414C	**Elective I** A)Embedded Systems B)Telivision Engineering C)Bio Medical Instrumentation	4	-	3	30	70	100
6	13ECE 415A 13ECE 415B 13ECE 415C	**Elective II** A)Radar systems B) Modern Digital Communication Techniques C) DSP Processors and Architectures	4	-	3	30	70	100
7	13ECE 416	Microwave and Optical Communications Lab	-	3	2	40	60	100
8	13ECE 417	Digital Signal &Image Processing Lab	-	3	2	40	60	100
9	13ECE 418	Project Seminar	2	-	3	50	-	50
Contact periods per week			26	6				
Total periods per week			32					
Total (6 Theory + 2 Labs)					25			
Total marks						310	540	850

SREENIVASA INSTITUTE of TECHNOLOGY and MANAGEMENT STUDIES

(Autonomous)

B.Tech IV-II Semester

S. No.	Course Code	Subject	Scheme of Instruction Periods per week			Scheme of Examination Maximum Marks		
			L	P	C	I	E	Total
1	13ECE 421	Mobile Communication & Networks	4	-	3	30	70	100
2	13ECE 422A 13ECE 422B 13ECE 422C	**Elective III** A)Satellite Communications B)Information Coding and Techniques C)Image and Video Processing	4	-	3	30	70	100
3	13ECE 423A 13ECE 423B 13ECE 423C	**Elective IV** A)Digital Design Through Verilog HDL B)Artificial Neural Networks C)Advanced Computer Architecture	4	-	3	30	70	100
4	13ECE 424	Comprehensive Examination	-	-	4	30	70	100
5	13ECE 425	Project Work	18	-	10	60	140	200
Contact periods per week			30	-				
Total periods per week			30					
Total (3Theory + Comprehensive Examination + Project Work)					23			
Total marks						180	420	600

L – Lectures P – Practical T – Tutorial C – Credits

I- Internal E - External D - Drawing

SUMMARY OF CREDIT ALLOCATION

S.NO	Subject Area	Credits As Per Semester							Total Credits	Percentage –wise Credit Distribution
		I YR	II-I	II-II	III-I	III-II	IV-I	IV-II		
1.	SH	26	6	3	-	-	-	-	35	19.4%
2.	ES	18	5	3	2	-	-	-	28	15.5 %
3.	PC	-	11	16	20	22	19	17	105	58.4%
4.	CE	-	-	-	-	-	6	6	12	6.7%
5.	AC	-	0	-	-	-	-	-	0	0%
Total		44	22	22	22	22	25	23	**180**	**100%**

SREENIVASA INSTITUTE of TECHNOLOGY and MANAGEMENT STUDIES

(Autonomous)

I B.Tech	**L**	**T**	**P**	**c**
	2	-	-	4

13HAS 101 ENGLISH
(Common to all Branches)

Course Educational Objectives:

CEO1: To Provide Knowledge on describing environmental aspects, developing vocabulary by deriving various ways of functional English words used.

CEO2: To acquire knowledge on Life skills and Usage of grammar aspects.

CEO3: To Cultivate self confidence in one's life with the help of renowned Engineers and Scientists.

CEO4: Contextual knowledge to recognize the need of ability to engage in independent and life-long learning in the broadest context of technological change.

CEO5: To cultivate Individual, Team Work and Adaptability Skills in work place.

UNIT - 1:
Heaven's Gate by Pico Iyer from Enjoying Everyday English - Mokshagundam Visvesvaraya from Inspiring Lives - Exercises – Questions.
Writing: Paragraph writing - Descriptions - Objects - Mechanisms and processes - Listening - Listening for sounds -Speaking - Greeting - Taking leave and introducing.
Grammar: Naming words - Pronouns - Vocabulary- Homonyms - Homophones - Homographs - Synonyms and Antonyms.

UNIT – 2:
The year 2050 by Theodre. J. Gordon from English for Students of Science - Vikram Sarabhai from Inspiring Lives - Exercises – Questions.
Writing: Official Letters - E-mail letters - Faxes – Memorandums. Listening: Listening for words - Speaking - Making requests and responding to them.
Grammar: Making naming words specific (Part-I) Articles - Genitives and Possessive Adjectives - Vocabulary - Word Formation.

UNIT – 3:
The Connoisseur from Enjoying Everyday English - Sam Pitroda from Inspiring Lives - Exercises – Questions.
Writing: Summarizing. Listening: Listening for word stress – Speaking: Making and accepting an apology - Inviting and accepting/declining an invitation.
Grammar: Making naming words specific (Part-II) Demonstratives - Quantifiers and Distributives - Adjectives - Vocabulary- Collocations - Words that go together.

UNIT – 4:
Human Environment from English for Students of Science - Viswanath Anand from Inspiring Lives - Exercises – Questions.
Writing: Official Reports. Listening: Listening for theme. Speaking: Congratulating - Expressing sympathy and offering condolences - Making a complaint.
Grammar: Tenses - Vocabulary - Phrasal verbs.

UNIT – 5:

Odds against us from Enjoying Everyday English - Charlie Chaplin from Inspiring Lives - Exercises-Questions.

Writing: Note Making. Listening: Announcements and Directions. Speaking: Making presentations. Grammar: Adverbials - Modal verbs - Conjunctions - Prepositions - Vocabulary - Idioms.

Course Outcomes:

On successful completion of course, the student will be able to		POS related to COS
CO1	Knowledge can be gained by describing Nature aspects, developing vocabulary by deriving various ways of functional English words used.	PO1, PO7, PO10
CO2	Acquire knowledge on Life skills and Usage of grammar aspects.	PO1, PO10,PO12
CO3	Cultivate self confidence in one's life with the help of renowned Engineers and Scientists.	PO1, PO10,PO12
CO4	Knowledge can be gained by describing environmental aspects, developing vocabulary by deriving various ways of functional English words used.	PO1, PO10, PO12
CO5	Develop knowledge on one's life leading individually, in a Team.	PO1, PO10,PO12

Text books:

1. For detailed study: Enjoying Every day English, 2009, A.Rama Krishna Rao, Sangam Books, Hyderabad.
2. English for Students of Science, 2005, A.Roy, P.L.Sharma, Orient Longman, New Delhi.
3. For Non-detailed study: Inspiring lives, 2009, Dr.Jandhyala Ravindranath & Dr.M.Sarat Babu, Maruti Publications, Guntur.

Reference books:

1. Technical Communication Principle and Practice, 2009, Meenakshi Raman and Sangita Sharma, Oxford University Press, New Delhi.
2. Essential Grammar in Use, (with CD) 3/e, 2009, Cambridge University Press, New Delhi.
3. Everyday Dialogues in English, 2006, Robert J. Dixson, Prentice-Hall of India Ltd., New Delhi.
4. Communication Skills for Technical Students, 2008, Farhathullah, T.M., Orient Blackswan, Chennai.

CO-PO Mapping

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

SREENIVASA INSTITUTE of TECHNOLOGY and MANAGEMENT STUDIES

(Autonomous)

I B.Tech	**L**	**T**	**P**	**C**
	2	**1**	**-**	**4**

13HAS 102 ENGINEERING PHYSICS
(Common to all Branches)

Course Educational Objectives:

CEO1: To analyze the structure of crystals by using X-Ray Diffraction Technique and to study properties, productions and applications of ultrasonic

CEO2: To develop ideas & mathematical solutions to Quantum mechanics& Semiconductors

CEO3: To understand the principles and applications optics, Lasers in various Streams of Engineering

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

CEO5: Optical Fibers in various Streams of Engineering and to Introduce Nano-materials & their applications in various fields of science and technology.

UNIT - 1: CRYSTAL STRUCTURES AND ULTRASONICS

Crystal Structures: Introduction - Space lattice - Basis - Unit cell - Lattice parameters - Bravis lattices- Crystal Systems - Structures of Simple Cubic - Body Centered Cubic - Face Centered Cubic crystals - Miller Indices - (h k l) planes in crystals - Bragg's law - X-ray diffraction - Laue and Powder Methods.

Ultrasonics: Introduction - Production of ultrasonic waves - Piezoelectric method - Properties of ultrasonic waves - Applications of ultrasonics.

UNIT - 2: QUANTUM MECHANICS AND ELECTRON THEORY

Quantum Mechanics: Dual nature of light - Matter waves and properties - De Broglie's concept of matter waves - Heisenberg's uncertainty principle - One dimensional time independent Schrodinger's wave equation - Particle in one dimensional potential box - Fermi-Dirac distribution function and effect of temperature.

Semiconductors: Intrinsic and extrinsic semiconductors - Drift and diffusion -Einstein's relation - Hall effect - Direct and indirect band gap semiconductors - p-n junction diode - Zener diode - Light emitting diode – Photodiode.

UNIT - 3: OPTICS AND LASERS

Optics: Interference - Interference in thin films by reflection - Newton's Rings - Diffraction - Fraunofer Diffraction at single slit - Diffraction grating - Grating spectrum.

Lasers: Laser characteristics - Spontaneous and Stimulated emissions - Basic requirements of a laser - Population inversion - Solid state laser (Ruby laser) - Gas (He-Ne) laser - Semiconductor (GaAs) laser - Applications of lasers.

UNIT - 4: MAGNETIC MATERIALS AND SUPERCONDUCTIVITY

Magnetic Materials: Origin of magnetic moment of an atom - Bohr magneton - Classification of dia - para - ferro magnetic materials on the basis of magnetic moment - Hysteresis curve - Soft and hard magnetic materials - Ferrites and their applications.

Superconductivity: General properties - Meissner effect - Types of superconductors - BCS Theory - Josephson's effect - Applications of superconductors.

UNIT - 5: ADVANCES IN PHYSICS

Fiber Optics: Structure of optical fiber - Types of optical fibers - Numerical aperture - Fiber optics in communications - Applications.

Nano Technology: Introduction to nanomaterials - nanoscale - surface to volume ratio - Preparation of Nanomaterials - Ball milling method - Sol-gel method - Chemical vapour deposition methods - Carbon nanowires, nanorods, nanotubes - 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		**POs related to COs**
CO1	Acquire the knowledge and applications on Optics, LASERS.	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	Acquire the knowlrdge on Optical fibers and to Apply the theoretical concepts pertaining to Nanomaterials in various fields engineering and Technology	PO1,PO12

Text books:

1. Engineering Physics, 2011, M.R. Srinivasan, New Age International, Chennai.
2. Engineering Physics, 4/e, 2013,V. Rajendran and K. Thyagarajan, Tata Mc Graw Hill Publishers, New Delhi.

Reference books:

1. Concepts of Modern Physics, 8/e, 2007, Aurther Beiser, Tata Mc Graw 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 Mc Graw 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. Engineering Physics, 7/e, 2006, Gaur & Gupta, Dhanpati Rai Publications, New Delhi.

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	3	3	-	-	-	-	-	-	-	-	-	-
CO.3	3	3	-	3	-	-	-	-	-	-	-	-
CO.4	3	3	-	-	-	-	-	-	-	-	-	-
CO.5	3		-	-	-	-	-	-	-	-	-	3
CO*	**3**	**3**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**

SREENIVASA INSTITUTE of TECHNOLOGY and MANAGEMENT STUDIES

(Autonomous)

I B.Tech	**L**	**T**	**P**	**C**
	2	**1**	**-**	**4**

13HAS 103 ENGINEERING CHEMISTRY
(Common to all Branches)

Course Educational Objectives:

CEO1: The Engineering Chemistry course for undergraduate students is framed to strengthen the fundamentals of chemistry and then build an interface of theoretical concepts with their industrial/engineering applications.
CEO2: To learn different purification method and analyse the impurities present in water .
CEO3: To develop skill to describe the mechanism and control of corrosion .
CEO4: To train the students to effectively use the knowledge of polymer science.
CEO5: To learn the concept of refractories and to develop skill to apply the concept of electrochemistry and lubricants.

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 - 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 series - Galvanic corrosion - Concentration cell corrosion - Oxygen absorption type - Factors influencing corrosion - Control of corrosion - Cathodic protection - Sacrificial anode and impressed current.

UNIT – 3: POLYMERS

Polymerization reactions - Basic concepts - Types of polymerization - Addition and condensation polymerization - Plastics -Thermosetting and thermoplastics - Composition - Properties - Engineering uses 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).

Refractories: Definition - Classification with examples - Criteria of a good refractory material - Causes for the failure of refractory materials.

UNIT – 5: LUBRICANTS AND ELECTRO CHEMISTRY

Lubricants: Principles and function of lubricants - Classification and properties of lubricants - Viscosity - Flash and fire points - Cloud and pour points - Aniline point - Neutralization number and mechanical strength.

Electro Chemistry: Conductance - Equivalent conductance - Molar conductance – Conductometric titrations - Conductivity Measurements.

Course Outcomes

On successful completion of the course the will be able to,		**POs related to Cos**
CO1	To understand the fundamentals of water technology and develop analytical skills in determination hardness of water and to acquire awareness to societal issues on quality of water.	PO1, PO2 ,PO3,PO6
CO2	Acquire the knowledge in corrosion phenomenon and develop skills in the design of methods for control of corrosion	PO1, PO2, PO3
CO3	Acquire knowledge on polymeric materials and to prepare polymeric material for environmental safety and society need.	PO1, PO3,PO6,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 analyse the properties of lubricants.	PO1, PO2

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, Dhanpat Rai Publishing Company, New Delhi.
3. A 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. Aulice Scibioh, 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, New Delhi.
5. Engineering Chemistry (Vol.1&2), 5/e, 2004, J C Kuriacose and J. Rajaram,, Tata McGraw-Hill Publishers, New Delhi.

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	3	3	2	-	-	2	-	-	-	-	-	-
CO.2	3	2	2	-	-	-	-	-	-	-	-	-
CO.3	3	-	2	-	-	2	2	-	-	-	-	-
CO.4	3	3	-	-	-	-	-	-	-	-	-	-
CO.5	3	3	-	-	-	-	-	-	-	-	-	-
CO*	**3**	**2.75**	2	-	-	2	**2**	-	-	-	-	-

SREENIVASA INSTITUTE of TECHNOLOGY and MANAGEMENT STUDIES

(Autonomous)

I B.Tech	**L**	**T**	**P**	**C**
	3	**1**	**-**	**5**

13HAS 104 MATHEMATICS – I

(Common to all Branches)

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 multi variables and also the concepts of double and triple integrals and compute double and triple integrals

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 and also identify important characteristics of higher order ordinary differential equations(HOODE) and develop appropriate method of obtaining solutions of HOODE.

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.

CEO5: 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: **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.

UNIT – 2: CALCULUS

Derivatives and its aplications: Taylor's and Maclaurin's series(simple examples) - Functions of several variables - Jacobian - Maxima and minima of functions of two variables - Lagrangian method of undetermined multipliers with three variables only.

Beta and gamma functions - Properties - Evaluation of integrals(simple examples).

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

UNIT – 3: DIFFERENTIAL EQUATIONS AND ITS APPLICATIONS

Differential equations of first order and its applications: Exact, Linear and Bernoulli's equation - Applications to Newton's law of cooling, Law of natural growth and decay - Orthogonal trajectories.

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

UNIT - 4: LAPLACE TRANSFORMS AND ITS APPLICATIONS

Laplace transform of standard functions - First shifting theorem - Second shifting theorem - Transform of Derivatives, Integrals, Unit step function, Dirac's delta function and Periodic function - Inverse transform - Convolution theorem - Application of Laplace transforms to ordinary differential equations of first and second order

UNIT - 5: VECTOR CALCULUS

Vector Differentiation: Gradient - Divergence - Curl and their properties

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's theorems.

Course Outcomes:

On successful completion of the course the will be able to,		**POs related to COs**
CO1	Demonstrate knowledge in estimating rank in solving linear equations through matrix methods and to develop analytical skills in solving problems involving eigen values and eigen vectors	PO1,PO2
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 in evaluating double and triple integrals and Develop analytical skills in solving problems involving functional dependence and independence using partial derivatives	PO1,PO2,PO3
CO3	Demonstrate knowledge in first order ordinary differential equations, higher order linear differential equations and Develop analytical skills in solving problems involving first order ordinary differential equations and higher order non homogeneous linear 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 and Develop analytical skills in solving problems involving initial value problems for constant coefficient linear ordinary differential equations using Laplace transform	PO1,PO2,PO3
CO5	Demonstrate knowledge in differentiation of vector functions, integration 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 and to Develop skills in 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,PO3

Text books:

1. Engineering Mathematics, Volume - 1, 2012, E.Rukmangadachari, E.Keshava Reddy, Pearson Educations, Chennai.
2. Engineering Mathematics–I, 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. 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.
3. Engineering Mathematics for JNTU, 2012, B.V. Ramana, Tata McGraw Hill Publishers,New Delhi.
4. Matrices, 29/e, 2006, A R. Vasistha, Krishna Prakashan media (P) Ltd. Meerut.
5. Advanced Engineering Mathematics, 8/e, 2009, Erwin Kreyszig, Wiley India, New Delhi.

CO-PO Mapping

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	3	3	3	-	-	-	-	-	-	-	-	-
CO.3	3	3	3	-	-	-	-	-	-	-	-	-
CO.4	3	3	3	-	-	-	-	-	-	-	-	-
CO.5	3	3	3	-	-	-	-	-	-	-	-	-
CO*	**3**	**3**	**3**	-	-	-	-	-	-	-	-	-

SREENIVASA INSTITUTE of TECHNOLOGY and MANAGEMENT STUDIES

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I B.Tech	**L**	**T**	**P**	**C**
	3	**-**	**-**	**3**

13HAS 105 REASONING and APTITUDE
(Common to all Branches)

Course Educational Objectives:

CEO1: To learn the basic methods to find L.C.M , H.C.F and simplification of roots , averages, percentages, and different shortcut techniques to find the solution in a stipulated time.

CEO2: To understand the logic behind the series, coding- decoding, ven-diagram concepts and familiarize the knowledge of arithmetic's to solve Time and Distance and Time and Work concepts extended to problems on trains , Boats and Streams

CEO3:To identify important characteristics Allegation and Mixture, Permutation and Combination, Probability concepts. To develop appropriate shortcut to solve reasoning concepts like Directions, Completion of incomplete patterns, Analogy, Classification, Assertion and Reasoning in an efficient and effective manner within a short span of time.

CEO4: To learn the concepts of Area - Volume - Surface areas and to explore the solving of Height and Distance concepts with the help of Trigonometry

CEO5: To develop skill to explain the characteristics of Data Interpretation , Tabulation and representation of Bar graphs , Pie charts and Line graphs, Data Sufficiency. To develop the ability of explaining the logic behind creation of Calendars and clocks.

UNIT – 1:

Numbers and Fractions - H.C.F and L.C.M - Simplification and Roots - Averages - Percentages - Ratio and Proportions - Profit and Loss - Partnership and Share - Simple Interest and Compound Interest

UNIT – 2:

Series - Coding and Decoding - Blood relation - Venn Diagrams - Puzzle test - Problems on ages - Time and Distance - Time and Work - Pipes and Cisterns - Problems on Trains, boats and streams

UNIT – 3:

Allegation and Mixture - Permutation and Combination - Probability - Directions - Completion of Incomplete Pattern – Analogy - Classification - Assertion and Reason

UNIT – 4:

Area – Volume - Surface areas - Height and Distance

UNIT – 5:

Calendar and Clocks - Data Interpretation - Tabulation and Bar graphs - Pie charts and Line graphs - Data Sufficiency

Course Outcomes:

On successful completion of the course the will be able to,		POs related to COs
CO1	Demonstrate knowledge in Partnership and Share - Simple Interest and Compound Interest.and to develop analytical skills in solving problems involving Numbers and Fractions - H.C.F and L.C.M - Simplification and Roots - Averages - Percentages - Ratio and Proportions - Profit and Loss.	PO1,PO2
CO2	Demonstrate knowledge in Time and Distance - Time and Work - Pipes and Cisterns - Problems on Trains, boats and streams. and Develop analytical skills in solving problems involving Series - Coding and Decoding - Blood relation - Venn Diagrams - Puzzle test	PO1,PO2,PO3
CO3	Demonstrate knowledge Allegation and Mixture - Permutation and Combination - Probability and Develop analytical skills of Analogy - Classification - Assertion and Reason and Develop skills in designing the Completion of Incomplete Patterns	PO1,PO2,P03
CO4	Demonstrate knowledge in Area - Volume - Surface areas and Develop analytical skills in solving problems Height and Distance.	PO1,PO2,PO3
CO5	Demonstrate knowledge in Data Interpretation - Tabulation and Bar graphs - Pie charts and Line graphs and to provide an understanding of characteristics of Calendar and Clocks and to Develop skills in providing solutions for Data Sufficiency	PO1,PO2,PO3

Text books:

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

Reference books:

1. Quantitative Aptitude for Competitive Examinations, 14/e, 2010, Abhijit Guha, Tata McGraw- Hill Publishers, New Delhi
2. Course in Mental Ability & Quantitative Aptitude, 3/e, 2012, Edgar Thorpe, Tata McGraw-Hill Publishers, New Delhi
3. Fast Track Objective Arithmetic, 2012, Rajesh Verma, Arihant Publications, Meerut
4. Reasoning and Aptitude, 2013, Nem Singh, Made Easy Publications, New Delhi
5. Quantitative Aptitude and Reasoning, 2/e, 2013, R.V. Praveen, PHI Learning Press, New Delhi CO-PO Mapping

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	3	3	3	-	-	-	-	-	-	-	-	-
CO.3	3	3	3	-	-	-	-	-	-	-	-	-
CO.4	3	3	3	-	-	-	-	-	-	-	-	-
CO.5	3	3	3	-	-	-	-	-	-	-	-	-
CO*	**3**	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

SREENIVASA INSTITUTE of TECHNOLOGY and MANAGEMENT STUDIES

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I B.Tech	**L**	**T**	**P**	**C**
	3	**1**	**-**	**5**

13CSE 101 C PROGRAMMING and DATA STRUCTURES

(Common to all Branches)

Course Educational Objectives:

CEO1: To Design an algorithm for a given problem and illustrate the flowchart to develop C Programs using operators and knowledge on conditional and iterative statements to write C Programs.
CEO2: To develop programming skills using the arrays, functions
CEO3:. To enable effective usage of pointers and strings
CEO 4: To enable effective usage of structures and to implement the memory management Concepts and to understand the file concepts
CEO 5: To provide knowledge on Types of Data Structures, to design Linked List data structures Stack, Queue and its applications and to analyze the Searching and Sorting techniques.

UNIT-1: Overview of Programming and Introduction to C Language

Computer software - Algorithm - Flowchart - Creating and running programs - Software development methods - Applying software development methods.

Introduction to C Language: Structure of C program - Simple C program - C character set - C Tokens - Keywords and identifiers - Constants and variables - Data types and sizes - Declarations of variables - Managing input and output operations.

Operators and Expressions: Arithmetic operators - Relational operators - Logical operators - Assignment operators - Increment and decrement operators - Conditional operator - Bit-Wise operators - Special operators - Expressions - Type conversion in expressions - Operator precedence and associativity.

Decision making - Branching and looping: Decision making with if statement - The switch statement - The goto statement - While statement - Do-while statement - For statement - Jumps in loops - Jumps out of the program.

UNIT - 2: Arrays and Functions

Arrays: One-dimensional arrays - Declaration - Initialization - Two-dimensional arrays - Declaration - initialization - Multi-dimensional arrays.

Functions: Library Functions - Need for user defined Functions - A Multi-function program - Elements of User defined functions - Definition of functions - Return values and their types - Function calls - Function declaration - Category of functions - Nesting of functions - Recursion - Passing arrays to functions - The scope - Visibility and lifetime of variables – Multi file programs - Preprocessor commands.

UNIT - 3: Pointers and Strings

Pointers: Introduction - Understanding pointers - Accessing the address of a variable - Declaring pointer variables - Initialization pointer variables - Accessing a variable through its pointer - Chain of pointers - Pointer expressions - Pointer increments and scale factor - Pointers and arrays - Pointers and character strings - Array of pointers - Pointers as function arguments - Functions returning pointers - Pointers to functions.

Strings: Introduction - Declaring and initializing string variables - Reading string from terminal - Writing strings to the screen - Arithmetic operations on characters - Putting strings together - Comparison of two strings - String handling functions - Table of strings - String/Data conversion.

UNIT - 4: Structures, Unions and Files

Structures and Unions: Introduction - Defining a structure - Declaring structure variables - Accessing structure members - Structure initialization - Copying and comparing structure variables - Operations on Individual members - Arrays of structures - Arrays within structures - Structures within structures - Structures and functions - Unions - Size of structures - Bit fields – Type def – Enum.

Files: Introduction - Types of files - Defining and opening a file - Closing a file - Input/Output operations on files - Error handling during I/O operations - Random access to files - Command line arguments - Application of command line arguments.

UNIT - 5: Data structures, Searching and Sorting

Data structures: Single linked list - Operations - Implementation - Linked list with header - Stacks - Stack operations - Array implementation of stack - Linked implementation of stack - Infix - Prefix - Postfix - Conversion from infix to prefix notation - Evaluation of prefix expression - Conversion from infix to postfix notation - Evaluation of postfix expression - Queues - Array implementation of queue - Linked implementation of queue.

Searching and Sorting: Bubble sort - Selection sort - Insertion sort - Quick sort - Merge sort - Linear and Binary search methods.

Course Outcomes

On successful completion of the course, the student will be able to		**PO's related to CO's**
CO1	Obtain the knowledge about the problem solving skills and will design the programs using iteration statements	PO1, PO2
CO2	Develop programs using the Arrays and functions	PO1, PO2, PO3
CO3	Develop program using the Pointers and Strings	PO1, PO2
CO4	Design the programs on structures and unions.	PO1, PO2, PO4
CO5	Knowledge on types of Data Structures and its applications , Searching and sorting techniques	PO1, PO2,PO4

Text books:

1. Programming in C and Data Structures, 2/e, 2012, E.Balaguruswamy, Tata McGraw Hill, New Delhi.
2. Programming in C and Data Structures, 2010, J.R.Hanly, Ashok N. Kamthane and A. Ananda Rao, Pearson Education, Chennai

Reference books:

1. Let Us C , 8/e, 2008, Yashavant P Kanetkar, BPB publication, New Delhi
2. The C Programming Language, 2/e, 2005, B.W. Kernighan, Dennis M.Ritchie, PHI/Pearson Education, New Delhi.
3. Problem Solving and Program Design in C, 5/e, 2009, J R Hanly, E B. Koffman, Pearson Education, New Delhi
4. C and Data structures, 3/e, 2009, P. Padmanabham , B.S. Publications, Hyderabad.
5. Computer Science : A Structured Programming Approach using C, 3/e, 2007,B. A. Forouzan, R.F. Gilberg, Thomson Publication, Haryana

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	-	-	-	-	-	-	-	-	-
CO3	3	3	-	-	-	-	-	-	-	-	-	-
CO4	3	3	-	3	-	-	-	-	-	-	-	-
CO5	2	3	-	3	-	-	-	-	-	-	-	-
CO*	**2.8**	**2.8**	**3**	**3**	-	-	-	-	-	-	-	-

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I B.Tech	**D**	**T**	**P**	**C**
	5	**-**	**-**	**5**

13MEC 101 ENGINEERING DRAWING
(Common to all Branches)

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

UNIT -1: Introduction to Engineering Drawing

Principles of engineering graphics and their significance - Drawing instruments and their use - Conventions in drawing - Lettering - BIS conventions.
Curves used in engineering practice: (a) Conic sections (b) Cycloidal curves and (c) Involutes

UNIT - 2: Projection of Points and Lines

Principles of orthographic projections - Conventions - First and third angle projections - Projection of points and lines inclined to one or both planes – Finding true lengths and traces

UNIT - 3: Projection of Planes and Solids

Projections of regular plane surfaces - Projections of regular solids inclined to both HP and VP.

UNIT - 4: Section of Solids and Development of Surfaces

Sectional planes and sectional views of right regular solids: Prism, cylinder, pyramid and cone. True shape of the sections.
Development of surfaces of right regular solids: Prism, cylinder, pyramid, cone and their sectional parts.

UNIT - 5: Isometric and Orthographic Projections

Principles of isometric projection - Isometric scale - Isometric views - Conventions - Isometric views of lines, planes, simple and compound solids - Isometric projection of objects having non- isometric lines Isometric projections of spherical parts.
Conversion of isometric projections/views into orthographic views – Conventions.

Course Outcomes:

On successful completion of the course, students will be able to		POs related to COs
CO1	Construct Engineering Curves and generate tangent and normal for those curves	P01,P02,P03
CO2	Draw Projection of Points, lines and Plane Surfaces	P01,P02,P03
CO3	Draw Projection of Solids and Sections of Solids like Prisms, Pyramids, Cylinder and Cone	P01,P02,P03
CO4	Construct Isometric Scale, Projections and develop the development of surfaces	P01,P02,P03
CO5	Draw Orthographic and perspective projections of Solids	P01,P02,P03

Text books:

1. Engineering Drawing, 51/e, 2012, N.D. Bhatt, Charotar Publishing Hose Pvt. Ltd., Anand.
2. Engineering Drawing, n/e, 2012, K.L. Narayana, P. Khanniah, Scitech Publishers, New Delhi.

References books:

1. Engineering Drawing and Graphics, 2/e, 2011, Venugopal, New age publishers, Chennai.
2. Engineering Drawing, 4/e, 2009, Venkata Reddy, B.S. Publishers, Hyderabad.
3. Engineering Drawing, 3/e, 2009, Johle, Tata McGraw-Hill, New Delhi.
4. Engineering Drawing, 2/e, 2010, Shah and Rana, Pearson Education, New Delhi.
5. Engineering Drawing, 5/e, 2013, Basant Agrawal and CM Agrawal, Tata McGraw-Hill, New Delhi.

CO-PO Mapping

O\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	-	-	-	-	-	-	-	-	-
CO2	3	3	3	-	-	-	-	-	-	-	-	-
CO3	3	3	3	-	-	-	-	-	-	-	-	-
CO4	3	3	3	-	-	-	-	-	-	-	-	-
CO5	3	3	3	-	-	-	-	-	-	-	-	-
CO*	3	2.8	2.8	-	-	-	-	-	-	-	-	-

SREENIVASA INSTITUTE of TECHNOLOGY and MANAGEMENT STUDIES

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	-	**-**	**3/2 each**	**3**

13HAS 106 ENGINEERING PHYSICS and ENGINEERING CHEMISTRY LAB
(Common to all Branches)

ENGINEERING PHYSICS LAB

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.

Eight Experiments has to be done in the following list.

S.No.	**Name of the Experiment**
1.	Diffraction grating - Measurement of wavelength of given Laser
2.	Torsional pendulum: Determination of rigidity modulus of given metal wire
3.	Determination of magnetic field along the axis of a current carrying circular coil - Stewart Gees method
4.	Determination of A.C frequency using Sonometer
5.	Verification of transverse laws of stretched string using Sonometer
6.	Melde's experiment: Determination of frequency of electrically driven Tunning fork
7.	Determination of numerical aperture and acceptance angle of an optical fiber
8.	Determination of particle size using a laser source
9.	Diode characteristics
10.	Zener diode characteristics
11.	LED characteristics
12.	Determination of energy band gap
13.	Hall effect: Determination of Hall coefficient and mobility of charge carriers
14.	Newton's rings – Determination of radius of curvature of given Plano convex lens
15.	Determination of Dielectric constant

ENGINEERING CHEMISTRY LAB

1. Preparation of Standard Potassium Dichromate and Estimation of Ferrous Iron
2. Preparation of Standard Potassium Dichromate and Estimation of Copper, by Iodometry
3. Preparation of Standard EDTA solution and Estimation of Hardness of Water
4. Preparation of Standard EDTA and Estimation of Copper
5. Determination of Manganese in Steel and Iron in Cement
6. Determination of strength of the given Hydrochloric acid against standard sodium hydroxide Solution by Conductometric titration
7. Determination of viscosity of the given oils through Redwood viscometer
8. Estimation of dissolved oxygen in given water sample
9. Determination of pH of a given solution by pH meter
10. Estimation of alkalinity of water

Course Outcomes:

On completion of the laboratory course the student will be able to		POs related to COs
CO1	**Demonstrate** Knowledge on measurement of various physical quantities using optical methods, fundamentals of magnetic fields and Frequency of Electrically operated tuning fork.	**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**

CO-PO Mapping

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	3	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	--	-	3	-	-	-	-
CO5	-	-	-	-	-	-	-	-	3	-	-	-
CO6	-	-	-	-	-	-	-	-	-	**3**	-	-
CO7	-	-	-	-	-	-	-	-	-	-	-	**3**
CO*	**3**	**3**	-	**3**	-	-	-	**3**	**3**	**3**	-	**3**

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	-	**-**	**3**	**3**

13HAS 107 ENGLISH LANGUAGE and COMMUNICATION SKILLS LAB
(Common to all Branches)

Course Educational Objectives:

CEO1: To Provide Knowledge on Pronouncing English words by suing Phonetic sounds.

CEO2: To Acquiring knowledge on using stress rules.

CEO3: To cultivate self confidence in one's life by performing presentation skills and Role plays.

CEO4: To develop knowledge on telephone speaking etiquette besides giving demonstrations.

CEO5: To develop knowledge to speak in a group and attend interviews confidently.

Syllabus:

The following course content is prescribed for the English Language Laboratory sessions:

1. Introduction to the Sounds of English - Vowels - Diphthongs - Consonants
2. Introduction to Stress - Intonation
3. Inflections
4. Conversation skills - Greeting and introducing - Asking for permission - Making request - Offering help - Giving directions and suggestions etc.
5. Role Play
6. Oral Presentations- Prepared and Extempore
7. Speaking on the mobiles and telephone conversation
8. Describing Objects - Situations - People
9. Information Transfer
10. Debate

Suggested software:

- Globarena software, Hyderabad
- English Pronouncing Dictionary, Daniel Jones 17/e with CD, Cambridge University Press, New Delhi.
- DELTA's key to the Next Generation TOEFL Test, 6 audio CDS, 2007, New Age International Publishers, Critical Study, New Delhi.
- Oxford Advanced Learners' Dictionary with CD,8/e, 2010, Oxford.
- Cambridge Advanced Learners' English Dictionary with CD, 3/e, 2010.
- Murphy's English Grammar with CD, 2004, Cambridge.

Course Outcomes:

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

Course Outcomes		POS related to COS
CO1	Get knowledge on how to communicate effectively by using phonetic sounds besides usage of stress rules.	PO1,PO10
CO2	Get Knowledge through communicating by using commonly used phrases in everyday life.	PO1, PO10
CO3	Get self confidence in one's life by performing presentation skills and Role plays.	PO1,PO10,PO12
CO4	Make good conversation over phone i.e. by using telephone etiquette.	PO1,PO10
CO5	Get knowledge to participate in team discussion to get individual confidence.	PO1,PO9, PO10

References books:

1. Spoken English, 2009, R. K. Bansal and J. B. Harrison, Edn, Orient Longman, Mumbai.
2. Speaking English Effectively,2/e, Krishna Mohan & NP Singh, Macmillan, New Delhi
3. A Practical Course in English Pronunciation,2004, J. Sethi, Kamlesh Sadanand & D.V. Jindal, Prentice-Hall of India Pvt. Ltd., New Delhi.
4. Body Language - Your Success Mantra, 2009, Dr Shalini Verma, S.Chand & Co, New Delhi.
5. A Handbook for English language Laboratories,2009,E.Sureshkumar, P.Sreehari, Foundation Books, Cambridge University Press, Chennai.

CO-PO Mapping

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

SREENIVASA INSTITUTE of TECHNOLOGY and MANAGEMENT STUDIES
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13CSE 102 C PROGRAMMING and DATA STRUCTURES LAB
(Common to all 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 design Linked List data structures Stack, Queue and its applications and to analyze the Searching and Sorting techniques.

Exercise-1:

a. Write a c program to convert the temperature unit from Fahrenheit to Celsius using the formula C= (F-32)
b. 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
c. Write a c program to calculate the simple interest.

Exercise-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. 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

Exercise-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. Write a program to find the grace marks for a student using switch. The user should enter the class obtained by the student and the number of subjects he has failed in. Use the following rules:

i) If the student gets first class and the number of subjects failed in is >3, then no grace marks are awarded. If the number of subjects failed in is < or = 3 then the grace is 5 marks per subject.
ii) If the student gets second class and the number of subjects failed in is >2, then no grace marks are awarded. If the number of subjects failed in is < or = 2 then the grace is 4 marks per subject.

iii) If the student gets third class and the number of subjects failed in is >1, then no grace marks are awarded. If the number of subjects failed in is = 1 then the grace is 5 marks per subject.

Exercise-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.

Exercise-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 amstrong number is a number that is the sum of the cubes of its individual digits.

Write a c program to print amstrong numbers below 1000.

Exercise-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 = $1 - x^2/2! + x^4/4! - x^6/6! + x^8/8! - x^{10}/10!$

Exercise-7:

a. Write a C program to find both the largest and smallest number in a list of integers.

b. Write a C program that uses functions to perform the following:

i) Addition of Two Matrices ii) Multiplication of Two Matrices

Exercise-8:

a. Write a C program to find the roots of quadratic equation

b.Write C programs that use both recursive and non-recursive functions

i) To find the factorial of a given integer.

ii) To find the GCD (greatest common divisor) of two given integers.

Exercise-9:

a. Write a c program using pointers to read in an array of integers and print its elements in reverse order.

b. Swap/exchange values of two integer variables using function.

Exercise-10:

a. Write a C program that uses functions to perform the following operations:

i) To insert a sub-string in to a given main string from a given position.

ii) To delete n Characters from a given position in a given string.

b**.** Write a C program to determine if the given string is a palindrome or not

Exercise-11:

a. Write a C program that displays the position or index in the string S where the string T begins, or –1 if S doesn't contain T.

b. Write a C program to count the lines, words and characters in a given text.

Exercise-12:

a. Write a C program to generate Pascal's triangle.

b. Write a C program to construct a pyramid of numbers.

Exercise-13:

a. 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's complement of a binary number.

c. Write a C program to convert a Roman numeral to its decimal equivalent.

Exercise-14:

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 ten students and displays result table. Also display student information separately who got the highest total. Use structures

Exercise-15:

Write a C program that uses functions to perform the following operations:

i) Reading a complex number ii) Writing a complex number

iii) Addition of two complex numbers iv) Multiplication of two complex numbers

(Note: represent complex number using a structure.)

Exercise-16:

a. Write a C program which copies one file to another.

b. Write a C program to reverse the first n characters in a file.

(Note: The file name and n are specified on the command line.)

Exercise-17:

a. Write a C program to display the contents of a file.

b. Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file)

Exercise-18:

Write a C program that uses functions to perform the following operations on singly linked list.:

i) Creation ii) Insertion iii) Deletion iv) Traversal

Exercise-19:

Write C programs that implement stack (its operations) using

i) Arrays ii) Pointers

Exercise-20:

Write C programs that implement Queue (its operations) using

i) Arrays ii) Pointers

Exercise-21:

Write a C program that uses Stack operations to perform the following:

i) Converting infix expression into postfix expression

ii) Evaluating the postfix expression

Exercise-22:

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

Exercise-23:

Write C programs that use both recursive and non recursive functions to perform the following searching

operations for a Key value in a given list of integers:

i) Linear search ii) Binary search

Exercise-24:

Write C program that implements the Quick sort method to sort a given list of integers in ascending order.

Exercise-25:

Write C program that implement the Merge sort method to sort a given list of integers in ascending order.

Course Outcomes:

On Successful completion of this course, the students will able to		POs related to COs
CO1	Apply the Knowledge to design the algorithm and flowchart for the given problem.	PO1,PO2
CO2	Analyze the concepts of control statements and arrays.	PO1,PO2,PO3
CO3	Design the programs for functions and strings	PO1,PO2,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 ,Data structures and sorting searching techniques	PO1,PO2,PO3
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

Reference books:

1. Programming in C and Data Structures, 2/e, 2012, E.Balaguruswamy , Tata McGraw-Hill, New Delhi.
2. Programming in C and Data Structures, 2010, J.R.Hanly, Ashok N. Kamthane and A. Ananda Rao, Pearson Education, Chennai.
3. Let Us C, 8/e, 2008, Yashavant P.Kanetkar, BPB Publication, New Delhi.
4. Computer Basics and C Programming, 2008, V. Rajaraman, PHI Publications, New Delhi.

CO-PO Mapping

PO / CO	PO1	PO2	PO3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	3	-	-	-	-	-	-	-	-	-
CO3	3	3	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	2	-	-	-
CO8	-	-	-	-	-	-	-	-	-	2	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO*	**3**	**3**	**3**	**3**	3	-	-	3	2	**2**	**-**	**3**

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13MEC 102 ENGINEERING AND I.T. WORKSHOP

(Common to all Branches)

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.

Engineering workshop

Objectives: The budding Engineer may turn out to be a technologist, scientist, entrepreneur, practitioner, consultant etc. There is a need to equip the engineer with the knowledge of common and newer engineering materials as well as shop practices to fabricate, manufacture or work with materials. Essentially he should know the labor involved, machinery or equipment necessary, time required to fabricate and also should be able to estimate the cost of the product or job work. Hence engineering work shop practice is included to introduce some common shop practices and on hand experience to appreciate the use of skill, tools, equipment and general practices to all the engineering students.

1. Trades for exercises:

a. Carpentry – Three joints (exercises) from: Making Middle lap T joint, Dove tail lap joint, Mortise and Tenon joint and Bridle T joint from out of 300 x 50 x 35 mm soft wood stock.
b. Fitting – Three joints (exercises) from: Square joint, V joint, Half round joint and Dove tail joint out of 50 x 50 x 5 mm M.S. flat piece.
c. Sheet metal – Three jobs (exercises) from: Tray, Cylinder, Open scoop and Frustum of pyramid out of 22 or 20 gauge G.I. sheets.
d. House-wiring – Three jobs (exercises) from: Wiring for two lamps (bulbs) with independent switch controls (series and parallel), wiring for stair case lamp, wiring for tube light and water pump with single phase starter.

2. Trades for demonstration:

a. Study of Lathe
b. Drilling Machine
c. Power Hacksaw
d. Grinding Machine

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

CO – PO Mapping

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	2	-	-	-	-	-	-	-	-	-	-
CO3	-	-	1	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	1	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	2	-	-	-	-
CO6	-	-	-	-	-	-	-	-	3	-	-	-
CO7	-	-	-	-	-	-	-	-	-	2	-	-
CO8	-	-	-	-	-	-	-	-	-	-	-	2
CO*	**3**	**2**	**1**	**-**	**1**	-	**-**	**2**	**3**	**2**	**-**	**2**

IT workshop

Objectives:

The IT Workshop for engineers is a training lab course. The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel, Power Point and Publisher.

PC Hardware introduces the students to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like MS Windows, Linux and the required device drivers. In addition hardware and software level troubleshooting process, tips and tricks would be covered**.** The students should work on a working PC (PIV or higher)to disassemble and assemble back to working condition and install Windows and Linux on the same PC. Students are suggested to work similar tasks in the Laptop scenario wherever possible.

Internet & World Wide Web module introduces the different ways of hooking the PC on to the internet from home and workplace for usage of the internet. Usage of web browsers, email, newsgroups and discussion forums would be covered. In addition, awareness of cyber hygiene, i.e.,

protecting the personal computer from getting infected with the viruses, worms and other cyber attacks would be introduced.

Productivity tools module would enable the students in crafting professional word documents, excel spread sheets, power point presentations and personal web sites using the Microsoft suite of office tools and LaTeX. (It is recommended to use Microsoft office 2007 in place of MS Office 2003)

PC Hardware

Exercise 1 – Task 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.

Exercise 2 – Task 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.

Exercise 3 – Task 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.

Exercise 4 – Task 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

Exercise 5 – Task 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

Exercise 6 – Task 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.

Office tools:

LaTeX and Word

Exercise 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.

Task 1 : 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

Exercise 8 - 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.

Task 1: Creating a Scheduler - Features to be covered:- Gridlines, Format Cells, Summation, auto fill, Formatting Text

LaTeX and MS/equivalent (FOSS) tool Power Point

Exercise 9 - Task1: 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).

Exercise 10 - Task 2 : 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

2 Exercises

Exercise 11 - Task 1: **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.

Exercise 12 - Task 2: **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:

On the successful completion of this course, the student should be able to,		**POs related to COs**
CO1	Acquire knowledge on computer system such as system unit, input devices, and output devices connected to the computer.	PO1, PO2
CO2	Demonstrate 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.	PO1,PO2, PO5
CO3	Demonstrate the working of the internet that include the use of protocols, domains, IP addresses, URLs, web browsers, web servers, mail-servers, etc.	PO1, PO5
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.	PO1, PO5
CO5	Familiarize with parts of LaTex, 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.	PO1, 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 and	PO10
CO9	Continue updating their skill related to MS Office, Internet and Computer in future.	PO12

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

CO – PO Mapping

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	3	-	-	-	-	-	-	-
CO3	3	-	-	-	3	-	-	-	-	-	-	-
CO4	3	-	-	-	3	-	-	-	-	-	-	-
CO5	3	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	3	-	-	-
CO8	-	-	-	-	-	-	-	-	-	3	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO*	**3**	**2.5**	**-**	**-**	**3**	-	**-**	**3**	**3**	**3**	**-**	**3**

SREENIVASA INSTITUTE of TECHNOLOGY and MANAGEMENT STUDIES
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II Year B.Tech I semester	**L**	**P**	**C**
	4	**-**	**3**

13HAS 211 MATHEMATICS – II
(Common to all Branches)

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 learn the method of evaluation of numerical derivative, numerical integration and to solve ordinary differential equations numerically using numerical methods

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

CEO4: 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

UNIT – 1: Solution of Algebraic, Transcendental Equations and Interpolation

Solution of Algebraic, Transcendental Equations

Introduction - The Bisection method - The method of False position - The Iteration method - Newton-Raphson method.

Interpolation: Introduction - Finite differences - Forward differences - Backward differences - Newton's forward and backward difference formulae for interpolation - Lagrange's formula.

UNIT – 2: Numerical Differentiation, 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 – 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: Partial Differential Equations

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

Course Outcomes:

On the successful completion of this course, the student should be able to,		POs related to COs
CO1	Demonstrate knowledge in solving algebraic and transcendental equations by various mathematical methods and Design novel mathematical methods for constructing the interpolating polynomials to the given data	PO1,PO2
CO2	Demonstrate knowledge in finding the numerical values to derivatives, 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
CO3	Develop analytical skills in evaluating the properties of functions through Fourier series	PO1,PO2
CO4	Develop analytical skills in evaluating the properties of functions through Fourier transform	PO1,PO2
CO5	Develop analytical skills for the problems involving partial differential equations and the methods to solve them	PO1,PO2

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.Engineering Mathematics , Volume–II , 2013, E. Rukmangadachari, E. Keshava Reddy, Pearson Education, Chennai.

Reference Books:

1.Engineering Mathematics for JNTU, 3/e, 2008, B.V. Ramana, Tata McGraw Hill Publishers, New Delhi.
2.Introductory methods of Numerical Analysis, 5/e, 2005, S.S. Sastry, Prentice Hall of India, New Delhi.
3.Higher Engineering Mathematics, 34/e, 1999, Dr. B. S. Grewal, Khanna Publishers, Delhi.
4.Advanced Engineering Mathematics, 8/e, 2009, Erwin Kreyszig, Wiley India, New Delhi.
5.Numerical Methods for Scientific and Engineering Computation, 4/e, 2004, M.K. Jain, S.R.K. Iyengar, R.K. Jain, New Age International Publication, New Delhi.

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	3	3	-	-	-	-	-	-	-	-	-	-
CO.3	3	3	-	-	-	-	-	-	-	-	-	-
CO.4	3	3	-	-	-	-	-	-	-	-	-	-
CO.5	3	3	2	-	-	-	-	-	-	-	-	-
CO*	3	3	**2**	-	-	-	-	-	-	-	-	-

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II Year B.Tech I semester	**L**	**P**	**C**
	4	**-**	**3**

13HAS 213 ENVIRONMENTAL SCIENCE
(Common to all Branches)

Course Educational Objectives:

CEO1: To study the nature and facts about environment.
CEO2: To finding and implementing scientific, technological, economic and political solutions to environmental problems.
CEO3: To study the interrelationship between living organism and environment.
CEO4: To appreciate the importance of environment by assessing its impact on the human world envision the surrounding environment, its functions and its value.
CEO5: To study the dynamic processes and understand the features of the earth's interior And surface.

UNIT – 1: Introduction to Environmental Science and Natural Resources

Introduction: Definition - Scope and importance of environment - Need for public awareness - Natural Resources: Forest resources: Use and over-exploitation - Deforestation - Conservation of forests.

Water resources: Use and over-utilization of surface and ground water - Floods and drought - Conflicts over water.

Mineral resources: Use and exploitation - Environmental effects of extracting mineral resources - Case studies.

Food resources: World food problems - Effects of modern agriculture - Fertilizer and pesticide effects - Water logging - Salinity - Case studies.

Energy resources: Conventional energy resources - Coal - Petroleum - Natural gas and Nuclear fuels - Non-conventional energy resources - Solar energy - Wind energy - Tidal energy - Geothermal energy and Biogas energy - Use of alternate energy sources - Case studies.

UNIT – 2: Ecosystem and Biodiversity

Ecosystem: Concept of an ecosystem - Structure and function of an ecosystem - Producers - Consumers and decomposers - Energy flow in the ecosystem - Ecological succession - Food chains - Food webs - Ecological pyramids - Introduction - Types - Characteristic features - Structure and function of the (a) Forest ecosystem (b) Grassland ecosystem (c) Desert ecosystem (d) Aquatic ecosystems (Ponds - Streams - Lakes - Rivers - Oceans - Estuaries).

Biodiversity: Introduction to biodiversity - Genetic - Species and Ecosystem diversity - Bio-geographical classification of India - Value of biodiversity: Consumptive value - Productive value - Social value - Ethical value - Aesthetic and Option values - India as a Mega-diversity nation - Hot spots 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

Definition - Causes - Effects - Control measures of pollution.

Air Pollution: Types of pollutants - Their sources and impacts - Air pollution meteorology - Air pollution control - Air quality standards and limits.
Noise Pollution: Impacts of noise - Permissible limits of noise pollution - Measurement of noise - Control of noise pollution.
Solid waste management: Characteristics - Generation - Collection and transportation of solid wastes - Engineered systems for solid waste management (reuse, recycle, energy recovery, treatment and disposal).
Marine Pollution: Pollution due to organic wastes - Control measures.
Soil Pollution: Causes of soil degradation - Excessive use of fertilizers - Problems with pesticide use - Excess salt and water.

UNIT – 4: Social Issues and the Environment

Water conservation measures - Rain water harvesting and water shed 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.
Sustainable development: Definition - Objectives - Environmental dimensions of sustainable development - Environmental audit for sustainable development.

UNIT– 5: Environmental Legislation and Human Population

Environmental acts: The water (Prevention and control of pollution) Act - The air (Prevention and control of pollution) act - The wild life (protection) act - The forest conservation act - The environmental protection act.
International conventions**:** Stockholm conference 1972 - Earth summit 1992 and Copenhagen conference 2009 - Case studies: Chipko movement - Narmada bachao andolan - Silent valley project - Chernobyl nuclear disaster - Ralegaon siddhi (Anna Hazare) and Bhopal gas tragedy
Population growth: Variation among nations - Population explosion - Family welfare programmes - Environment and human health - Human rights - Value education - HIV/AIDS - Women and child welfare - Role of information technology in environment and human health - Case studies.

Field Work

Visit to a local area to document environmental assets: River/ Forest/ Grasslands/ Mountains
Visit to local polluted site: Urban/ Rural/ Industrial/ Agriculture
Study of simple ecosystems: Pond/ River/ Hill slope etc.

Course Outcomes:

On successful completion of the course, students will be able to		POs related to COs
CO1	Demonstrate knowledge on fundamentals of Environment and analyze the availability of non conventional energy resources.	PO1,PO2,PO6,PO7, PO8,
CO2	Identify appropriate types of habitats in the surrounding and analyze the influence of habitats on survival.	PO1, PO2, PO7, PO8,
CO3	Identify appropriate method of controlling of pollution and design the ecofriendly techniques	PO1,PO2,PO6,PO7,PO8,
CO4	Analyze the effect of climatic changes	PO1, PO2, PO6 PO7, PO8
CO5	Understand the population growth and variation- environmental acts	PO1, PO2, PO6 PO7, PO8

Text books:

1. Text book of Environmental Studies, 4/e, 2012, C.P. Kaushik and Anubha Kaushik, New Age International (P) Ltd., Publishers, New Delhi.
2. Text book of Environmental Studies, 1/e, 2008, Erach Bharucha, University Press (India) Private Ltd. Hyderabad.

Reference books:

1. Environmental Studies-From Crisis to Cure, 2/e, 2012, R. Rajagopalan, Oxford University Press , New Delhi.
2. A Text Book of Environmental science and Technology ,1/e, 2008, Dr.M.Anji Reddy, B.S. Publications, Hyderabad.
3. Principles of Environmental Science and Engineering, 1/e, 2005, Keerthinarayana and Daniel Yesudiam, Hi –Tech Publications , Chennai.
4. Glimpses of Environment , 1/e, 2005, Dr. KVSG Murali Krishna, Environmental Protection Society, Kakinada, India.
5. Environmental Studies , 1/e, 2009, Anindita Basak , Pearson Education, New Delhi.

CO-PO Mapping

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	3	-	-	-	3	3	3	-	-	-	-
CO.2	3	3	-	-	-	-	3	3	-	-	-	-
CO.3	3	3	-	-	-	2	3	3	-	-	-	-
CO.4	3	3	-	-	-	3	3	3	-	-	-	-
CO.5	3	3	-	-	-	2	3	3	-	-	-	-
CO*	**3**	**3**	-	-	-	**2.5**	**3**	**3**	-	-	-	-

SREENIVASA INSTITUTE of TECHNOLOGY and MANAGEMENT STUDIES

(Autonomous)

II Year B.Tech I semester	**L**	**P**	**C**
	4	**-**	**3**

13ECE 211 ELECTRONIC DEVICES AND CIRCUITS
(Common to ECE,EEE,CSE,IT,EIE)

Course Educational Objectives:

CEO1:To study the basic concepts and characteristics of the electronic devices and to provide overview of semiconductor materials.
CEO2:To understand the operation of Rectifiers & Filters as application of PN junction diode.
CEO3: To learn the concept of different transistor configurations and FET characteristics and to describe the different semiconductor devices for special application.
CEO4: To understand the basic operation of single stage and multistage amplifiers of transistor.
CEO5: To provide knowledge and overview of FET amplifiers

UNIT - 1: Junction Diode Characteristics

Open Circuited PN Junction - Energy Band Diagram of PN Diode- PN Diode as a Rectifier (Forward And Reverse Bias) - Current Components - Law Of Junction - Diode Equation - V-I Characteristics Of PN Diode - Characteristics Piece-Wise Linear Approximation - Temperature Dependence - Transition And Diffusion Capacitances - Diode Resistances - Diode Equivalent Circuits - Break Down Mechanisms In Semiconductor Diodes - Zener Diode -Tunnel Diode - Varactor Diode - Operation and Characteristics**.**

UNIT - 2: Rectifiers- Filters and Regulators

HWR- FWR – BR - Harmonic Components In Rectifier Circuits - Inductor Filter - Capacitor Filter - L-Section Filter - Π-Section Filter - Comparison of Various Filter Circuits In Terms of Ripple Factor- Problems on Rectifiers - Simple Circuit of Regulator Using Zener Diode - Series and Shunt Voltage Regulators - Simple Problems on Voltage Regulators.

UNIT - 3: Transistor and FET characteristics

Transistor Construction – Operation – Symbol - Equivalent Circuit - Detailed Study Of Current Components – CB – CE - CC Configurations - Input – Output Characteristics - Parameter Calculations and Relationships - Transistor as an Amplifier.
FET: JFET – Construction – Operation – Symbol - Pinch-off voltage - V-I characteristics - MOSFET: Characteristics in Enhancement and Depletion modes. SCR – UJT
Biasing And Stabilisation: BJT Biasing - DC Equivalent Model - Criteria for Fixing Operating Point - DC And AC Load Lines - Fixed Bias - Emitter Feedback Bias - Voltage Divider Bias - Collector To Base Bias - Bias Stability - Stabilization Against Variations In V_{BE} and B - Bias Compensation - Thermal Run away - Thermal Stability- Biasing of JFET and MOSFET.

UNIT - 4: BJT Amplifiers

Small Signal Low Frequency Transistor Amplifier Circuits: H- Parameter Representation Of Transistor- Measurement Of H-Parameter- Analysis Of Single Stage Transistor CE- CB- CC

Amplifiers: Voltage Gain - Current Gain - Input Impedance - Output Impedance - RC Coupled Amplifier - Problems.

UNIT - 5: FET amplifiers

Small signal model of FET (JFET AND MOSFET)- Generalized FET amplifier- CS- CD- CG amplifiers- Comparison between BJT and FET- Simple problems- RC coupled amplifier- FET as Voltage variable resistor- Comparison between BJT and FET.

Course Outcomes:

On successful completion of the course, students will be able to		**POs related to Cos**
CO1	Demonstrate Knowledge on construction and analysis of PN Junction diode, Zener diode with their VI Characteristics.	PO1, PO2
CO2	Design and analysis of various rectifiers and filter circuits.	PO1,PO2,PO3
CO3	Demonstrate knowledge on Construction and Analysis of BJT and FET,biasing, special devices and their VI characteristic.	PO1,PO2,PO3,PO4
CO4	Design and analyze the hybrid parameters of single stage and multi stage amplifiers.	PO1, PO2,PO3,PO4
CO5	Design characteristics with various FET amplifiers.	PO1, PO2

Text Books:

1. Electronic Devices and Circuits, 2/e, 2007, J.Millman, C.C.Halkias, and Satyabratha Jit , Tata McGraw-Hill, Noida.
2. Electronic Devices and Circuits, 9/e, 2006, R.L.Boylestad and Louis Nashelsky, Pearson/Prentice Hall, NewDelhi.

Reference Books:

1. Electronic Devices and Circuits, 6/e, 2004, T.F.Bogart Jr., J.S.Beasley and G.Rico, Pearson Education, NewDelhi.
2. Principles of Electronic circuits, 2/e, 1998, S.G.Burns and P.R.Bond, Galgotia Publications, Gurgaon.
3. Electronic Devices and Circuits, 2/e, 2005, Dr.K.Lalkishore, B.S.Publications, Hyderbad.
4. Microelectronics, 2/e, 2012, J.Millman and A. Grabel, Tata McGraw-Hill, Noida.
5. Electronic Devices and Circuits, 3/e, 2010, A.P.Godse, U.A.Bakshi, Technical Publications, Pune.

CO-PO Mapping

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	3	2	-	-	-	-	-	-	-	-	-
CO3	3	3	3	2	-	-	-	-	-	-	-	-
CO4	3	3	2	2	-	-	-	-	-	-	-	-
CO5	3	3	-	-	-	-	-	-	-	-	-	-
CO*	**3**	**2.8**	**2.33**	**2**	-	-	-	-	-	-	-	-

SREENIVASA INSTITUTE of TECHNOLOGY and MANAGEMENT STUDIES

(Autonomous)

II Year B.Tech I semester	**L**	**P**	**C**
	4	**-**	**3**

13ECE 212 SIGNALS AND SYSTEMS
(Common to ECE & EIE)

Course Educational Objectives:

CEO1: To introduce the concepts and techniques associated with the understanding of signals and systems.

CEO2: To familiarize the concepts of transform based, continuous time and discrete time analysis of signals and systems

CEO3: To provide fundamental knowledge about sampling process

CEO4: The concept of convolution is useful for analysis in the areas of linear systems and communication theory.

CEO5: To provide a foundation to the courses like communication, digital signal processing, control systems, instrumentation, and so on, that deals with signal and system concepts directly or indirectly

UNIT - 1: Introduction to Signals

Analogy between vector and signals - Orthogonal signal space - Signal approximation using orthogonal functions - Mean square error - Closed or complete set of orthogonal functions - Orthogonality in complex functions - Classification of signals - Different types of standard signals and Basic operations on signals.

UNIT - 2: Fourier Series & Fourier Transform

Representation of Fourier series - Properties of FS - Dirichlet's condition - Gibb's phenomena - Trigonometric & Exponential FS and Complex Fourier spectrum. Deriving Fourier Transform from Fourier Series - FT of different signals - Properties of FT & Fourier Transform of periodic signals – Correlation - Auto & Cross correlation - Parsavel's Theorem - PSD & ESD.

UNIT - 3: Sampling Theorem

Sampling theorem for lowpass and bandpass signals – Ideal - Natural & Flat top sampling, Effect of Under sampling (Aliasing effect) - Nyquist sampling rate and Reconstructing of Signal from its samples.

UNIT - 4: Signal Transmission Through LTI System

Convolution, Computation of Convolution - Response of LTI System - Classification of Systems - Distortion Less Transmission - Signal BW - System BW - Classification of Filters- Relation Between Rise Time & BW and Poly Wiener Criteria for Physical Realization.

UNIT - V: Laplace Transform & Z-Transform

Laplace Transform - Concept of ROC & Properties - Properties Of LT - Laplace Transform of Different Signals and InverseLT. Z – Transform , Concept of ROC & Properties - Properties of ZT - Z- Transform of Different Signals - Inverse ZT and Comparison Between FT , LT and ZT.

Course Outcomes:

On successful completion of the course, students will be able to		**POs related to Cos**
CO1	Demonstrate the concepts of signals and systems, analyze the signals and apply different operations on signals	PO1, PO2
CO2	Analyze the frequency components of signals using fourier series, fourier transform to demonstrate knowledge on properties by usage of fourier series, fourier transform	PO1,PO2,PO4
CO3	Demonstrate knowledge on sampling process.	PO1,PO2,PO4
CO4	Analyze time and frequency characteristics of systems	PO1,PO2,PO4
CO5	Demonstrate knowledge on laplace and z transform analyze the system characteristics using laplace transform & z-transform	PO1,PO2,PO4

Text books:

1. Signals, Systems & Communications, 2/e, 2003, B.P Lathi, BS Publications, Hyderabad.
2. Signals and systems, 2/e, 2002, A.V. Oppenheim, A.S. Willsky and S.H. Nawab, Pearson Education, Delhi.

Reference books:

1. Signals & System, 2/e, 2001, Simon Haykin and Van Veen,John Wiley & Sons, inc, Delhi.
2. Signals and Systems, 3/e, 2010, A. Ramkrishna Rao, Tata McGraw-Hill, Delhi.
3. Linear Systems and Signals, 2/e, 2008, B.P. Lathi, Oxford University Press, Delhi.
4. Fundamntals of Signals and Systems, International Edition, 2008, Michel J. Robert, Tata McGraw-Hill, Delhi.
5. Signals, Systems and Transforms, 3/e, 2006, C.L. Phillips, J.M. Parr and Eve A. Riskin, Pearson education, Delhi.

CO-PO Mapping

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

SREENIVASA INSTITUTE of TECHNOLOGY and MANAGEMENT STUDIES
(Autonomous)

II Year B.Tech I semester	**L**	**P**	**C**
	4	**-**	**3**

13ECE 213 SWITCHING THEORY AND LOGIC DESIGN
(common to ECE,EIE&EEE)

Course Educational Objectives:

CEO1: To Provide Knowledge On
designing different logic circuits and fundamentals of number systems
- Conversions Of Number Systems, weighted And Non Weighted Codes.
- Minimization Of Switching Functions Using Boolean Algebra.

CEO2: To develop skill to minimize switching functions in effective way by using K-MAP and Machine method

CEO3: To develop skill to design combinational logic circuits and also 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 - Complements- Weighted & Non Weighted Codes - Error Detection And Error Correction Codes - Hamming Code.
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 - Minimisation of Logic Functions Using Theorems.

UNIT - 2: Minimisation of Switching Functions

Minimisation of Switching Functions Using K-Map Upto 5variables - Tabular Minimization (Quine-Mcluskey) - 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 - BCD Adder - Carry Look Ahead Adder Circuit - Binary Multiplier - Magnitude Comparator – Decoder - Encoder - Priority Encoder – Multiplexer – Demultiplexer – Codeconverters – 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 - Conversion of 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 Flipflops - Melay and Moore State Machines - Introduction To ASM Charts With Examples

Course Outcomes:

On successful completion of the course the student will be able to		POs related to COs
CO1	Demonstrate knowledge on conversion of number systems with different radix, Error Detection and Error Correction in binary words, arithmetic and logical operations of binary and applying boolean algebra for switching functions.	PO1, PO2
CO2	Identify the most efficient grouping to minimize the switching functions using k-map.and machine method	PO1,PO2
CO3	Design the combinational logic circuits and realize the circuits using PLD's for a given specifications.	PO1,PO2,PO3
CO4	Understand the knowledge on latches,different flip flops,registers,and counters and used to 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. and idea about ASM charts	PO1,PO2,PO3,PO4

Text books:

1. Digital Design, 3/e, 2006, Morris Mano, Prentice Hall of India, NewDelhi.
2 . Digital Fundamentals, 10/ e, 2008, Thomas L. Floyd, Pearson/Prentice Hall, NewDelhi.

Reference books:

1. Fundamentals of Logic Design, 5/e, 2004 ,Charles H.Roth , Thomas Publications, New Delhi.
2. Switching & Finite Automata Theory , 2/e, ,Zvi Kohavi, Tata McGraw Hill, NewDelhi.
3. Digital systems Principles And Applications, -8/e, 2002, Ronald J.Tocci Neal S.widmer, Pearson education, New Delhi.
4. Digital Principles And Applications, 4/e, 1999, Albert Paul Malvino,Donald P.Leach,Tata Mc Graw Hill, New delhi.
5. Fundamentals of digital Logic with VHDL Design, 5/e, 2004, Stephen Brown, ZvonkoVranesic, Tata McGraw Hill, New Delhi.

CO-PO Mapping

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO2	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO3	**3**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO4	**3**	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO5	**3**	**2**	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO*	**3**	**2.6**	**2.3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

SREENIVASA INSTITUTE of TECHNOLOGY and MANAGEMENT STUDIES
(Autonomous)

II Year B.Tech I semester	**L**	**P**	**C**
	4	**-**	**3**

13EEE 218 PRINCIPLES OF ELECTRICAL ENGINEERING
(Common to ECE and EIE)

Course Educational Objectives:

CEO 1: To acquire the knowledge on DC and AC transients.
CEO 2: To impart the knowledge on two port networks.
CEO 3: To acquire the knowledge on filters and attenuators.
CEO 4: To attain the knowledge on D.C. machines.
CEO 5: To acquire the knowledge on transformers and single phase ac machine.

UNIT - 1: Network Analysis

Basic Definitions - Types Of Elements - Types Of Sources - Resistive Networks - Inductive Networks - Capacitive Networks - Series - Parallel Circuits - Kirchoff's Laws.Star Delta And Delta Star Transformation - Mesh Analysis - Nodal Analysis - Superposition Theorem - Thevinins Theorem - Nortons Theorem - Maximum Power Transfer Theorem.

UNIT - 2: Alternating Quantities

Principle of AC Voltages - Waveforms And Basic Definitions - Root Mean Square And Average Values Of Alterating Currents And Voltage - Form Factor And Peak Factor - Single Phase Series And Parallel Circuits.

UNIT-3: Two Port Networks

Impedance Parameters - Hybrid Parameters - Transmission(ABCD) Parameters - Conversion of One Parameter To Another - Conditons For Reciprocity And Symmetry - Interconnection of Two Port Networks In Series - Parallel and Cascaded Configurations.

UNIT - 4: D.C Generators & D.C Motors

Principle of Operation of DC Generator - EMF equation - Types of Generators - Magnetisation characterstics of DC Generator - Principle of Operation of DC Motor - Types of DC Motor - Torque equation - Losses and efficiency calculation ina D.C motor-swinburne's Test.

UNIT-5: Transformers

Principle of Operation - Constructional details - Losses and efficiency and Regulation of Transformer - Testing : OC & SC Test.

Course Outcomes:

On successful completion of the course the student will be able to		POs related to COs
CO1	Demonstrate knowledge on basic circuit elements and its analysis	PO1
CO2	To Describe alternating quantities	PO1,PO3
CO3	To determine and analyze different two-port networks	PO1,PO2,PO3,PO5
CO4	Demonstrate knowledge on Construction and performance of DC motor and Generators Analyze Losses and Efficiency of motor by different methods	PO1,PO2,PO4,PO5
CO5	Demonstrate knowledge on Construction and performance of transformer and design of the parameters of equivalent circuit of single phase transformer	PO1,PO2,PO4,PO5

Text Books:

1. Network Analysis, 4/e, 2009, A.Sudhakar, Shyammohan S.pilli, Tata McGraw-Hill Education Pvt. Ltd., Noida.
2. Principles of Electrical Engineering , 2/e, 2003, V.K.Mehta, Rohit Mehta, S.Chand &Company Pvt.Ltd., NewDelhi.

Reference Books:

1. Electrical Technology – 2/e, 1998, Huges Edward, Addison-Wesley, logman Ltd, London.
2. Introduction to Electrical Engineering, 3/e, 2009, Naidu and Kamakshiah, Tata McGraw-Hill Education Pvt. Ltd., Noida.
3. Basic Electrical Engineering, 2/e, 2007, Nagasarkar and Sukhija, Oxford Press, New Delhi.
4. Basic Electrical Engineering, 3/e, 2008, KB. Madhusahu, Scitech Publications India Pvt Ltd, Chennai.
5. Theory and Problems of Basic Electrical Engineeing , 2/e, 2002, D.P.Kothari & I.J.Nagrath Printice Hall of India, New delhi.

CO-PO Mapping

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	2	-	3	-	-	-	-	-	-	-	-	-
CO3	1	3	3	-	3	-	-	-	-	-	-	-
CO4	1	2	--	3	3	-	-	-	-	-	-	-
CO5	1	2	-	3	3	-	-	-	-	-	-	-
CO*	**1.6**	**2.33**	**3**	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

SREENIVASA INSTITUTE of TECHNOLOGY and MANAGEMENT STUDIES
(Autonomous)

II Year B.Tech I semester	**L**	**P**	**C**
	-	**3**	**2**

13ECE 214 ELECTRONIC DEVICES AND CIRCUITS LAB
(Common to ECE, EIE, EEE)

Course Educational Objectives:

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

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

CEO3: Tostudy the operation of Analog and digital meters which are used for practical experiments.

CEO4: To understand soldering practice of basic electronic circuits for projects.

CEO5: To know the practical knowledge of diodes and transistors with their input-output characteristics.

PART - A: Electronic Workshop Practice

1. Identification, Specification, Testing of R, L, C components (color codes), Potentiometers, Switches (SPDT, DPDT, AND DIP), Coils, Gang condensers, Relays, Breadboards.
2. Identification, Specification, Testing of active devices, diodes, BJTs, Low power JFETs, MOSFETs.
3. Study and operation of
   - ***** Multimeters
   - ***** Function Generators
   - ***** Regulated Power Supplies
   - ***** CRO

PART - B: Laboratory Experiments (Minimum of 10 Experiments)

1. PN Junction Diode Characteristics- Forward and Reverse Bias
2. Zener Diode Characteristics
3. Transistor CB Characteristics (Input And Output) and Determine H- Parameters From Graphs
4. Transistor CE Characteristics (Input And Output) and Determine H- Parameters From Graphs
5. Transistor CC Characteristics (Input And Output) and Determine H- Parameters From Graphs
6. Half Wave Rectifier With and Without Filter
7. Full Wave Rectifier With and Without Filter
8. FET Characteristics
9. Frequency Response of CE Amplifier
10. Frequency Response of CC Amplifier
11. Frequency Response of Common Source FET Amplifier
12. Single Stage RC Coupled Amplifier

Course Outcomes:

On successful completion of the course the student will be able to		POs related to COs
CO1	Demonstrate knowledge on identification & testing of passive components along with active devices.	PO1
CO2	Analyze the practical characteristics of diodes and transistor with different configurations	PO2
CO3	Design Simple electronic circuits by soldering with specifications	PO3
CO4	Analyze the special purpose devices with their characteristics for future applications	PO4
CO5	Implement the devices like LED, LDR, Photo diode etc. for society applications	PO6
CO6	Follow ethical principles on analysis of different electronic circuits which is used for project works.	PO8
CO7	Do experiments effectively as an individual and as a member in a group.	PO9
CO8	Communicate verbally and in written form, the understandings about the experiments.	PO10
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	-	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)

II Year B.Tech I semester	**L**	**P**	**C**
	-	**3**	**2**

13EEE 219 ELECTRICAL ENGINEERING LAB
(Common to ECE and EIE)

Course Educational Objectives:

CEO1: To gain practical experience on basic circuits and network theorems.

CEO2: To gain practical experience on different two port networks.

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 and speed control of DC shunt motor

PART – A

1.Verification of KVL And KCL.
2. Time Response of First Order RC/RL Network for Periodic Non-Sinusoidal Inputs-Time Constant and Steady State Error Determination.
3. Two Port Network Parameters: Z and Y Parameters.
4. Two Port Network Parameters: ABCD and H-Parameters.
5. Verification of Superposition and Reciprocity Theorems.
6. Verification of Maximum Power Transfer Theorem.
7. Verification of Thevinins Theorem.
8. Verification of Norton's Theorem.

PART – B

1.Magnetization Characteristics of D.C Shunt Generator Determination of Critical Field Resistance.
2.Swinburne's Test of DC Shunt Machine.
3.Brake Test on DC Shunt Motor, Determination of Performance Characteristics.
4.OC & SC Tests on Single Phase Transformer.

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

Course Outcomes		**POs related to COs**
CO1	Demonstrate knowledge on the fundamental concepts of KVL, KCL and Network Theorems.	PO1
CO2	Identify and Analyze the Parameters of Two-Port Network and DC Generators & Motors.	PO2
CO3	Design of Two port networks for attaining solution through different parameters.	PO3
CO4	Investigate Two-Port Networks and for solve complex problems	PO4

	related.	
CO5	Follow the ethical values in designing the circuits.	PO8
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	Continue updating their design skill related to for various circuits based on application 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	-	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
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B.Tech II-I Semester	**L**	**P**	**C**
	2	**-**	**-**

13AUD 211 PROFESSIONAL ETHICS

Course Educational Objectives:

CEO1: To develop the human values in work place, society and every where.
CEO2: To understand the importance of engineering ethics with the mentors' theory on ethics
CEO3: To inculcate codes of ethical values to the engineers in the society
CEO4: To understand the ethical issues on safety, responsibilities and human rights in society.
CEO5: To know the ethics issues on environmental, weapons, computers ethics & Moral leaderships.

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' – Variety of moral issued – Types of inquiry – Moral dilemmas – 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 – 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 witnesses and advisors – Moral leadership.

Course Outcomes:

After the completion of this course, a successful student is able to		**POs related to COs**
CO1	Develop the human values in work place, society and everywhere.	PO6,PO8,PO9, PO11,PO12
CO2	Understand the importance of engineering ethics with the mentors' theory on ethics	PO6,PO8,PO9, PO11,PO12
CO3	Inculcate codes of ethical values to the engineers in the	PO6,PO8, PO12

	society	
CO4	Understand the ethical issues on safety, responsibilities and human rights in society.	PO6,PO8,PO9, PO12
CO5	Know the ethics issues on environmental, weapons, computers ethics & Moral leaderships	PO6,PO7,PO8,PO9

Text books:

1.A Textbook on Professional Ethics and Human Values, 1/e, 2006, Naagarazan R.S., New Age International (P) Ltd, Publishers, New Delhi.
2. Professional Ethics and Human Values, S. Dinesh Babu, 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. Engineering Ethics, 2004, Charles D. Fleddermann, Pearson Education/ Prentice- Hall, New Jersey (Indian Reprint now available).
3. Engineering Ethics- Concepts and Cases,2000, Charles E Harris, Michael S. Protchard and Michael J Rabins, Wadsworth Thompson Leaning, United States (Indian Reprint now available).
4. Ethics in Engineering, Mike Martine and Roland Schinzinger, Tata McGraw- Hill Education, Pvt. Ltd.,Noida.
5. Ethics and the Conduct of Business, 2003, John R Boatright, Pearson Education, New Delhi.
6. Fundamentals of Ethics for Scientists and Engineers, 2001, Edmund G Seebauer and Robert L Barry, Oxford University press, Oxford.

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	-	-	-	-	-	2	-	3	2	-	1	2
CO.2	-	-	-	-	-	2	-	3	2	-	1	2
CO.3	-	-	-	-	-	3	-	3	-	-	-	2
CO.4	-	-	-	-	-	2	-	3	2	-	-	2
CO.5	-	-	-	-	-	2	2	3	2	-	-	-
CO*	**-**	**-**	**-**	**-**	**-**	2.2	2	3	2	**-**	**1**	2

SREENIVASA INSTITUTE of TECHNOLOGY and MANAGEMENT STUDIES

(Autonomous)

II Year B.Tech II semester	**L**	**P**	**C**
	4	**-**	**3**

13HAS 221 MATHEMATICS-III
(Common to ECE, EEE, EIE)

Course Educational Objectives:

CEO1: To learn the concepts of z-transformation and inverse z- Transforms and to explore the Solving difference equations by using z- transform method.

CEO2: To learn continuity, differentiability and analyticity of a complex function and analyze the functions of complex variable with a review of elementary complex functions.

CEO3: To learn complex integration and applications to real integrals

CEO4: To learn conformal mapping of complex functions and to understand the Taylor and Laurent expansion with their use in finding out the residue and improper integral

UNIT - 1: Z- Transforms

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

UNIT - 2: Complex Functions

Functions of a complex variable - Elementary functions: Exponential - Trigonometric - Hyperbolic - Logarithmic functions and their properties - Principal value - Continuity - Differentiability - Analyticity – Properties - Cauchy-Riemann equations in cartesian and polar coordinates - Harmonic and conjugate harmonic functions - Milne-Thompson method.

UNIT - 3: Complex Integration and Complex Power Series Complex Integration

Line integral - Evaluation along curves and closed contours - Cauchy's integral theorem - Cauchy's integral formula - Generalized integral formula.
Complex Power Series: Taylor's and Laurent series expansions of complex functions - Singular point - Isolated singular point - Pole of order m - Essential singularity.

UNIT - 4: Residue Calculus

Residue - Evaluation of residue by formula - Residue theorem - Evaluation of integrals using residue theorem - Evaluation of improper and real integrals of the type

(a) $\int_{-\infty}^{+\infty} f(x)dx$ (b) $\int_{c}^{c+2\pi} f(\cos\theta, \sin\theta)d\theta$ (c) $\int_{-\infty}^{\infty} e^{imx} f(x)dx$

UNIT - 5: Argument Principle, Rouche's Theorem its applications and conformal mapping
Argument Principle, Rouche's Theorem its applications:

Argument principle - Rouche's theorem - Determination of number of zeros of complex polynomials - Maximum modulus principle - Fundamental theorem of algebra - Liouville's theorem.
Conformal Mapping: Definitions - Transformation by e^z , lnz, z^2 , sin z , cos z - Translation - Rotation - Inversion and Bilinear transformation - Fixed point - Cross ratio - Determination of bilinear transformation.

Course Outcomes:

After the completion of this course, a successful student is able to		POs related to COs
CO1	Demonstrate knowledge in z-transform and inverse z- transform and develop analytical skills in solving problems involving difference equations using z-transformation	PO1,PO2,PO3
CO2	Demonstrate knowledge in continuity and differentiability of a complex function and write Cauchy-Riemann equations to describe the analyticity of complex functions	PO1,PO2
CO3	Demonstrate knowledge in integration of complex functions and develop analytical skills in providing solutions for problems involving integration of complex functions and develop skills in analyzing the properties of complex functions by expressing them in power series	PO1,PO2
CO4	Develop analytical skills in providing solutions for problems involving improper real integrals and develop skills in analyzing properties of improper integrals through residue theory	PO1,PO2
CO5	Demonstrate knowledge in conformal mappings and bilinear transformations and develop skills in analyzing the properties exhibited by complex functions in Argand plane	PO1,PO2

Text Books:

1.Engineering Mathematics – III, 2013, T.K.V. Iyengar, B. Krishna Gandhi, S. Ranganatham and M.V.S.S.N. Prasad , S. Chand and Company Publishers, New Delhi.
2.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.

Reference Books:

1.Engineering Mathematics, Volume – III , 2013, E. Rukmangadachari, E. Keshava Reddy, Pearson Education, Chennai.
2.Higher Engineering Mathematics, 34/e, 1999, Dr. B. S. Grewal, Khanna Publishers, New Delhi.
3.Engineering Mathematics for JNTU, 3/e, 2008, B.V. Ramana, Tata McGraw Hill Publishers, New Delhi.
4.Theory and Applications of Complex Variables, 1981, Murray R. Spiegel, Schaum's outline series, McGraw-Hill Book Company, Singapore.
5.Complex Variables and Applications, 6/e, 1996, James Ward Brown, Ruel V. Churchill, McGraw-Hill International /s, Singapore.

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	3	3	-	-	-	-	-	-	-	-	-
CO.2	3	3	-	-	-	-	-	-	-	-	-	-
CO.3	3	3	-	-	-	-	-	-	-	-	-	-
CO.4	3	3	-	-	-	-	-	-	-	-	-	-
CO.5	3	3	-	-	-	-	-	-	-	-	-	-
CO*	**3**	**3**	**3**	-	-	-	-	-	-	-	-	-

SREENIVASA INSTITUTE of TECHNOLOGY and MANAGEMENT STUDIES

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II Year B.Tech II semester	**L**	**P**	**C**
	4	**-**	**3**

13MBA 218 BUSINESS MANAGEMENT
(Common to all Branches)

Course Educational Objectives:

CEO1: The Objective of the course is to give a basic perspective of Management theories and practices.

CEO2: This will form foundation to study other functional areas of 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

Cost Concepts - Production Function - Laws Of Returns - Production Management - Plant Layout - Basic Concepts Of MIS And ERP - Total Quality Management (TQM) - Six Sigma - Business Process Re-Engineering.

UNIT - 3: Business Organisation and Management

Features of Business - Types of Business Organisations - Sole Proprietorship – Partnership - Joint Stock Company and Public Enterprises – Management - Nature - Significance and Functions of Management.

UNIT - 4: HR and Marketing

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: Financial Management

Objectives and Functions of Financial Management - Sources of Long-Term and Short-Term Finance - Cash Budgeting Techniques (Payback Period Method - ARR – NPV - IRR).

Course Outcomes:

On successful completion of the course the student will be able to		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	PO2,PO5,PO7,PO9,PO12

Text Books:

1.Managerial Economics and Financial Analysis, 4/e, 2011, Dr.A.R.Aryasri, Tata McGraw Hill, NewDelhi.
2.Management Science, 1/e, 2009, Dr. G. Sreenivasa Rao, High tech Publishers, Hyderabad.
3.Management Science, 3/e, 2008, A.R.Aryasri, Tata McGraw Hill, NewDelhi.

References Books:

1.Managerial Economics, Analysis, Problems and Cases, 17/e, 2011, P.L.Mehta, Sultan Chand & Sons, New Delhi.
2.Production and Operations Management, 3/e, 2011, Aswathappa .K, Himalaya Publishing House, Mumbai.
3.Marketing Management, 4/e, 2010, Rajan Saxena, Tata McGraw Hill, NewDelhi.
4.Personnel and Human Resource Management, 2/e, 2009, Subba Rao, HPIL, New delhi
5.Financial Management, 3/e, 2011, I.M. Pandey, Vikas Publishers, Hyderabad.

CO-PO Mapping

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
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

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II Year B.Tech II semester	**L**	**P**	**C**
	4	**-**	**3**

13ECE 221 ELECTRONIC CIRCUIT ANALYSIS
(Common to ECE & EIE)

Course Educational Objectives:

CEO1: To develop the basic understanding of Small signal amplifiers and its analysis using hybrid model.
CEO2: To make the students to learn about Multistage Amplifiers and its analysis.
CEO3: To make students aware of amplifier operation at low and high frequency and its Frequency responses
CEO4: To make students learn about different types of feedback amplifiers and oscillators
CEO5 : To Analyse the power efficiency calculations of power amplifiers and to make Students learn about different types of Tuned amplifiers

UNIT - 1: Review of Single Stage Amplifiers

BJT Transistor Modeling - H-Parameter Model - Hybrid π Model & r_e Model of Transistor - CE Amplifier - Emitter Follower - Miller's Theorem and Its Dual- Design of Single Stage RC Coupled Amplifier Using BJT.

UNIT - 2: Multi Stage Amplifiers

Concepts of Multistage Amplifiers - Cascade Amplifier - Cascode Amplifier - Darlington Pair - Current Mirror Circuits - Different Coupling Schemes used in Amplifiers - RC Coupled Amplifier- Transformer Coupled Amplifier - Direct Coupled Amplifier.

UNIT - 3: BJT & JFET Amplifier Frequency Response

Logarithms – Decibels - General Frequency Considerations - Low Frequency Response of BJT Amplifier - Low Frequency Response of JFET Amplifier - Miller Effect Capacitance and High Frequency Response of BJT and JFET Amplifiers.

UNIT - 4: Feedback Amplifiers & Oscillators

Concepts of Feedback - Classification of Feedback Amplifiers - General Characteristics of Negative Feedback Amplifiers - Voltage Series - Voltage Shunt - Current Series and Current Shunt Feedback Configurations - Classification of Oscillators - Conditions for Oscillations - RC Phase Shift Oscillator - Generalized Analysis of LC Oscillators – Hartley and Colpitts Oscillators - Wien-Bridge & Crystal Oscillators - Stability of Oscillators. Illustrative Problems.

UNIT - 5: Power Amplifiers & Tuned Circuits

Classification - Class A Large Signal Amplifiers - Transformer Coupled Class A Audio Power Amplifier - Efficiency of Class A Amplifier - Class B Amplifier - Efficiency of Class B Amplifier - Distortion in Power Amplifiers - Thermal Stability and Heat Sinks.

Introduction To Tuned Circuits: Q-Factor - Small Signal Tuned Amplifiers - Effect of Cascading Single Tuned Amplifiers on Bandwidth - Effect of Cascading Double Tuned Amplifiers on Bandwidth - Stagger Tuned Amplifiers - Stability of Tuned Amplifiers

Course Outcomes:

On successful completion of the course the student will be able to		POs related to COs
CO1	Demonstrate knowledge on small signal analysis of BJT amplifiers and design single stage amplifier using BJT.	PO1,PO2,PO3,PO4
CO2	Analyzedifferent coupling schemes used for multistage amplifiers	PO1,PO2
CO3	Analyzefrequency response of BJT and FET amplfiers	PO1,PO2
CO4	Demonstrate knowledge on different types of feedback amplifiers and oscillators.	PO1,PO2
CO5	Analyze characteristics of tuned amplifiers and Demonstrate knowledge on different types ofpower amplifiers.	PO1,PO2

Text Books:

1. Electronic Devices and Circuit Theory, 9/e, 2008, Robert L.Boylestad- Louis Nashelsky,Pearson Education, NewDelhi.
2. Electronic Devices and Circuits, 5/e, 2008, David A. Bell, Oxford University Press.

Reference Books:

1. Electronic Devices and Circuits, 2/e, 2009, S. Salivahanan, N.Suresh Kumar, A Vallavaraj, Tata McGraw Hill, NewDelhi.
2. Integrated Electronics, 9/e, 2008,Jacob Millman and Christos C Halkias, Tata McGraw Hill, NewDelhi.
3. Introductory Electronic Devices and Circuits, 7/e,2009,Robert T. Paynter PEI,New Delhi.
4. Electronic Circuit Analysis, 1/e,2004,K. Lal Kishore,BSP, Hyderabad.
5. Electronic Devices and Circuits, 2/e, 2007 J.Millman, C.C.Halkias, and Satyabratha Jit , Tata McGraw Hill, NewDelhi.

CO-PO Mapping

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

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II Year B.Tech II semester	**L**	**P**	**C**
	4	**-**	**3**

13ECE 222 PULSE AND DIGITAL CIRCUITS
(Common to ECE & EIE)

Course Educational Objectives:

CEO1: To provide knowledge on linear and nonlinear network responses for different signals

CEO2: To develop a skill on analysis and design of different switching devices and multi-vibrators

CEO3: To provide knowledge on different time base generators and its applications

CEO4: To provide knowledge on designing different logic gates using different logics

CEO5: To develop skill to analyze different logic characteristics on different logic families

UNIT - 1: Linear &Non Linear Waveshaping

High Pass - Low Pass RC Circuits - Their Response for Sinusoidal – Step – Pulse - Square and Ramp Inputs - RC Network as Differentiator and Integrator – Attenuators - Its Applications in Cro Probe – RL and RLC Circuits.

Non Linear Waveshaping: Diode Clippers - Transistor Clippers - Clipping at Two Independent Levels - Transfer Characteristics of Clippers - Comparators - Applications of Voltage Comparators - Clamping Operation - Clamping Circuits using Diode with Different Inputs - Clamping Circuit Theorem - Practical Clamping Circuits - Transfer Characteristics of Clampers.

UNIT - 2: Switching Characteristics of Devices & Multivibrators

Diode as a Switch - Transistor as a Switch - Break Down Voltage Consideration of Transistor - Saturation Parameters of Transistor and Their Variation with Temperature - Design of Transistor Switch - Transistor-Switching Times.

Multivibrators : Analysis and Design of Astable Multivibrators – Monostable - Bistable and Schmitt Trigger using Transistors -Triggering Methods.

UNIT - 3: Time Base Generators

General Features of a Time Base Signal - Methods of Generating Time Base Waveform - Miller and Bootstrap Time Base Generators - Basic Principles - Transistor Miller Time Base Generator - Transistor Bootstrap Time Base Generator - Current Time Base Generators.

UNIT - 4: Synchronization And Frequency Division

Principles of Synchronization - Frequency Division in Sweep Circuit - UJT Relaxation Circuit - stable Relaxation Circuits - Synchronization of a Sweep Circuit with Symmetrical Signals - Sine Wave Frequency Division with a Sweep Circuit.

UNIT - 5: Sampling Gates & Logic Gates

Basic Operating Principles of Sampling Gates - Unidirectional and Bi-Directional Sampling Gates - Reduction of Pedestal in Gate Circuits - Applications of Sampling Gates. **Realization of Logic Gates using Diodes & Transistors :** AND - OR Gates using Diodes – Resistor - Inverter Gate by Transistor Logic - Universal Gates by Diode Transistor Logic.

Course Outcomes:

On successful completion of the course the student will be able to		**POs related to COs**
CO1	Analyse different linear and non linear networks for different input signals	PO1, PO2,PO3
CO2	Demonstrate design knowledge on diode , transistor switching and multivibrators	PO1, PO2, PO3
CO3	Able to Identify appropriate time base generator circuit based on application	PO1, PO2, PO3
CO4	Understand the concept of designing different digital logic circuits	PO1, PO2, PO3
CO5	Analysis the different logic families with different characteristics of logic gates	PO1, PO2, PO3

Text Books :

1. Pulse, Digital and Switching Waveforms, 3/e,1991, J. Millman and H. Taub, McGraw-Hill, New Delhi.
2. Solid State Pulse circuits , 4/e., 2002, David A. Bell, Prentice Hall of India, New Delhi.

References Books:

1. Pulse and Digital Circuits , 2 /e, 2009,A. Anand Kumar, Prentice Hall of India, New Delhi.
2. Pulse, Digital Circuits and Computer Fundamentals, 3/e, 1997, R.Venkataraman,Dhanpat Rai Publications,New Delhi
3. Pulse and Digital Circuits, 3/e, 2006, Prof B.N. Yoga Narasimhan,Shiva book Publishers, Bangalore.
4. Pulse and Digital Circuits ,3 /e, 2006,Syed Amjad Ali, Hi-Tech Publishers, Hyderabad.
5. Pulse and Digital Circuits, 1/e, 2011,U.A Bakshi,A.P.Godse , Technical Publications,Pune.

CO-PO Mapping

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	-	-	-	-	-	-	-	-	-
CO2	3	3	3	-	-	-	-	-	-	-	-	-
CO3	3	3	2	-	-	-	-	-	-	-	-	-
CO4	2	2	3	-	-	-	-	-	-	-	-	-
CO5	3	2	2	-	-	-	-	-	-	-	-	-
CO*	2.8	2.6	2.4	-	-	-	-	-	-	-	-	-

SREENIVASA INSTITUTE of TECHNOLOGY and MANAGEMENT STUDIES

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II Year B.Tech II semester	**L**	**P**	**C**
	4	**-**	**3**

13ECE 223 PROBALILITY THEORY AND STOCHASTIC PROCESS
(Common to ECE & EIE)

Course Educational Objectives:

CEO1: To provide mathematical background and sufficient experience so that the student can read, write, and understand sentences in the language of probability theory, as well as solve problems in Signal Processing and Communication Engineering.

CEO2: To introduce students to the basic knowledge of Probability and Stochastic Process.

CEO3: To understand basic concepts of probability theory and random variables, how to deal with random variables, Statistical Parameters of Single & Multiple random variables, Temporal & Spectral Characteristics, LTI System with Random Inputs

UNIT - 1: Probability

Definition - Basic Terminology in Probability - Sample Space - Types of Sampling Space - Joint Probability - Conditional Probability - Total Probability - Bayes' Theorem & Independent Events.

UNIT - 2: Random Variables

Definition of Random Variable - Conditions to be a Random Variable - Types of Random Variables – Continuous - Discrete& Mixed - PDF - CDF & Properties - Conditional PDF and Properties - Monotonic and Non Monotonic Transformation of Random Variables – Continuous & Discrete.

UNIT - 3: Statistical Parameters of Single & Multiple Random Variables

Moment about Origin - Central Moments - Characteristic Function (CF) - Moment Generating Function (MGF) - Calculation of Statistical Parameters for Binomial - Poisson- Uniform – Gaussian - Exponential & Rayleigh Random Variables - Joint PDF & CDF - Marginal PDF & CDF - Conditional PDF &CDF - Statistical Independence - Joint Moment About Origin - Central Moment - Joint Characteristic Function (CF) - Joint Moment Generating Function (MGF) - Calculation of Statistical Parameters For Multiple Random Variables - Sum of Two Random Variable & Central Limit Theorem.

UNIT - 4: Stochastic Process – Temporal & Spectral characteristics

Concept of Stochastic Process - PDF & CDF of Stochastic Process - Time Averages - Statistical Averages - Classification of Stochastic Process - Deterministic - Non Deterministic - Strict Sense - Wide Sense & Ergodicity - Correlation - Auto Correlation - Cross Correlation & Properties - Relation Between Auto Correlation and Power Spectral Density - Cross Power Spectral Density - Properties of PSD - Band Pass - Band Limited - Narrow Band Pass Process.

UNIT - 5: LTI System with Random inputs

Response of LTI System to Statistical Averages – Mean - Mean Square - Correlation & PSD – Noise - Noise Bandwidth - Calculation of Noise Figure - Effective Noise Temperature in Passive Circuits - Single Stage and Cascaded Stages.

Course Outcomes:

On successful completion of the course the student will be able to		POs related to COs
CO1	Demonstrate knowledge in Probability theory, Single and multiple random variables, Operation on Single and multiple random variables and Stochastic process and their characteristics	PO1, PO2
CO2	Analyze operations on single and multiple random variables and Stochastic Process Temporal and Spectral Characteristics.	PO1,PO2
CO3	Formulate solutions for complex engineering problems involving Probability and Stochastic Processes.	PO1, PO2, PO3
CO4	Model random processes for the analysis of communication System.	PO1, PO2
CO5	Evaluate Statistical Averages of LTI Systems and Noise Figure of Single and Cascaded Stages.	PO1, PO2

Text Books:

1.Probability, Random Variables & Random Signal Principles, 4/e, 2001, Peyton Z. Peebles, TataMcGraw-Hill, Delhi.
2.Probability and Random Processes with Applications to Signal Processing, 3/e, 2001, Henry Stark and W. Woods, Peason Education, Delhi

Reference Books:

1.Probability, Rondom Variables and Stochastic Processes, 4/e, 2002, Athanasios Papoulis and S. Unnikrishna Pillai, Tata McGraw-Hill, Delhi.
2.Probability Theory and Stochastic Processes, 1/e, 2010, Dr. Y.Mallikarjuna Reddy, Golden Era Publications, Guntur.
3.Signals, Systems & Communications, 2/e, 2003, B.P Lathi, BS Publications, Hyderabad.
4.Principles of communication Systems, 3/e, 2007, H. Taub and Donald L.Schilling, Tata McGraw-Hill, Delhi.
5.Probability Methods of Signals and System Analysis, 3/e, 1999, George R. Cooper, Clave D. Mc Gillem, Oxford, Delhi.

CO-PO MAPPING

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

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II Year B.Tech II semester	**L**	**P**	**C**
	4	**-**	**3**

13ECE 224 ELECTROMAGNETIC WAVES AND TRANSMISSION LINES
(Common to ECE & EIE)

Course Educational Objectives:

CEO1: Analyze and solve the problems of electric fields that vary with three dimensional spatial co-ordinates as well as with time.

CEO2: Analyze and solve the problems of magnetic fields that vary with dimensional spatial co- ordinates as well as with time.

CEO3: Get the knowledge and ability to apply the Maxwell's Equations to various field waves and at different boundaries

CEO4: Understand and analyze the propagation of electromagnetic waves in different media

CEO5: Learn the basics of transmission line concepts and parameters to apply on real-time applications

UNIT - 1: Electrostatics-I

Coulomb's Law - Electric Field Intensity – Fields Due To Different Charge Distributions - Electric Flux Density - Gauss Law and Applications - Electric Potential - Relations between E And V - Maxwell's Two Equations for Electrostatic Fields - Energy Density - Illustrative Problems - Convection and Conduction Currents - Dielectric Constant - Isotropic and Homogeneous Dielectrics - Continuity Equation - Relaxation Time - Poisson's and Laplace's Equations – Capacitance - Parallel Plate – Coaxial - Spherical Capacitors- Illustrative Problems.

UNIT - 2: Magneto Statics

Biot-Savart Law - Ampere's Circuital Law and Applications - Magnetic Flux Density - Maxwell's Two Equations for Magnetostatic Fields - Magnetic Scalar and Vector Potentials - Forces due to Magnetic Fields - Ampere's Force Law - Inductances and Magnetic Energy - Illustrative Problems.

UNIT - 3: Maxwell's Equations (Time Varying Fields)

Faraday's Law and Transformer EMF- Inconsistency of Ampere's Law and Displacement Current Density - Maxwell's Equations in Different Final Forms and Word Statements - Conditions at a Boundary Surface – Dielectric - Dielectric and Dielectric -Conductor Interfaces - Illustrative Problems.

UNIT - 4: Em Wave Characteristics-I

Wave Equations for Conducting and Perfect Dielectric Media - Uniform Plane Waves - Definition - All relations between E & H - Sinusoidal Variations - Wave Propagtion in Lossless and Conducting Media - Conductors & Dielectrics – Characterization - Wave Propagation in good Coductors and good Dielectrics – Polarization - Reflection and Refraction of Plane Waves - Normal and Oblique Incidences - For both Perfect Conductor and Perfect Dielectrics - Brewster Angle - Critical Angle and Total Internal Reflection - Surface Impedance - Poynting Vector and Poynting Theorem - Applications - Power Loss in a Plane Conductor - Practical Applications of EM Fields - Illustrative Problems.

UNIT - 5: Transmission Lines

Types – Parameters - Transmission Line Equations - Primary & Secondary Constants - Expressions for Characteristic Impedance - Propagation Constant - Phase and Group Velocities - Infinite Line Concepts - Losslessness/Low Loss Characterization – Distortion - Condition for Distortionless and Minimum Attenuation - Loading - Types of Loading - Input Impedance Relations - SC and OC Lines - Reflection Coefficient – VSWR - UHF Lines as Circuit Elements - Impedance Transformations & Matching - Smith Chart and Its Applications - Illustrative Problems.

Course Outcomes:

On successful completion of the course the student will be able to		POs related to COs
CO1	Demonstrate knowledge and analyze different co-ordinate systems to describe the spatial variations of the physical quantities dealt in electromagnetic field theory as they are functions of space and time. Apply different techniques to understand different concepts of electromagnetic theory	PO1, PO2,PO4
CO2	Analyze fundamental laws governing electromagnetic fields and evaluate the physical quantities of electromagnetic fields (Field intensity, Flux density etc.) in different media using the fundamental laws.	PO1,PO2
CO3	Design electromagnetic fields in time varying (Maxwell's equation) conditions with reference to boundary conditions.	PO1, PO2
CO4	Demonstrate Knowledge and analyze the concepts of electromagnetic waves, means of transporting energy or information, in the form of radio waves.	PO1, PO2,PO3,PO4
CO5	Analyze and design the different types of parameters for Primary and Secondary constants, also characteristics for transmission lines to provide a losslessness	PO1, PO2

Text Books :

1. Elements of Electromagnetics, 5/e, 2010, Matthew N.O. Sadiku, Oxford University Press, New Delhi.
2. Networks, Lines and Fields, 2/e,1999, John D. Ryder, Prentice Hall of India, New Delhi.

Reference Books :

1. Electromagnetic Waves and Radiating Systems , 2/e , 2000, E.C. Jordan and K.G. Balmain, Prentice Hall of India, New Delhi.
2. Transmission Lines and Networks , 2001 Umesh Sinha, Satya Prakashan (Tech. India Publications), New Delhi.
3. Fundamentals of Electromagnetics for Engineering, 2009, Nannapaneni Narayana Rao, Pearson Education, New Delhi
4. Engineering Electromagnetics, 7/e, 2006, William H. Hayt Jr. and John A. Buck, Tata McGraw-Hill, Noida.
5. Engineering Electromagnetics , 2/e, 2005, Nathan Ida, Springer (India) Pvt. Ltd., New Delhi.

CO-PO MAPPING

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	-	3	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-
CO3	3	3	-	-	-	-	-	-	-	-	-	-
CO4	3	2	2	2	-	-	-	-	-	-	-	-
CO5	3	2	-	-	-	-	-	-	-	-	-	-
CO*	**3**	**2.4**	**2**	**2.5**	-	-	-	-	-	-	-	-

SREENIVASA INSTITUTE of TECHNOLOGY and MANAGEMENT STUDIES
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II Year B.Tech II semester	**L**	**P**	**C**
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13ECE 225 ELECTRONIC CIRCUIT ANALYSIS LAB
(Common to ECE & EIE)

Course Educational Objectives:

CEO1: Help students to make transition from analysis of electronic circuits to design of electronic Circuits.

CEO2: To understand the analysis of transistor at high frequencies.

CEO3: To understand the concept of designing of tuned amplifier& Voltage regulator circuits.

- **The list of experiments has to be Design, Simulation and Hardware verification will be carried out in ECA lab. (Minimum of 10 Experiments)**

1. Frequency Response of Common Base Amplifier
2. Frequency Response of Two Stage RC Coupled Amplifier
3. Frequency Response of Darlington Pair Amplifier
4. Cascode Amplifier
5. Current Shunt and Voltage Series Feedback Amplifier
6. Hartley Oscillators
7. Colpitts Oscillator
8. RC Phase Shift Oscillator using Transistor.
9. Efficiency of Class A Power Amplifier
10. Efficiency of Class B Complementary Symmetry Amplifier
11. Single Tuned Voltage Amplifier

Course Outcomes:

On successful completion of the course the student will be able to		**POs related to COs**
CO1	Demonstrate the knowledge on amplifier and oscillators	PO1
CO2	Analyze the frequency response of amplifiers designed using transistor	PO2
CO3	Design and develop amplifier and oscillator circuits for various specifications	PO3
CO4	Conduct investigation on the performance analysis of amplifiers for various applications	PO4
CO5	Use appropriate simulation tools for analyzing and designing the electronic circuits	PO5
CO6	Follow ethical principles while doing experiments related to analyzing and design the various circuits	PO8
CO7	Do experiments effectively as an individual and as a member in a group.	PO9
CO8	Communicate verbally and in written form, the understandings about the circuits.	PO10
CO9	Continue updating their skill related to electronic devices and their applications during their life time	PO12

CO-PO Mapping

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	3	-	-	-
CO8	-	-	-	-	-	-	-	-	-	3	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	3

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II Year B.Tech II semester	**L**	**P**	**C**
	-	**-**	**3**

13ECE 226 PULSE AND DIGITAL CIRCUITS LAB
(Common to ECE & EIE)

Course Educational Objectives

CE01: To provide knowledge on responses of different circuits for various linear and non-linear circuits.

CE02: To design and analysis the transistor switch

CE03: To provide a design knowledge and analysis of different multi-vibrators and Schmitt trigger

CE04: To analysis different sweep circuits

CE05: To develop skill on different logic gates using RTL and DTL logics.

Minimum Ten experiments

1. Linear wave shaping
2. Non Linear Wave Shaping – Clippers
3. Non Linear Wave Shaping – Clampers
4. Transistor as a switch
5. Astable Multivibrator,
6. Monostable Multivibrator
7. Bistable multivibrator
8. Schmit Trigger
9. UJT relaxation oscillator
10. Boot strap sweep circuit
11. Sampling gates
12. Verify the TT of universal gates by using DTL

Course Outcomes:

On successful completion of the course the student will be able to		**POs related to COs**
CO1	Demonstrate knowledge on linear and non linear circuits	PO1
CO2	Analyze the behavior of linear, non linear, logic gates and multivibrator circuits	PO2
CO3	Design and develop linear, non linear and multivibrator circuits	PO3
CO4	Investigate and test the behavior of linear, non linear and multivibrator circuits	PO4
CO5	Follow the ethical values in designing the circuits.	PO8
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	Continue updating their design skill related to for various circuits based on application during their life time	PO12

CO-PO Mapping

CO\PO	PO1	PO2	PO3	PO4	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	**3**	-	-	-	-	-	-	-	-	-	-
CO2	-	**3**	-	-	-	-	-	-	-	-	-
CO3	-	-	**3**	-	-	-	-	-	-	-	-
CO4	-	-	-	**3**	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	**3**	-	-	-	-
CO6	-	-	-	-	-	-	-	**3**	-	-	-
CO7	-	-	-	-	-	-	-	-	**3**	-	-
CO8	-	-	-	-	-	-	-	-	-	-	**3**

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	4	**-**	**3**

13ECE 311 ANALOG COMMUNICATIONS

Course Educational Objectives:

CEO1: To provide knowledge on
- Principle of basic communication system
- Modulation in time & frequency domain
- Generation and degeration of Amplitude Modulation

CEO2: To develop skills and describe different types of amplitude modulation schemes.
- Evaluate analog modulated waveforms time/frequency domain and also calculation of power.

CEO3: To introduce the concepts of angle modulations and their spectral characteristics.

CEO4: To understand the concepts of Multiplexing &pulse modulation schemes,
- Introduce the techniques of transmitters and receivers

CEO5: To Understand noise as a random process and its effect on communication receivers.
- Compare the performance of AM, FM and PM schemes with reference to SNR

UNIT - 1 : Amplitude Modulation

Introduction -Elements of Communication System - Frequency Spectrum and Applications – Need for Modulation – AM for Single tone - Muntitone & Band of Frequencies – Time&Frequency Domain Analysis – Power & Current Analysis – Band Width – Phasor Analysis - Generation of AM wave: Square Law Modulator - Balanced Modulators - Switching Modulator – Transistor Modulators - Detection of AM waves: Square Law Detector- Envelop Detector – Synchronous Detector – Applications of AM - Need for Suppressed Carrier-Types - Percentage of Power Saving.

UNIT – 2: Amplitude Modulation With Suppressed Carrier DSBSC:

Single tone – Mutitone & Band of Frequencies - Time & Frequency Domain Dnalysis - Power Analysis – Band Width - Phasor Analysis– Generation of DSBSC: Product Modulator - Balanced Modulator- Ring Modulator – Detection of DSBSC: Coherent Detection - Costas Loop – Square Loop Detection – Envelope Detection – Quadrature Amplitude Modulation - Hilbert Transform & Properties - **SSBSC:** Single tone – Multitone – Band of Frequencies - Time & Frequency Domain Analysis - Power Analysis – Band Width - Phasor Analysis – Generation of SSBSC: Phase & Frequency Discrimination Method – Third method – Detection of SSBSC: Corerent & Envelope mothod – Need for **VSBSC -** Generation of VSBSC : Phase & Frequency Discrimination method – Detection of VSBSC: Corerent & Envelope Mothod – Applications of AM-SC Sytems – Comparision between AM &AM-SC.

UNIT – 3: Angle Modulations

FM : Single tone – Multi tone – Time & Frequency domain analysis - Narrow Band FM: Single tone – Multitone – Time & Frequency domain analysis – Bandwidth- Transmission bandwidth of FM waves-Comparision between NBFM & WBFM - Generation of FM waves: indirect FM and direct FM – Detection of FM: Single tuned Discrimination – Balanced slope - Fosterseeley – Ratio method – PLL detection – Zero crossing detector – Capture effect - Improvement of SNR - PM: Narrow Band PM & Wide Band PM – Applications of FM & PM - Comparision between AM,FM &PM.

UNIT - 4 : Transmitters & Receivers

Generation, Detection & Applications of PAM, PWM & PPM – Multiplexing: FDM & TDM. **Transmitters:**AM Transmitter: Low Level – High Level - DSBSC Transmitter – SSBSC Tranmitter –VSBSC

Transmitter –FM Transmitter. **Receivers:** Sensitivity – Selectivity – Fedility – AM Receiver: TRF – Super Heterodyne Receiver(SHR) – Image frequency & its rejection – Selection of IF - AGC - AFC - Squelech Circuit – FM Receiver – Amplitude Limiter – Pre emphasis & De emphasis.

UNIT - 5: Noise

Introduction to Noise – Types – Bandpass Noise System Model – Noise Calculations in AM – Square Law Detection – Envelope Detection: Small Noise Case - Large Noise case – Theshold effect – Noise calculation in DSBSC & SSBSC - Noise calculations in NBFM – WBFM – NBPM – WBPM.

Course Outcomes:

On successful completion of the course the student will be able to		POs related to COs
CO1	Demonstrate knowledge on principle of communication system, formulate the power relations of amplitude modulation and understand the different type of modulation and demodulation.	PO1, PO2.
CO2	Analyze the different types of amplitude modulation schemes with AM, formulate the power relations of DSB, SSB and solve the analog modulation problems,	PO1, PO2, PO3.
CO3	Analyze the performance of analog modulation schemes, evaluate time /frequency domain waveforms and also find modulation index. Calculate bandwidth and power requirements for FM, PM.	PO1, PO2, PO3.
CO4	Understand the different characteristics of transmitter and receivers and analyze the pulse modulation systems.	PO1, PO2,PO4
CO5	Analyze the different types of noise and predict its effect on various analog communication systems and Formulate the SNR & figure of merit for AM, FM, PM.	PO1, PO2, PO4.

Text Books:

1.Communication Systems, 3/e , 1996,Simon Haykins, John Willey,New Delhi.
2.Modern digital and analog Communication systems, 3/e, 2005, B. P. Lathi, Oxford University press, New Delhi.

Reference Books:

1.An Introduction to Analog and Digital Communication, 2/e, 2003, Simon Haykins, John Wiley, New Delhi.
2.Principles of communication, 3/e,2008, H. Taub and Schilling McGraw Hill, Noida.
3.Communication Systems, 2/e, 2004, Harold P.E, Stern Samy and A Mahmond, Pearson Edn, New Delhi.
4.Communication Systems: Analog and Digital Communication, 1/e,1995,Singh and Sapre, McGraw Hill, Noida.
5. Analog Communications,, 2/e, 2008, KN Hari Bhat & Ganesh Rao, Pearson Publications,New Delh

CO-PO Mapping

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	2	3	-	-	-	-	-	-	-	-	-
CO3	3	2	3	-	-	-	-	-	-	-	-	-
CO4	3	3	-	2	-	-	-	-	-	-	-	-
CO5	3	3	-	3	-	-	-	-	-	-	-	-
CO*	3	2.6	3	2.5	-	-	-	-	-	-	-	-

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III Year B.Tech I semester	**L**	**P**	**C**
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13ECE 312 LINEAR IC APPLICATIONS

(Common to ECE& EIE)

Course Educational Objectives:

CEO1: To provide knowledge on fundamental concepts of Differential amplifiers and their configurations**.**

CEO2: To Analyze and understand the characteristics and parameters of op-amp.

CEO3: To **Design and analyze the various** Linear and Non – Linear applications of Op-Amp**..**

CEO4: To develop skill to design various types of filters

CEO5: To Analyze and understand . various types of ADC's and DAC's

UNIT - 1: Integrated Circuits

Differential Amplifier- DC and AC analysis of Dual input Balanced output Configuration and Dual Input Unbalanced Output- Cascade Differential Amplifier Stages- Level translator.

UNIT - 2: Characteristics Of OP-Amps

Integrated circuits-Types- Classification- Power supplies- Op-amp Block Diagram- ideal and practical Op-amp specifications- DC and AC characteristics- 741 op-amp & its features -Op-Amp parameters- Frequency Compensation technique.

UNIT - 3: Linear & Non Linear Applications of OP- Amps

Inverting -Non-inverting amplifier- and Difference amplifier- Integrator and differentiator- Instrumentation amplifier- AC amplifier- V to I- I to V converters- Buffers.

Non-Linear Applications of OP- Amps : Non- Linear function generation- Comparators- Multivibrators- Triangular and Square wave generators- Log and Anti log amplifiers- Precision rectifiers.

UNIT - 4: Filters - Oscillators and Timers

Introduction- Butter worth filters – 1st order- 2nd order LPF- HPF filters. Band pass- Band reject and all pass filters. Applications of VCO (566)- PLL (565)-and balanced modulator(IC1496)-Introduction to 555 timer- functional diagram- Monostable and Astable operations and applications- Schmitt Trigger.

UNIT - 5: D To A & A To D Converters

Introduction- basic DAC techniques- weighted resistor DAC- R-2R ladder DAC- Different types of ADCs - counter type ADC- successive approximation ADC and dual slope ADC. DAC and ADC Specifications.Other applications: Introduction to voltage regulators of 79xx and 78xx series.

Course Outcomes:

On successful completion of the course the student will be able to		**POs related to COs**
CO1	Demonstrate knowledge on fundamental concepts of Differential amplifiers and their configurations.	PO1, PO2.
CO2	Analyze and understand the characteristics and parameters of op-amp	PO1, PO2
CO3	Design and analyze the various Linear and Non – Linear applications of Op-Amps.	PO1, PO2, PO3,PO4
CO4	Design and analyze various types of filters	PO1, PO2,PO3,PO4
CO5	Analyze and understand . various types of ADC's and DAC's	PO1, PO2

Text Books :

1. Linear Integrated Circuits, 2/e, 2003, D. Roy Chowdhury, New Age International (p) Ltd,Mumbai.
2. Op-Amps & Linear ICs, 4/e, 1987, Ramakanth A. Gayakwad, Prentice Hall of India, New Delhi.

Reference Books:

1.Design with Operational Amplifiers & Analog Integrated Circuits, 3/e, 2002, Sergio Franco, McGraw Hill, New Delhi.
2.Operational Amplifiers & Linear Integrated Circuits, 6/e Edition ,R.F.Coughlin & Fredrick Driscoll, Prentice Hall of India,New Delhi.
3. Micro Electronics, 2/e, 1999, Jacob Millman, McGraw Hill, New Delhi.
4. Linear Integrated Circuits, 1/e, 2008, S.Salivahanan and V.S.Kanchana Bhaskaran,Tata McGraw Hill, New Delhi.
5. Linear IC and Applications, 1/e, 2005, U.A.Bakshi and A.P.Godse,Technical Publications,Pune.

CO-PO Mapping

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	**3**	**2**	-	-	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO2	**3**	**2**	-	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO3	**2**	**3**	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO4	**2**	**3**	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO5	**3**	**2**	-	-	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO*	**2.6**	**2.4**	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

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13ECE 313 DIGITAL IC APPLICATIONS
(Common to ECE&EIE)

Course Educational Objectives:

CEO1: To enable the students to learn about static and dynamic characteristics of MOS Inverters
CEO2: To introduce the basic knowledge of HDL & their ways of implementation.
CEO3: To analyze logic processes and implement logical operations using combinational logic circuits.
CEO4: To understand concepts of sequential circuits and to analyze sequential systems in terms of state machines.
CEO5: To make the students to understand the concept of semiconductor memories.

UNIT - 1: CMOS Logic

Introduction to Logic Families - CMOS Logic - CMOS Steady State Electrical Behavior - CMOS Dynamic Electrical Behavior - CMOS Logic Families.
Bipolar Logic And Interfacing: Bipolar Logic - Transistor Logic - TTL Families - CMOS/TTL Interfacing - Low Voltage CMOS Logic and Interfacing - Emitter Coupled Logic - Comparison of Logic Families- Familiarity With Standard 74XX and CMOS 40XX Series -ICs – Specifications.

UNIT - 2: The VHDL Hardware Description Language

Design Flow- Program Structure- Types and Constants - Functions and Procedures - Libraries and Packages.
The VHDL Design Elements: Structural Design Elements- Data Flow Design Elements - Behavioral Design Elements- Time Dimension and Simulation Synthesis.

UNIT - 3: Combinational Logic Design

Decoders – Encoders - Three State Devices - Multiplexers and Demultiplexers - Code Converters- EX-OR Gates and Parity Circuits – Comparators - Adders & Sub Tractors – Alus - Combinational Multipliers - VHDL Modes for the above ICs.
Design Examples (Using VHDL): Design Examples (Using VHDL) - Barrel Shifter- Floating-Point Encoder- Dual Parity Encoder.

UNIT - 4: Sequential Logic Design

Latches and Flip-Flops – PLDs – Counters - Shift Register and their VHDL Models - Synchronous Design Methodology - Impediments to Synchronous Design.

UNIT - 5: Memories

Roms: Internal Structure- 2D - Decoding Commercial Types - Timing and Applications - Static RAM: Internal Structure - SRAM Timing - Standard SRAMS - Synchronous SRAMS - Dynamic RAM: Internal Structure – Timing - Synchronous Drams. Familiarity with Component Data Sheets – Cypress CY6116- CY7C1006- Specifications.

Course Outcomes:

On successful completion of the course the student will be able to		POs related to COs
CO1	Demonstrate knowledge on CMOS Logic, Electrical behavior. Understand the concept of Bipolar Logic family and interfacing. Differences between various logic families.	PO1, PO2.
CO2	Understand the design flow, data types, constants, functions and procedures, libraries and packages. Enumerate the differences of VHDL design elements.	PO1, PO2
CO3	Understand the basics of combinational logic design. Design and analysis of combinational logic elements from basic decoders to complex barrel shifter and floating point encoder.	PO1, PO2, PO3,PO4,PO5
CO4	Understand the basics of sequential logic design. Design and analysis of sequential logic elements from basic latches, flip-flops to complex PLDs, counters and shift registers.	PO1, PO2,PO3,PO4,PO5
CO5	Describe the characteristics of RAM and ROM memories and its classifications.	PO1, PO2

Text books:

1. Digital Design Principles & Practices, 3/e, 2005, John F. Wakerly, Prentice Hall of India / Pearson Education Asia, New Delhi.
2.A VHDL Primer, 3/e, 2006, J. Bhasker, Pearson Education/ Prentice Hall of India, New Delhi.

Reference books:

1. Digital System Design Using VHDL, 2/e, 2008, Charles H. Roth Jr., PWS Publications, New Delhi.
2. Fundamentals of Digital Logic with VHDL Design, 2/e, 2005,Stephen Brown and Zvonko Vramesic, McGraw Hill, New Delhi.
3. VHDL , 3/e , 2001,Douglas Perry,Tata McGraw Hill, New Delhi.
4. A VHDL Synthesis Primer, 2/e, 2003, J. Bhasker, BS Publications,Hyderabad.
5. Introductory VHDL from simulation to synthesis2/e, 2002, Sudhakar yalamanchili, Pearson Edition, New Delhi.

CO-PO Mapping

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-
CO3	3	2	3	1	3	-	-	-	-	-	-	-
CO4	3	2	3	1	3	-	-	-	-	-	-	-
CO5	3	3	-	-	-	-	-	-	-	-	-	-
CO*	**3**	**2.4**	**3**	**1**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

SREENIVASA INSTITUTE of TECHNOLOGY and MANAGEMENT STUDIES

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III Year B.Tech I semester	**L**	**P**	**C**
	4	**-**	**3**

13ECE 314 COMPUTER ORGANIZAION

CE01: To have a thorough understanding of the basic structure and operation of a digital Computer and data representation.

CE02: To understand the concepts register transfer language with its microoperations.

CE03: To discuss in detail the operation of the arithmetic unit including the algorithms of addition, subtraction, multiplication & division and pipelining concepts.

CE04: To study the different types of Memories and Parallel processing procedures Implemented in computers.

CEO5: To provide knowledge on Input and Output organization and its interface devices

UNIT - 1: Basic Structure of Computers

Computer Types - Functional Units - Basic Operational Concepts - Bus Structures – Performance - Historical Perspective - Data Representation - Fixed Point Representation - Floating – Point Representation.

UNIT - 2: Register Transfer Language and Micro operations

Register Transfer Language - Register Transfer - Bus and Memory Transfer - Arithmetic Micro Operations - Logic Micro Operations - Shift Micro Operations - Arithmetic Logic Shift Unit - Instruction Codes - Computer Registers Computer Instructions – Instruction Cycle – Memory – Reference Instructions - Input-Output Interrupt - Stack Organization - Instruction Formats - Addressing Modes - DATA Transfer And Manipulation - Program Control - Reduced Instruction Set Computer

UNIT - 3: Computer Arithmetic & Pipelining

Addition and Subtraction - Multiplication Algorithms - Division Algorithms - Floating – Point Arithmetic Operations -Decimal Arithmetic Unit - Decimal Arithmetic Operations - Parallel Processing – Pipelining - Arithmetic Pipeline - Instruction Pipeline - RISC Pipeline Vector Processing - Array Processors.

UNIT - 4: Memory System & Multi Processors

Memory Hierarchy - Control Memory Hard -Wired Control - Micro Programmed Control Main Memory - Auxiliary Memory - Associative Memory - Cache Memory -Virtual Memory - Characteristics Of Multiprocessors - Interconnection Structures - Inter Processor Arbitration - Inter Processor Communication and Synchronization - Cache Coherence.

UNIT - 5: Input /Output Organization

Accessing I/O Devices - Interrupts – Interrupt Hardware - Priority Interrupt - Modes of Data Transfer - Handling Multiple Devices - Controlling Device Requests - Direct Memory Access - Interface Circuits - Standard I/O Interfaces – PCI Bus – USB - Serial Communication.

Course Outcomes:

On successful completion of the course the student will be able to		POs related to COs
CO1	Demonstrate knowledge on fundamentals of Computer functional units and types of computers, Analyze the importance of Floating point operations	PO1, PO2,
CO2	Be familiar with the basic registers, Microoperations, and Risc instructions	PO1, PO2,PO3
CO3	Analyzethe Arithmetic algorithms, Pipelining process and abilty to understand the concept of cache mapping techniques and pipeline hazards.	PO1, PO2
CO4	Understand the different memories and interprocess communications	PO1
CO5	Be familiar with accessing Input and Output devices, Interrupts operation and request direct Memory access	PO1,PO2,PO3, PO4

Text Books:

1.Computer System Architecture , 3/e, 1999,M.Moris Mano, Prentice Hall of India /Pearson,New Delhi.
2.Computer Organization, 5/e, 2000, Carl Hamacher, Zvonks Vranesic, SafeaZaky, McGraw Hill, New Delhi.

Reference Books:

1.Computer Organization and Architecture, 7/e,2003, William Stallings, Prentice Hall of India /Pearson, New Delhi.
2.Digital logic and Computer design, 2004,M.Moris Mano , Prentice Hall of India, New Delhi.
3.Structured computer organization, 5/e, 2002, Andrew S. Tanenbaum, Prentice Hall of India /Pearson, New Delhi.
4.Computer architecture a quantitative approach, 4/e, 2003, John L.Hennessy and David A.patterson Elsevier, New Delhi.
5.Fundamentals of computer organization and design,Int. Edition, 2003, Sivaraama Dandamudi, Springer, Landon.

CO-PO Mapping

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

SREENIVASA INSTITUTE of TECHNOLOGY and MANAGEMENT STUDIES
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III Year B.Tech I semester	**L**	**P**	**C**
	4	**-**	**3**

13EEE 314 CONTROL SYSTEMS
(Common to EEE, ECE &EIE)

Course Educational Objectives:

CEO1: To Acquire knowledge on modelling of physical systems such as Mechanical and Electrical systems.
CEO2: To Acquire knowledge on block diagram reduction and signal flow graph techniques and to apply in physical systems.
CEO3: To Analyze the time domain specification and the corresponding errors for various order and type number of the systems.
CEO4: To Investigate and analyze the stability of the system in time domains by selecting appropriate methods like Routh array, Root locus methods, etc.
CEO5: To Investigate and analyze the stability of the system in time domains by selecting appropriate methods like Bode plots, Polar plots and Nyquist method.

UNIT - 1: Modelling of Systems

The Control System - Mathematical Models of Physical Systems – Introduction - Differential Equations of Physical Systems – Mechanical Systems - Friction - Translational Systems - Rotational Systems - Electrical Systems - Analogous Systems.

UNIT - 2 : Block Diagrams and Signal Flow Graphs

Transfer Function of DC Servo Motor - AC Servo Motor - Synchro Transmitter and Receiver - Block Diagram Algebra – Signal Flow Graph - Reduction using Mason's Gain Formula.

UNIT – 3: Time Response of Feed Back Control Systems

Standard Test Signals - Unit Step Response of First and Second Order Systems - Time Response Specifications - Time Response Specifications of Second Order Systems - Steady State Errors and Error Constants.

UNIT - 4: Stability Analysis & Root Locus Techniques

Concepts of Stability - Necessary Conditions for Stability - Routh Stability Criterion - Relative Stability Analysis - More on the Routh Stability Criterion - The Root Locus Concepts - Construction of Root Loci

UNIT -5: Frequency Domain Analysis & Stability in the Frequency Domain

Mathematical Preliminaries - Nyquist Stability Criterion - Polar Plots - Assessment of Relative Stability Using Nyquist Criterion - Bode Plots - Assessment of Relative Stability using Bode Plots.

Course Outcomes:

On successful completion of the course the student will be able to		POs related to COs
CO1	Demonstrate knowledge on modelling of physical systems such as Mechanical and Electrical systems etc.	PO1, PO2,
CO2	Apply different reduction techniques to minimize the block diagram and develop signal flow graph.	PO1, PO2,PO5
CO3	Design and Analyze the time domain specification and the corresponding errors for various order and type number of the systems.	PO1, PO2,PO3
CO4	Investigate and analyze the stability of the system in time domains by selecting appropriate methods like Routharray, Root locus methods, etc	PO1,PO2,PO4,PO5
CO5	Investigate and analyze the stability of the system in time domains by selecting appropriate methods like Bode plots, Polar plots and Nyquist method..`	PO1,PO2,PO4,PO5

Text Books:

1.Control Systems Engineering , 5/e , 2007, I. J. Nagrath and M. Gopal, New Age International (P) Limited Publishers.
2.Control Systems, 1/e , 2007, A. Anand Kumar, Prentice Hall of India Pvt. Ltd, New Delhi.

Reference Books:

1.Modern Control Engineering, 5/e, 2010, Katsuhiko Ogata, Prentice Hall of India Pvt. Ltd, Delhi.
2.Automatic Control Systems, 8/e, 2009, B. C. Kuo and Farid Golnaraghi , John wiley, New Delhi .
3.Control Systems Engineering , 6/e , 2010 , Norman S NISE John wiley, New Delhi.
4.Modern Control Engineering , 1/e, 2011, Yaduvir Singh and S. Janardhan, CENGAGE Learning.
5. Control Systems , 2 /e, 2001, Nagoorkhani, Prentice Hall of India Pvt. Ltd, New Delhi

CO-PO Mapping

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

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B.Tech III-I Semester	**L**	**P**	**C**
	4	**-**	**3**

13ECE 315 TECHNICAL CASE STUDY

CEO1: To develop the ability to solve a specific problem right from its identification and literature review till the successful solution of the same.
CEO2: To learn and experience all the major phases and processes involved in solving "real life engineering problems".

The aim of this course is to deepen comprehension of principles by applying them to a new technical issues which may be the design & analysis for a specific application, a research area with a focus on an application needed by the industry / society. To train the students in preparing technical writing document reports and to face reviews and viva voce examination. The progress of the course is evaluated based on a minimum of three reviews. The review committee may be constituted by the Head of the Department. A case study report is required at the end of the semester.

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 technical issues chosen for research work to attain substantiated conclusions.	PO2
CO3	Design solutions to the chosen technical case study problem.	PO3
CO4	Undertake investigation of case study problem to provide valid conclusions	PO4
CO5	Use the appropriate techniques, resources and modern engineering tools necessary for case study	PO5
CO6	Apply case study 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 case study issues	PO8
CO9	Function effectively as individual and a member in the student team	PO9
CO10	Develop communication skills, both oral and written for preparing and presenting study report.	PO10
CO11	Demonstrate knowledge and understanding of cost and time analysis required for carrying out the study	PO11
CO12	Engage in lifelong learning to improve knowledge and competence in the chosen area of the study	PO12

CO-PO MAPPING

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

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III Year B.Tech I semester	**L**	**P**	**C**
	-	**2**	**3**

13ECE 316 IC APPLICATIONS LAB
(Common to ECE&EIE)

Course Educational Objectives:

CEO1: Gain the practical hands-on experience on 741 Op-Amp applications
CEO2: Gain the practical hands-on experience on 555 timer applications
CEO3: Gain the practical hands-on experience on Voltage Regulator
CEO4: To construct and verify the combinational designs using digital ICs.
CEO5: To construct and verify the sequential designs using digital ICs.

List of Experiments:

PART- A (Linear IC Applications)
Minimum seven Experiments to be conducted :

1. Study of OP Amps - IC 741, IC 555, IC 565, IC 566, - Functioning, Parameters and Specifications.
2. OP AMP Applications - Adder, Subtractor, Comparator Circuits.
3. Integrator and Differentiator Circuits using IC 741.
4. Active Filter Applications - LPF, HPF (First and Second Order).
5. Function Generator using OP Amps.
6. A) IC 555 Timer - Monostable Operation Circuit.
   B) IC 555 Timer - Astable Operation Circuit.
7. Schmitt Trigger Circuits - Using IC 741 and IC 555.
8. IC 565 - PLL Applications.
9. Three Terminal Voltage Regulators - 7805, 7809, 7912.
10. 4 Bit DAC Using OP AMP.

PART-B (Digital IC Applications)
Minimum seven Experiments to be conducted : VHDL

1. Design all Gates Using VHDL. -74XX.
2. Write VHDL Programs for the following Circuits, Check The Wave forms and the Hardware Generated
   A .Half Adder, Half Subtractor,
   B. Full Adder , Full Subtractor
3. Write VHDL Programs for the following circuits, Check the Wave forms and the Hardware Generated- Multiplexer -74X151 and 2x4 Demultiplexer-74X155.
4. Write VHDL Programs for the following Circuits, Check the Wave forms and the Hardware Generated -3-8 Decoder -74138 & 8-3 Encoder- 74X148.
5. Write A VHDL Program for a Comparator (74x85)) and Check the Wave forms and The Hardware Generated
6. Write A VHDL Program for a Parity Generator/Checker and Check the Wave forms and The Hardware Generated .
7. Write A VHDL Program for D FLIP-FLOP and Check the Wave forms and The Hardware Generated
8. Write A VHDL Program for a Counter (74x90) and Check the Wave forms and The Hardware Generated
9. Write VHDL Programs for the following Circuits, Check the Wave forms and The Hardware Generated
   A. Register B. Shift Register

Course Outcomes:

On successful completion of the course the student will be able to		POs related to COs
CO1	Demonstrate the knowledge on Integrated circuits using IC741 and IC555	PO1
CO2	Analyze the functioning performance of linear and digital ICs	PO2
CO3	Gain the practical knowledge to design an electronic circuit using integrated chips	PO3
CO4	Conduct investigation for analyzing the integrated circuits performance in various applications	PO4
CO5	Follow ethical principles in analyzing and design the circuits	PO8
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 circuits.	PO10
CO8	Continue updating their skill and apply during their life time.	PO12

CO-PO Mapping

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

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III Year B.Tech I semester	**L**	**P**	**C**
	-	**3**	**2**

13MBA 311 SOFT SKILLS LAB
(Common to all Branches)

Course Educational Objectives:

CEO1: To gain the concepts of time management and goal setting

CEO2: To Understand the concepts of team building and creativity.

.**CEO3**: To develop the skill of paper presentation and preparation

CEO4: To develop the skill of communication to deliver in a group discussion

CEO5: To develop the courage to face the interview successfully

The objective of soft skill lab is to enhance the knowledge of the students to improve their employability and career opportunities.

Unit – 1: Just a Minute (JAM) and Debates

Introduction – Activity Types – Time Management – Rules and Procedure – Confidence Building – Goals.

Debates: Introduction- Importance of Team Line- Different formats of Debates-Judging the Debate-Qualities of Good Debates.

Unit - 2: Team Building and Creativity

Team Building – Introduction - Meaning – Definition of Team – Difference between Team and Group – Factors of Team Building – Key roles – Impact of Team Building - Challenges and its overview.

Creativity : Introduction - Meaning – Definition - Importance of Creativity and its Quality – Basic ideas of improving Creativity – Techniques and Tools – Creativity thinking skills – Barriers to Creativity – Overview.

Unit - 3: Resume Preparation and Seminars with PPTs

Introduction – Necessity – Difference between Resume and Curriculum vitae – Types of Resume Writing – Tools and Techniques – Preparation of Effective Resume writing.

Seminars with PPTs: Introduction – Collection of Data – Planning Preparation – Type Style and Format – Use of Props – Attracting Audience – Voice Modulation – Clarity – Body Language and asking Queries.

Unit - 4: Group Discussion

Introduction – Types – Guidelines to Group Discussion - Group Discussion Topics – Dos and Dont's of Group Discussion – Practical Group Discussion Sessions.

Unit - 5 : Interview Skills

Interviews – Types of Interviews – Guide lines for Interview – Tips for Interviews – Dos and Dont's of Interview – Mock Interviews –Advancement in Conducting and Organizing Practical HR Interviews.

Course Outcomes:

On successful completion of the course the will be able to,		POs related to COs
CO1	Gain the concepts of time management in an event and develop the goal setting	**PO12**
CO2	Understand the concepts of team building and creativity and Cultivate knowledge to gain confidence in one's life skills.	**PO10, PO12**
CO3	Develop the skill of technical paper preparation and presentation	**PO9, PO10,PO12**
CO4	Get Knowledge on behavioral aspects and communicate effectively with others by using Indian words used in English.	**PO9,PO10, PO12**
CO5	Develop the audacity to face the interview successfully	**PO12**

Reference books:

1. Career Planning and Development, 1/ e, 2010, S.D.Naidu, N.G.Naidu, Students Help Line TM Publishing Home, Hyderabad.
2. Leadership for Leaders , 2/e, 2008, Micheal Williams, Viva Books, New Delhi.
3. Essentials of Business Communication, 11/e, 2009, Pal, Rajendra , Korlahalli ,Sultan Chand and Sons, New Delhi.
4. Personality Development ,2/e, 2010, S.Sujana, S.Murali Krishna, Student Help Line TM Publishing Home, Hyderabad.
5. The Art of Creative Thinking, 2/e, 2008, John Adair, Kogan Page Publications, New Delhi.
6. Effective Team Work, 1/e, 2006, Micheal West, Excel Books, New Delhi.
7. A-Z Guide To Job Searching, 1/e, 2004, Andra Shavick, Kogan Page, New Delhi.
8. How To Motivate people, 2/e, 2008, Patric Forsyth, Kogan page, New Delhi.

CO-PO MAPPING

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	-	-	-	-	-	-	-	-	-	-	-	3
CO.2	-	-	-	-	-	-	-	-	-	3	-	3
CO.3	-	-	-	-	-	-	-	-	3	3	-	3
CO.4	-	-	-	-	-	-	-	-	3	3	-	3
CO.5	-	-	-	-	-	-	-	-	-	-	-	3
CO*	-	-	-	-	-	-	-	-	3	3	-	3

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	4	**-**	**3**

13ECE 321 ANTENNAS AND WAVE PROPAGATION

Course Educational Objectives:

CEO1: To understand the transmission line parameters, and to introduce antennas, their principle of operation, fundamental parameters, and to understand the Dipole antenna analysis.

CEO2: To understand the Antenna arrays – BSA, EFA, and Binomial.

CEO3: To analyze and design VHF, UHF and Microwave antennas.

CEO4: To Design the Patch and Lens antennaconcepts and different measurement concepts to be analyzed.

CEO5: To understand the Propagation effects in microwave systems, satellite, space, and radar links.

UNIT - 1: Antenna Fundamentals

Introduction - Radiation Mechanism - Basic Antenna Parameters - Radiation Patterns – Beamwidths - Beam Area - Radiation Intensity - Beam Efficiency - Front to Back Ratio – Directivity – Gain - Antenna Apertures - Effective Height - Field Zones – Polarization - Retarded Potentials - Radiation From Small Electric Dipole - Quarterwave Monopole and Halfwave Dipole - Current Distributions - Evaluation of Field Components - Power Radiated - Radiation Resistance – Beamwidths – Directivity - Effective Area and Effective Height - Natural Current Distributions - Fields and Patterns of Thin Linear Center - Fed Antennas of Different Lengths - Radiation Resistance at a Point Which is not Current Maximum - Antenna Theorems - Applicability and Proofs for Equivalence of Directional Characteristics - Loop Antennas - Characteristics.

UNIT - 2: Antenna Arrays

Point Sources- Arrays of 2 Point Sources – Different Cases - N Element Uniform Linear Arrays – Broadside - Endfire Arrays - EFA With Increased Directivity- Derivation of their Characteristics and Comparison - Concept of Scanning Arrays - Directivity Relations (No Derivations) - Principle of Pattern Multiplication - Arrays with Parasitic Elements - Yagi Uda Arrays - Folded Dipoles & Their Characteristics - Related Problems - Binomial Arrays - Effects of Uniform and Non-Uniform Amplitude Distributions - Design Relations.

UNIT - 3: VHF- UHF and Microwave Antennas – I

Introduction- Travelling Wave Radiators – Basic Concepts - Longwire Antennas – Field Strength Calculations and Patterns - Broadband Antennas: Helical Antennas – Significance - Geometry - Basic Properties - Design Considerations for Monofilar Helical Antennas in Axial Mode and Normal Modes (Qualitative Treatment) - Horn Antennas – Types - Optimum Horns - Design Characteristics of Pyramidal Horns- Reflector Antennas : Flat Sheet and Corner Reflectors - Paraboloidal Reflectors – Geometry - Characteristics - Types of Feeds - F/D Ratio- Spill Over - Back Lobes - Aperture Blocking - Off-Set Feeds - Cassegrainian Feeds.

UNIT - 4: VHF- UHF and Microwave Antennas- II

Micro Strip Antennas – Introduction - Features - Advantages and Limitations - Rectangular Patch Antennas - Geometry and Parameters - Characteristics of Micro Strip Antennas - Lens Antennas – Geometry- Features - Dielectric Lenses and Zoning - Applications - Antenna Measurements – Introduction - Concepts - Reciprocity- Near and Far Fields - Sources of Errors - Patterns Required - Set Up - Distance Criterion - Directivity and Gain Measurements (Comparison- Absolute And 3-Antenna Methods).

UNIT - 5: Wave Propagation- I

Concepts of Propagation – Frequency Ranges and Types of Propagations - Ground Wave Propagation – Characteristics - Parameters - Wave Tilt - Flat and Spherical Earth Considerations - Sky Wave Propagation – Formation of Ionospheric Layers and their Characteristics - Mechanism of Reflection and Refraction - Critical Frequency - MUF & Skip Distance – Calculations for Flat and Spherical Earth Cases - Optimum Frequency - LUHF- Virtual Height - Ionospheric Abnormalities - Ionospheric Absorption - Fundamental Equation for Free - Space Propagation - Basic Transmission Loss Calculations - Space Wave Propagation – Mechanism - LOS and Radio Horizon - Tropospheric Wave Propagation – Radius Of Curvature Of Path - Effective Earth's Radius - Effect

Of Earth's Curvature - Field Strength Calculations - M-Curves and Duct Propagation - Tropospheric Scattering - Radiowave Propagation and Smart Antennas for Wireless Communications.

Course Outcomes:

On successful completion of the course the student will be able to,		**POs related to COs**
CO1	Demonstrate knowledge on radiation of EM waves through antenna, various antenna parameters, analyze Dipole antenna operation.	PO1, PO2
CO2	Analyze antenna BSA, EFA, arrays with 2 element and N-element cases and demonstrate radiation patterns of arrays, Design Yagi Uda antenna for VHF and UHF ranges.	PO1,PO2,PO3, PO4
CO3	Analyze and Design VHF, UHF and Microwave antennas for the required specification and applications.	PO1,PO2,PO3
CO4	Design the Patch and Lens antennas for the required specification and different measurement concepts to be analyzed.	PO1, PO3, PO4
CO5	Demonstrate knowledge on different modes of wave propagation through in atmospheric layers; analyze MUF, Virtual height, LOS etc.	PO1,PO4

Text Books :

1. Antennas and Wave Propagation, 4/e, (Special Indian Edition), 2010, J.D. Kraus, RJ. Marhefka and Ahmad S. Khan. Tata Mc Graw Hill, New Delhi.
2. Antenna & Wave Propagation, 2001, K.D. Prasad, Satya Prakashan, Tech India Publications, New Delhi.

Reference Books:

1.Electromagnetic Waves and Radiating Systems, 2/e, 2000, E.C. Jordan and K. G. Balmain, Prentice Hall of India, New Delhi.
2.Antenna Theory, 3/e, 2005, C.A. Balanis, John Wiley & Sons, New Delhi.
3.Transmission and Propagation - E.V.D. Glazier and H.R.L. Lamont, The Services Text Book of Radio, vol. 5, Standard Publishers Distributors, Delhi.
4.Electronic and Radio Engineering, 4/e, 1955, EE. Terman, McGraw-Hill, Noida.
5.Antennas for All Applications , 3/e, 2003, John D. Kraus and Ronald J. Marhefka, Tata McGraw Hill, Noida.

CO-PO Mapping

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	**3**	**3**	-	-	-	-	-	-	-	-	-	-
CO2	**3**	**2**	**2**	**2**	-	-	-	-	-	-	-	-
CO3	**3**	**2**	**2**	-	-	-	-	-	-	-	-	-
CO4	**3**	-	**3**	**2**	-	-	-	-	-	-	-	-
CO5	**3**	-	-	**2**	-	-	-	-	-	-	-	-
CO*	**3**	**2.33**	**2.33**	**2**	-	-	-	-	-	-	-	-

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	4	**-**	**3**

13ECE 322 DIGITAL COMMUNICATIONS

Course Educational Objectives:

CEO1: To acquire knowledge on analog to digital data conversion process and various data coding techniques

CEO2: To cultivate the skill sets of the students to obtain skills in the principle of multiplexing& base band Line coding schemes also analyze probability of error performance.

CEO3: To obtain the knowledge of the basics of information theory, entropy, analyze their properties

CEO4: To develop knowledge source coding, channel coding techniques and apply their concepts in the analysis and design of digital communication systems techniques.

CEO5: To understand the Band pass digital systems withtheconstellation diagrams and analysis ofthe probability error of all digital modulation techniques.

UNIT – 1: Base Band Data Transmission - I

Overview of Analog modulations – General block diagram of digital communication system – Analog to Digital conversion(ADC) – Samplers – Quantizers: Uniform – Non uniform - Differential – Types of Encoders – Pulse Code Modulation(PCM) – Noise in PCM – Differential PCM – Noise in DPCM – Delta Modulation – Noise in DM – Adaptive DM – Continously Variable Slope DM (CVSDM) – Comparision between PCM, DPCM, DM & ADM.

UNIT – 2: Base Band Data Transmission – II

Fundamentals of Time Division Multiplexing - T1 Digital Carrier system- Synchronization and Signaling of T1- PCM hierarchy – Different types of Binary encoding – M ary encoding – Correlative coding - Calculation of PSD – Inter Symbol Interference(ISI) – Nyquist criteria - Eye diagram – Probability of error in Binary encoding & M ary encoding – Equalizers - Base band Signal Receiver: Optimum Filter - White Noise - The Matched Filter - Correlation receiver.

UNIT – 3: Source Encoder & Decoder

Information - Entropy – Source Coding & Decoding : Fixed length – Shanon fano – Huffman - Joint & Conditional entropy – Redundancy - Mutual & Self informations – Binary Symmetry Cannel – Binary Erase Channel – Shannon Hartly theorem -Channel Capacity. theorem.

UNIT – 4: Channel Encoder & Decoder

Introduction - Types of error control coding : Automatic Repaet Request –Forword error control – Linear block codes – Error detection & correction capabilities of linear block codes - Binary Cyclic Codes – Error detection & Correction in BCC - Convolutional codes : Time domain & Frequency domain Approach – State diagram – Trellis Diagram – Convolutional Decoder : Viterbi & Squential decoder.

UNIT – 5: Bandpass Data Transmission

Introduction - ASK Modulator - Bandwidth and Frequency Spectrum of ASK- Coherent ASK Detector - Non-Coherent ASK Detector - Signal Space Representation & Probability of Error for ASK . FSK - Bandwidth and Frequency Spectrum of FSK. Signal Space Representation & Probability of Error for FSK - Non coherent FSK Detector - Coherent FSK Detector - FSK Detection Using PLL – BPSK - Bandwidth and Frequency Spectrum of BPSK. Signal Space Representation & Probability of Error for BPSK - Coherent PSK Detection - Differential Binary Phase Shift Keying- Quadrature Phase Shift Keying (QPSK)- QPSK Demodulator – Introduction to M ary signaling – GMSK & QAM.

Course Outcomes:

On successful completion of course the students will be able to		POs related to COs
CO1	Develop**knowledge** on conversion analog source to digital information ,**Analyze** the performance of base band digital modulation techniques, **Formulate** the SNR for PCM & DM, ADM Technique .	**PO1, PO2, PO3.**
CO2	Understand the **principle** of multiplexing & base band digital encoding schemes**Analyze** probability of error performance and **design** digital communication systems	**PO1, PO2, PO3.**
CO3	Obtain the basics knowledge on information theory, **analyze** entropy and channel capacity **problem solving**with the properties of entropy and **Calculate/Formulate** the transmission efficiency for Source encoding techniques.	**PO1, PO2, PO4.**
CO4	To obtain knowledge on various source coding, channel coding techniques apply their concepts in the **analysis** and **design** of digital communication systems	**PO1, PO2, PO3, PO4.**
CO5	**Analyze** and compare the Band pass various digital modulation techniques **design** the constellation diagrams and **calculate/formulate** the probability error of all digital modulation techniques.	**PO1, PO2, PO3, PO4.**

Text Books:

1.Digital Communications, 2/e, 2005, Simon Haykin, John Wiley,New delhi.
2.Digital and Analog Communicator Systems ,2/e, 2005, Sam Shanmugam, John Wiley, New delhi.

Reference Books:

1.Principles of Communication, 3/e, 2008, H. Taub and Schilling, McGraw Hill, Noida.
2.Digital Communications, 5/e, 2008, J G Proakis, McGraw Hill, New delhi.
3.Digital Communications, 2/e, 2007, Bernard Sklar,Pearson edition, New delhi.
4.Digital Communications, 2/e, 2008,Ian A. Glover, Peter M. Grant, Edition, Pearson Edu,New delhi.
5.Communication Systems, 2/e, 2006, B.P. Lathi, BS Publication,Hyderabad.

CO-PO Mapping

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2		-	-	-	-	-	-	-	-
CO2	3	3	2		-	-	-	-	-	-	-	-
CO3	3	3	-	3	-	-	-	-	-	-	-	-
CO4	3	2	3	2	-	-	-	-	-	-	-	-
CO5	3	3	3	2	-	-	-	-	-	-	-	-
CO*	3	2.8	2.5	2.33	-	-	-	-	-	-	-	-

SREENIVASA INSTITUTE of TECHNOLOGY and MANAGEMENT STUDIES
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III Year B- Tech II semester	**L**	**P**	**C**
	4	**-**	**3**

13ECE 323 MICROPROCESSORS AND INTERFACING
(Common to ECE, EEE, EIE, CSE & IT)

Course Educational Objectives:

CEO1: To provide knowledge on
- Architecture of 8085, Registers and Memory.
- Instruction classification of 8085

CEO2: To acquire knowledge on 8086 Microprocessor, Memory organization.

CEO3:To understand assembly language programming and its Modes of operation.

CEO4: To understand the concepts of Programmable Interfacing devices, 8086 interfacing with Input output devices

CEO5: Analyze how the Serial communication is performed using 8251.

UNIT - 1: Introduction to 8085 Microprocessor

Architecture of 8085 Microprocessor - The 8085 Programming Model - Pin diagram Of 8085 - Machine Cycle Status and Control Signals - Addressing Modes - Instruction Classification - Instruction Format - Simple Programs Involving Logical - Branch And Call Instructions.

UNIT - 2: Introduction to 8086 Microprocessor

Architecture o f 8086 Microprocessor - Special functions of General Purpose register - 8086 flag register and function of 8086 Flags - Addressing modes of 8086 - Instruction set of 8086 - Assembler directives - Simple programs – procedures and Macros

UNIT - 3: Assebly Language Programming & Timing Diagrams

Assembly Language Programs Involving Logical - Branch & Call Instructions – Sorting - Evaluation of Arithmetic expressions - String Manipulation - Pin Diagram of 8086-Minimum Mode and Maximum Mode of Operation- Timing Diagram - Memory interfacing To 8086 (Static RAM&EPROM) - Need for DMA - Interfacing With 8237/8257.

UNIT - 4: Programmable Interfacing Devices & Interrupt Structure

8255 PPI – Various Modes of Operation and Interfacing to 8086 - Interfacing Keyboard – Displays – 8279 - Stepper Motor - D/A and A/D Converter Interfacing,Interrupt Structure of 8086 - Vector Interrupt Table - Interrupt Service Routines - Introduction to Dos and Bios Interrupts - 8259 PIC Architecture And Interfacing and Its Importance.

UNIT - 5: Serial Data Transfer Schemes

Serial Data Transfer Schemes - Asynchronous and Synchronous Data Transfer Schemes - 8251 Usartarchitecture and Interfacing - TTL to RS 232C and RS232C to TTL Conversion - Sample Program of Serialdata Transfer - Introduction to High Speed Serial Communications Standards - USB - Features of Advanced Microprocessors (80286,80386, Pentium) - Features of 8051 Microcontroller.

Course Outcomes:

On successful completion of course the students will be able to		POs related to COs
CO1	Demonstrate **knowledge** on the Architecture of 8085 and its Registers, Memory concepts.	**PO1**
CO2	Demonstrate Knowledge on Architecture of 8086 and its addressing modes, Registers.	**PO1**
CO3	Understand the basics of Instruction set and able to write programs using 8086 Microprocessor.	**PO1, PO2, PO3.**
CO4	Acquire the knowledge programmable peripheral interfaces and how they are interfaced with 8086 processor.	**PO1, PO2**
CO5	**Select appropriate s**erial data transfer scheme and analyze the difference between synchronous and asynchronous, features of advanced microprocessors.	**PO1, PO2,PO5**

Text Books :

1. Advanced microprocessor and Peripherals , 2/e, 2000, A.K.Ray and K.M,.Bhurchandi, Tata McGraw-Hill, Delhi.
2. Microprocessor architecture, programming and applications with 8085/8080A, 2/e, 1996, Ramesh S, Goankar, New age international Publishers, New Delhi.

Reference Books:

1.Micro Processors & Interfacing , revised, 2/e, 2007, Douglas U, Hall , Tata McGraw-Hill, Delhi.
2.The 8088 and 8086 microprocessors, 1/e, 2003, Walter A, Triebel, Avtar Singh, Prentice Hall of India, New Delhi.
3.Micro Computer System 8086/8088 Family Architecture, Programming and Design, 2/e, 2000, Liu and GA Gibson, Prentice Hall of India , New Delhi.
4.The X8086 microprocessor architecture, programming and interfacing, 1/e, 2010, I.Das, Pearson Education india limited, New Delhi.
5.The 8086 microprocessor programming and interafacing, 1/e, 2007, Kenneth J, Ayala, Cenange learning private limited, New Delhi.

CO-PO Mapping

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-		-	-	-	-	-	-	-
CO2	3	-	-	-	-	-	-	-	-	-	-	-
CO3	2	3	3	-	-	-	-	-	-	-	-	-
CO4	2	3	-	-		-	-	-	-	-	-	-
CO5	2	3	-	-	2	-	-	-	-	-	-	-
CO*	**2.4**	**3**	**3**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

SREENIVASA INSTITUTE of TECHNOLOGY and MANAGEMENT STUDIES

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III Year B- Tech II semester	**L**	**P**	**C**
	4	**-**	**3**

13ECE 324 DIGITAL SIGNAL PROCESSING
(Common to ECE, EIE & EEE)

Course Educational Objectives:

CEO1: To provide knowledge on
- Fundamentals of Signals, Systems
- Step and Impulse Response
- Frequency response

CEO2: To develop skill to analyze frequency & complex frequency representations of signals and Systems using DFT,FFT.

CEO3: To develop skill to understand the Z transforms and DFT, difference equations.

CEO4: To inculcate skill to investigate the effect of finite word length effect in various applications, Suitability of IIR/FIR for various input specifications

CEO5: To develop skill to apply the concept of Multi-rate signal processing in designing of various applications

UNIT - 1: Introduction To DSP

Discrete time signals and systems - Elementary discrete signals – Classification – Operation - Classification of discrete time systems - Representation of an arbitrary sequence - Linear constant coefficient difference equation – Solutions - Step and Impulse response - Frequency domain representation of discrete time signals and systems - Frequency response

UNIT - 2: Discrete Fourier Transform

Review of DFS – DTFT - DFT: Properties of DFT - Linear convolution of sequences using DFT - Comparison between Circular and Linear convolution - Methods to evaluate Circular convolution - Linear convolution from Circular convolution - Computation of DFT - Fast Fourier Transform - Radix-2 DIT and DIF FFT algorithms - Inverse FFT- FFT for composite N

UNIT - 3: Z- Transform

Introduction – Definition - ROC of Finite and Infinite duration sequences - Stability- Properties of ROC - Properties of Z- transform - System function - Poles and Zeros of system function - Stability criterion - Relationship between Z- transform and DFT - and DFS - Inverse Z Transform - Solution of difference equations of digital filters

UNIT - 4: Digital Filters IIR Digital Filters

Analog Filter Approximations - Butterworth and Chebyshev - Design Of IIR Digital Filters from Analog Filters - Impluse Invariant Technique and Bilinear Transformation - Design Examples: Analog to Digital Transformations - Illustrative Examples - Realization using Direct – Cascade and Parallel Forms

FIR Digital Filters: Characteristics of FIR Filters (Symmetric and Antisymmetric) - Linear Phase FIR Filters - Frequency Response - Design of FIR Filters - Frequency Sampling Method and Window Method - Design Problems - Realization using Transversal - Linear Phase - Poly Phase Structures

UNIT - 5: Multirate Digital Signal Processing

Basic Sample Rate Alteration Devices - Decimation and Interpolation by Integer Factor (Time Domain and Frequency Domain Characterization) - Sampling Rate Conversion by Rational Factor - Multistage Implementation of Multirate System - Filter Implementation for Sampling Rate Conversion - Direct Form FIR Structures and Polyphase Filter Structure

Course Outcomes:

On successful completion of course the students will be able to		POs related to COs
CO1	Demonstrate knowledge on fundamentals of Signals & Systems and Analyze the solution of linear systems for different signals	**PO1,pO2**
CO2	Analyze the frequency representation of the signals using DFT and develop various algorithms for fast computation	**PO1,PO2,PO4**
CO3	Analyze the behavior of systems using Z transforms and determine solution of various systems	**PO1, PO2, PO4.**
CO4	Design and develop of filters for various specifications and realize the same using different structures.	**PO1, PO2,PO3,PO5**
CO5	Demonstrate knowledge on Multi-rate signal processing and develop filters for implementation.	**PO1, PO2,PO3**

Text Books:

1. Digital Signal Processing, Principles, Algorithms, and Applications, Indian Reprint, 2/e, 2007, John, G.Proakis, Dimitris.G.Monolakis, Pearson Education/ Prentice Hall of India, NewDelhi.
2. Digital Signal Processing, 4/e, 2010, P.Ramesh Babu, Scitech Publications, Chennai.
3. Digital Signal Processors, Architecture, Programming and Applications, 2/e, 2011, B.Venkataramani and M.Bhaskar, Tata McGraw Hill, NewDelhi.

Reference Books:

1. Discrete Time Signal Processing, 2/e, A.V.Oppenheim and R.W.Schaffer, Prentice Hall of India, NewDelhi.
2. Digital Signal Processing, 3/e, 2010, Andreas Antoniou, Tata McGraw Hill, NewDelhi.
3. Digital Signal Processing, 2/e, 2009, S.Salivahanan, A.Vallavaraj, Tata McGraw Hill,NewDelhi.
4. Digital Signal Processing, 2/e, 2012, S. Nagoorkani, Tata McGraw Hill, NewDelhi.
5. Digital Signal Processing: A Computer Based Approach, 2/e, 2001, S.K.Mithra, Mc Graw Hill, NewDelhi.

CO-PO Mapping

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	2	-	-	-	-	-	-	-	-
CO3	3	3	-	2	-	-	-	-	-	-	-	-
CO4	2	3	3	-	3	-	-	-	-	-	-	-
CO5	3	3	3	-	-	-	-	-	-	-	-	-
CO*	**2.8**	**3**	**3**	**2**	**3**	-	-	-	-	-	-	-

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13ECE 325 ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

Course Educational Objectives:

CEO1: To provide a brief knowledge of measurements and measuring Instruments related to engineering.
CEO2: To give the sufficient information of measurements in any kind of Industry viz. electrical, electronics, mechanical etc
CEO3: Select the instrument to be used based on the requirements.
CEO4: Understand and analyze different signal generators and analyzers.
CEO5: Understand the design of oscilloscopes for different applications.
CEO6: To provide knowledge on different transducers for measurement of different parameters

UNIT - 1: Performance Characteristics of Instruments

Static Characteristics – Accuracy – Precision – Resolution – Sensitivity - Static and Dynamic Calibration- Errors in Measurement and their Statistical Analysis - Dynamic Characteristics - Speed of Response - Fidelity- Lag and Dynamic Error. DC Voltmeters- AC Voltmeters –Ohm Meters - Multimeter .

UNIT - 2: Signal Generators & Analyzers

Fixed and Variable - AF Oscillators - Function Generators - Pulse Random Noise – Sweep and Arbitrary Waveform Generators & Their Standards - Specifications and Principles of Working (Block Diagram Approach). Wave Analyzers - Spectrum Analyzer - Harmonic Distortion Analyzers - FFT Analyzers - Network Analyzer - Overview of Data Acquisition System.

UNIT - 3: Oscilloscopes

Standard Specifications of CRO - CRT Features - Vertical and Horizontal Amplifiers - Horizontal and Vertical Deflection Systems - Sweep Trigger Pulse - Delay Line - Sync Selector Circuits - Triggered Sweep CRO - and Delayed Sweep - Dual Trace/Beam CRO - Measurement of Amplitude - Frequency and Phase (Lissajous Method Only). Principles of Sampling Oscilloscope - Storage Oscilloscope- and Digital Storage Oscilloscope - Time and Period Measurement.

UNIT - 4: Bridges

Review of DC Bridges: Wheatstone Bridge - Wein Bridge - Errors and Precautions in Using Bridges - AC Bridges: Measurement of Inductance -Maxwell's Bridge - Anderson Bridge. Measurement of Capacitance - Schering Bridge - Kelvin Bridge- Q-Meter.

UNIT - 5: Sensors and Transducers

Introduction about Sensors - Active and Passive Transducers - Measurement of Displacement (Resistance – Capacitance – Inductance - LVDT) Force (Strain Gauges) Pressure (Piezoelectric Transducers) Temperature (Resistance Thermometers – Thermocouples - and Thermistors) – Velocity - Acceleration.

Course Outcomes:

On successful completion of course the students will be able to		POs related to COs
CO1	Illustrate and analyze the operating characteristics of electronic measuring instruments, compute different types of errors in measurements.	**PO1,pO2**
CO2	Demonstrate knowledge on the working principles of different types of signal generators and analyzers.	**PO1,PO2**
CO3	Demonstrate Knowledge on functions of CRO and sampling oscilloscope for measuring parameters like amplitude, frequency and time period .	**PO1**
CO4	Analyze various AC &DC Bridges for measuring resistance, inductance and capacitance parameters and identification of different errors in bridges.	**PO1, PO2,PO4**
CO5	Identify suitable sensor, transducer for the measurement of temperature, displacement and strain,	**PO1, PO2**

Text Books:

1. Electronic instrumentation, 2/e, 2004, H.S.Kalsi, Tata McGraw Hill, New Delhi.
2. Modern Electronic Instrumentation and Measurement Techniques, 5/e, 2002, A.D. Helfrick and W.D. Cooper, Prentice Hall of India, New Delhi.

References books:

1. Electronic Test Instruments (Analog & Digital Measurements), 2/e, 2006, Robert A.Witte, Pearson Education , New Delhi.
2. Measurements and Instrumentation, 1/e, 2005, M.Janaki Rani& G.Sathiyabhama, Anuradha Agancies – Chennai.
3. Electronic Instrumentation & Measurements, 2/e, 2003, David A. Bell, Prentice Hall of India, New Delhi.
4. Electronic Measurement and Instrumentation, Oliver and Cage, Tata McGraw Hill, New Delhi**.**
5. A course on Electrical & Electronic Measurement and Instrumentation, 18/e, 2010, A.K.Sawhney & Puneet Sawhney, Dhanpat Rai & Co, New Delhi.

CO-PO Mapping

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

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13ECE 326 VLSI DESIGN

(Common to ECE, EEE, EIE)

Course Educational Objectives:

CEO1: To gain knowledge on fabrication process of NMOS,PMOS,CMOS AND BICMOS and in-depth analysis of the electrical properties of MOS transistor.

CEO2: To understand the layout and stick diagrams for MOS transistors, layers and design rules.

CEO3: To acquire the conceptual ideas of floor planning ,routing, placement and fundamentals of Standard cells, FPGA and CPLD.

CEO4: To gain the knowledge on synthesis process for design tools and testing principles.

CEO5: To obtain knowledge on fundamentals of fabrication process and Super integration concepts. Design of resistors and die area for a specified gate count.

UNIT - 1: Basic Electrical Properties of MOS Circuits

Drain to Source Current (I_{ds}) Versus Drain to Source Voltage (V_{ds}) Relationships - MOS Transistor Threshold Voltage (V_t) – MOS Transistor Transconductance G_m and Output Conductance G_{ds} - Figure Of Merit (Ω_0) - Pass Transistor- Pull – Up to Pull – Down Ratio - NMOS - PMOS - CMOS – BICMOS Processes – Comparison.

UNIT - 2: VLSI Circuit Design Processes

VLSI Design Flow - Layers of Abstraction - Stick Diagrams - Design Goals and Layout Diagrams - Sheet Resistance R_s - Standard Unit of Capacitance - Inverter Delays - Propagation Delays - Wiring Capacitance - Inverter Design Aspects – Specifications Considering Worst case Parameters - Inverter in the Input Stage - Output Stage - Internal Inverter. Design Rules and Layout - 2µm CMOS Design Rules for Wires - Contacts and Transistor Layout Diagrams for NMOS and CMOS Inverters and Gates - Scaling of MOS Circuits - Limitations of Scaling.

UNIT - 3: Semiconductor Integrated Circuit Design

PLAs – FPGAs – CPLDs - Standard cells - Programmable Array Logic - Design Approach.

UNIT - 4: VHDL Synthesis

VHDL Synthesis - Circuit Design Flow - Circuit Synthesis – Simulation – Layout - Design Capture Tools - Design Verification Tools - Test Principles.

UNIT - 5: VLSI Technology

Fabrication Sequence - Process Flow – Oxidation - Lithography Techniques - Diffusion Process - Ion Implantation – Metallization – Encapsulation – Testing - Super Integration Concepts - Integrated Passive Components - MOS Resistors and Capacitors – Crossovers - IC Packing Techniques.

Course Outcomes:

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

Course Outcomes		POs related to COs
CO1	Demonstrate knowledge on appropriate methods for fabrication flow of NMOS,PMOS,CMOS AND BICMOS and in-depth analysis of the electrical properties of MOS transistor.	PO1, PO2, PO4
CO2	Design of layout and stick diagrams for MOS transistors, wires, contacts and comparative analysis of MOS layers.	PO1, PO2, PO3, PO5
CO3	Analyze the effect of floor planning, routing, placement and power delay estimation and design of Standard cells, FPGA and CPLD.	PO1, PO2, PO3, PO4
CO4	Identify appropriate method for synthesis process for design tools and testing principles.	PO1, PO2, PO3, PO5
CO5	Demonstrate knowledge on fundamentals of fabrication process and Super integration concepts. Design of resistors and die area for a specified gate count.	PO1, PO2, PO3

Text Books:

1. Basic VLSI Design, 3/e, 2011, Douglas A. Pucknell, Kamran Eshraghian, Prentice Hall of India, New Delhi.
2. Modern VLSI design, 3/e, 2008, Wayne Wolf, Pearson Education, New Delhi.

References Books:

1. Introduction to VLSI Circuits and Systems, Student Edition, 2006, John .P.Uyemura, John Wiley, New Delhi.
2. Application Specific Integrated Circuits, Indian Edition, 2001, Michel John Sebastian Smith, Addison Wesley, New Delhi.
3. Introduction to VLSI design, International Edition, Eugine D. Fabricus, Mc Graw Hill, New Delhi.
4. VLSI Technology, 2/e , 2003, S.M. SZE, Bell Laboratories, Tata Mc Graw Hill, New Delhi.
5. principles of CMOS VLSI Design, 2/e , N.H.E Weste , K.Eshraghian, Adisson Wesley, New Delhi.

CO-PO Mapping

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	-	3	-	-	-	-	-	-	-	-
CO2	3	3	3	-	3	-	-	-	-	-	-	-
CO3	3	3	3	2	-	-	-	-	-	-	-	-
CO4	3	2	3	-	3	-	-	-	-	-	-	-
CO5	3	2	3	-	-	-	-	-	-	-	-	-
CO*	**3**	**2.6**	**3**	**2.5**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

SREENIVASA INSTITUTE of TECHNOLOGY and MANAGEMENT STUDIES

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	-	**3**	**2**

13ECE 327 ANALOG AND DIGITAL COMMUNICATIONS LAB

COURSE EDUCATIONAL OBJECTIVES:

CEO1: To understand the functionality of CRO & DSO display devices.

CEO2: To provides the practical knowledge of Analog modulation techniques with input-output waveforms.

CEO3: To develop skills on working of multiplexing system in communication practically.

CEO4: To provides the practical knowledge on pulse modulation systems.

CEO5: To know the practical knowledge of Digital modulation techniques with input-output waveforms.

List Of Experiments

Analog Communications:

1. Introduction to DSO & Spectrum Analyser
2. Signal Spectrum Analysis using DSO & Spectrum Analyser
3. AM generation and demodulation.
4. FM generation and FM demodulation (using 1496, 565 & 566 ICs)
5. Pre-emphasis and de-emphasis
6. Balanced Modulator & Synchronous Detector.
7. SSB Generation and Detection
8. Frequency Multiplexing & Demultiplexing
9. Time Multiplexing & Demultiplexing
10. Muting Circuit.

Digital Communications:

1. Pulse Amplitude Modulation & Demodulation
2. Pulse Amplitude Modulation & Demodulation
3. Pulse Amplitude Modulation & Demodulation.
4. Pulse Code Modulation and Demodulation.
5. Delta Modulation and Demodulation.
6. ASK Modulator and Demodulator.
7. FSK Modulator and Demodulator.
8. PSK Modulator and Demodulator.
9. DPSK Modulator and Demodulator.
10. QPSK Modulator and Demodulator.
11. QAM Modulator and Demodulator.

COURSE OUTCOMES:

On successful completion of the course the student will be able to		POs related to COs
CO1	Demonstrate knowledge on study of DSO, and analog and Digital communication systems	**PO1**
CO2	Analyze the functionality of generation and degeneration of modulation techniques	**PO2**
CO3	Design the circuits which are used to improve the SNR in FM systems	**PO3**
CO4	Conduct investigation and test the functionality on implementation of generation and degeneration circuits.	**PO4**
CO5	Select appropriate technique and procedure to analyze and implement analog and Digital modulation systems	**PO5**
CO6	Follow ethical principles in analyzing and implementing various base band and band pass modulation techniques	**PO8**
CO7	Do experiments effectively as an individual and as a member in a group.	**PO9**
CO8	Communicate verbally and in written form, the understandings about the experiments.	**PO10**
CO9	Continue updating their skill related to communication for various applications during their life time.	**PO12**

CO-PO Mapping

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	**3**	-	-	-	-	-	-	-	-	-	-	-
CO2	-	**3**	-	-	-	-	-	-	-	-	-	-
CO3	-	-	**3**	-	-	-	-	-	-	-	-	-
CO4	-	-	-	**3**	-	-	-	-	-	-	-	-
CO5	-	-	-	-	**3**	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	**3**	-	-	-	-
CO7	-	-	-	-	-	-	-	-	**3**	-	-	-
CO8	-	-	-	-	-	-		-	-	**3**	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	**3**

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III Year B- Tech II semester	**L**	**P**	**C**
	-	**3**	**2**

13ECE 328 MICROPROCESSORS AND INTERFACING LAB

Course Educational Objectives:

CEO1: To provide knowledge on
- Fundamentals of 8086 processor.
- Basic Arithmetic, logical operations.
- Fundamentals of Assembler.

CEO2: To become skilled in 8086 Assembly language programming.

CEO3: To develop skill to understand programmable peripheral devices and their interfacing With Processor.

CEO4: To understand and learn how to program using String instructions.

CEO5: To develop skill to learn DOS/BIOS programming.

List of experiments:

I. **Microprocessor 8086:**

1.Introduction to Masm/Tasm
2.Arithmetic Operation-Multibyte Addition and Subtraction, Multiplication and Division Signed and Unsigned Arithmetic Operation , ASCII-Arithmetic Operations.
3.Logic Operations-Shift Rotate-Converting Packed BCD to Unpacked BCD, BCD to ASCII Conversion
4.By using string operation and instruction prefix: move block, reverse string, Sorting, inserting, deleting, length of string, string comparison.
5.DOS/BIOS programming: Display Characters, Strings

II. Interfacing

1.8279-Keyboard display: write a small program to display a string of characters.
2.8259- Interrupt controller: Generate an Interrupt using 8259
3.8255-Interfacing with DAC to generate Triangular and Square waveform.
4.8251- USART program to establish communication between two processors.

III. Microcontroller 8051:

1.Arithmetic operations using 8051 microcontroller
2.Reading and writing on parallel port

Equipment required for laboratory:

1. 8086 MICROPROCESSOR KITS
2. 8051 MICROCONTROLLER KITS
3. INTERFACES/PERIPHERAL SUBSYSTEMS
    1) 8259 PIC
    2) 8279 KB/DISPLAY
    3)8255 PPI
    4)8251 USART

Course Outcomes:

On successful completion of the course the student will be able to		POs related to COs
CO1	Develop testing and experimental procedures on 8086 microprocessor and analyze the operation under different cases.	PO1
CO2	Setup programming strategies and select proper mnemonics and run the program on the training boards.	PO2
CO3	Able to understand and work with microprocessor real time interfaces including digital to analog converters, stepper motors, analog to digital converters	PO3
CO4	Design and implement programs on 8051 microcontrollers	PO4
CO5	Able to interfacing circuits with RTOS development boards and understand the concept related to I/O devices.	PO5
CO6	Follow ethical principles in designing, simulating and implementing various circuits.	PO8
CO7	Do experiments effectively as an individual and as a member in a group.	PO9
CO8	Communicate verbally and in written form, the understandings about the experiments.	PO10
CO9	Continue updating their skill related to semiconductors implementation for various application during their life time	PO12

CO-PO Mapping

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	**3**	-	-	-	-	-	-	-	-	-	-	-
CO2	-	**3**	-	-	-	-	-	-	-	-	-	-
CO3	-	-	**3**	-	-	-	-	-	-	-	-	-
CO4	-	-	-	**3**	-	-	-	-	-	-	-	-
CO5	-	-	-	-	**3**	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	**3**	-	-	-	-
CO7	-	-	-	-	-	-	-	-	**3**	-	-	-
CO8	-	-	-	-	-	-		-	-	**3**	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	**3**

SREENIVASA INSTITUTE of TECHNOLOGY and MANAGEMENT STUDIES

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IV Year B.Tech I semester	**L**	**P**	**C**
	4	**-**	**3**

13ECE 411 MICROWAVE ENGINEERING

COURSE EDUCATIONAL OBJECTIVES

CEO1: Concepts of microwaves.

CEO2: Operation of Microwave tubes

CEO3: Different Microwave solid state devices

CEO4: Working principle and Scattering matrix of different Waveguide components

CEO5: Microwave test bench setup for Microwave measurements.

UNIT - 1: Microwave Transmission Lines - I

Introduction - Microwave Spectrum and Bands - Applications of Microwaves - Rectangular Waveguides - Solution of Wave Equation In Rectangular Coordinates - TE/TM Mode Analysis - Expressions for Fields - Characteristic Equation and Cutoff Frequencies - Filter Characteristics - Dominant and Degenerate Modes - Mode Characteristics - Phase and Group Velocities - Wavelengths and Impedance Relations - Rectangular Waveguides – Power Transmission and Power Losses - Impossibility of TEM Modes - Micro Strip Lines –Introduction - Z0 Relations - Effective Dielectric Constant – Losses - Q-Factor - Cavity Resonators – Introduction - Rectangular and Cylindrical Cavities - Dominant Modes and Resonant Frequencies – Q factor and Coupling Coefficients - Illustrative Problems.

UNIT - 2: Waveguide Components and Applications- I

Coupling Mechanisms – Probe – Loop - Aperture Types - Wave Guide Discontinuities - Waveguide Windows - Tuning Screws and Posts - Matched Loads - Waveguide Attenuators - Waveguide Phase Shifters – Wave Guide Multiport Junctions - E Plane and H Plane Tees - Magic Tee - Directional Couplers - Illustrative Problems.

Wave Guide Components and Applications-Ii

Ferrites - Composition and Characteristics - Faraday Rotation - Ferrite Components – Gyrator - Isolator – Circulator - Scattering Matrix – Significance - Formulation and Properties - S Matrix Calculations for 2 - Port Junction - E Plane and H Plane Tees - Magic Tee – Directional Coupler-Circulator and Isolator - Illustrative Problems

UNIT - 3: Microwave Tubes-I

Limitations and Losses of Conventional Tubes at Microwave Frequencies - Microwave Tubes - O Type and M Type Classifications - O Type Tubes – 2 Cavity Klystrons – Structure - Reentrant Cavities - Velocity Modulation - Process and Applegate Diagram - Bunching Process and Small Signal – Theory - Expressions for O/P Power and Efficiency. Reflex Klystronsstructure - Velocity Modulation - Applegate Diagram – Mathematical Theory of Bunching - Power Output - Efficiency - Oscillating Modes ond O/P Characteristics - Effect of Repeller Voltage on Power O/P- Illustrative Problems.

UNIT - 4: Microwave Tubes - II

Helix Twts - Significance - Types and Characteristics of Slow Wave Structures - Structure of TWT and Amplification Process (Qualitative Treatment) - M -Type Tubes - Introduction - Cross Field Effects – Magnetrons - Cylindrical Travelling Wave Magnetron - Hull Cutoff and Hartree Conditions - Modes of Resonance and Pi-Mode Operation - Separation of Pi-Mode - O/P Characteristics - Illustrative Problems.

Unit - 5: Microwave Solid State Devices:

Introduction – Classification – Applications - Transfer Electronic Devices - Gunn Diode – Principles - Rwh Theory – Characteristics - Basic Modes of Operation - Gunn Oscillation Modes. Lsa Mode - Varactor Diode - Parametric Amplifier - Introduction to Avalanche Transit Time Devices (Brief Treatment Only).

Microwave Measurements: Description of Microwave Bench - Different Blocks and Their Features - Errors and Precautions - Microwave Power Measurement - Bolometers - Measurement of Attenuation - Frequency -Standing Wave Measurements – Measurement of Low and High VSWR.

Course Outcomes:

On successful completion of the course the student will be able to		**POs related to COs**
CO1	**Demonstrate** knowledge on the various modes of a rectangular waveguide and **analyze** various cavity resonators.	PO1, PO2
CO2	**Demonstrate** the usage of microwave components such as isolators, Couplers, Circulators, Tees, Gyrators and **analyze** the various advanced Tee junctions.	PO1, PO2
CO3	**Analyze** the principles involved in various Microwave Klystron tubes and Reflex klystrons.	PO1, PO2
CO4	**Demonstrate** the knowledge on the working principles involved in Microwave TWTs and Magnetron and analyze the characteristics of the devices.	PO1, PO2
CO5	**Demonstrate** the basic principles engaged in various Microwave solid state devices and **understand** the set up with the microwave bench for measurement of various parameters such as microwave frequency, VSWR, power, etc.	PO1, PO2

Text Books:

1. Microwave Devices And Circuits, 3/e, 2003, Samuel Y. Liao, Pearson Education, New Delhi.
2. Microwave and Radar Engineering, 3/e, 2003, M. Kulakarni, Umesh Publications, New Delhi.

Reference Books:

1. Foundations For Microwave Engineering, 2/e, 2002, R.E.Collin, IEEE Press, John Wiley.
2. Microwave Circuits And Passive Devices, 1995, M.L.Sisodia And G.S.Raghuvanshi, Wiley Eastern Ltd., New Age International Publishers Ltd.
3. Microwave engineering passive circuits, 1999, Peter A.Rizzi, Pearson/Prentice Hall of india.
4. Electronic and Radio Engineering, 4/e, 1995, F.E.Terman, McGraw-Hill, New Delhi.
5. Microwave Engineering, 2/e, 2009, A. Das, Tata Mc Graw Hill, New Delhi.

CO-PO Mapping

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-
CO3	3	3	-	-	-	-	-	-	-	-	-	-
CO4	3	2	-	-	-	-	-	-	-	-	-	-
CO5	3	2	-	-	-	-	-	-	-	-	-	-
CO*	**3**	**2.4**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

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13CSE 311 COMPUTER NETWORKS
(Common to CSE, IT and ECE)

Course Educational Objectives:

CEO1: Build an understanding of the fundamental concepts of transmission media, switching criteria and different Layer models.

CEO2: Familiarize the student with different protocols and its services in the networking area.

CEO3: Introduce the student to advanced networking concepts, like WLAN, Routing Algorithms and Internet.

CEO4: Allow the student to gain expertise in some specific areas of networking such as the design and maintenance of individual networks.

UNIT – 1: Introduction, Physical Layer and Data Link Layer

Network Hardware - Network Software - References Models - Guided Transmission Media - Communication Satellites - The Public Switched Telephone Network – Switching - Data Link Layer Design Issues - Elementary Data Link Protocols - Sliding Window Protocols

UNIT – 2: The Medium Access Control Sub layer

The Channel Allocation Problem - Multiple Access Protocols – Ethernet - Ethernet Cabling - Manchester Encoding - The Ethernet MAC Sub Layer Protocol - The Binary Exponential Back off Algorithm - Ethernet Performance - 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

Network Layer Design Issues - Routing Algorithms – Congestion Control Algorithms - Internetworking - The Network Layer in the Internet

UNIT - 4: The Transport Layer

The Transport Service - Elements of Transport Protocols - The Internet Transport Protocols: UDP - The Internet Transport Protocols: TCP

UNTI – 5: The Application Layer

DNS - The Domain Name System - Electronic Mail - The World Wide Web – Multimedia

Course Outcomes:

On successful completion of the course the student will be able to		**POs related to COs**
CO1	Demonstrate knowledge on the basic computer network technology and *Enumerate* the layers of the OSI model and TCP/IP reference models.	PO1
CO2	Demonstrate knowledge and carryout investigation on Multiple access protocols and Wireless LANS technology.	PO1,PO4
CO3	Investigate and analyze the Network layer design issues, Routing algorithms and Congestion control algorithms.	PO1, PO2,PO4
CO4	Demonstrate knowledge on Transport layer services and various designs of the transport protocols.	PO1, PO4
CO5	Demonstrate knowledge on Domain Name System, World Wide Web and Multimedia.	PO1, PO2

Text Books:

1.Computer Networks, 4/e, 2003, Andrew S. Tanenbaum, Pearson Education, New Jersey.
2. Data Communications and Networking, 4/e, 2006, Behrouz A. Forouzan, Tata McGraw Hill, Delhi.

Reference Books:

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

CO-PO Mapping

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	**3**	-	-		-	-	-	-	-	-	-	-
CO2	**3**	-	-	**2**	-	-	-	-	-	-	-	-
CO3	**3**	**2**	-	**2**	-	-	-	-	-	-	-	-
CO4	**3**	-	-	**1**	-	-	-	-	-	-	-	-
CO5	**3**	**2**	-		-	-	-	-	-	-	-	-
CO*	**3**	**2**	-	**1.66**	-	-	-	-	-	-	-	-

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13ECE 412 OPTICAL FIBER COMMUNICATIONS

Course Educational Objectives:

CEO1:To realize the significance of optical fibre communications.
CEO2:To understand the construction and characteristics of optical fibre cable.
CEO2:To develop the knowledge of optical signal sources and power launching.
CEO4:To identify and understand the operation of various optical detectors.
CEO5:To understand the design of optical systems and WDM.

UNIT – 1: Overview Of Optical Fiber Communication

Introduction - Historical Development - General System – Advantages – Disadvantages - and Applications of Optical Fiber Communication - Optical Fiber Waveguides - Ray Theory - Cylindrical Fiber Single Mode Fiber - Electromagnetic Mode Theory for Optical Propagation - Cutoff Wave Length- Mode Filed Diameter - Optical Fibers: Fiber Materials - Photonic Crystal - Fiber Optic Cables Specialty Fibers.

UNIT – 2: Transmission Characteristics of Optical Fibers

Introduction – Attenuation – Absorption - Scattering Losses - Bending Loss – Dispersion - Intra Model Dispersion - Inter Model Dispersion - Polarization.

UNIT – 3: Optical Sources and Detectors:

Introduction - LED's - Laser Diodes - Quantum Efficiency And Led Power - Modulation Of LED - Photo Detectors - Photo Detector Noise - Response Time - Double Hetero Junction Structure - Photo Diodes - Comparison of Photo Detectors - Structures for InGaAs APDs.

Fiber Couplers And Connectors: Introduction - Fiber Alignment and Joint Loss - Single Mode Fiber Joints - Fiber Splices - Fiber Connectors and Fiber Couplers - Optical Isolators and Circulators.

UNIT – 4: Optical Receiver

Introduction - Optical Receiver Operation - Receiver Sensitivity - Quantum Limit - Eye Diagrams - Coherent Detection - Burst Mode Receiver - Operation- Analog Receivers.

Analog Links – Introduction- Overview of Analog Links – CNR - Multichannel Transmission Techniques - RF Over Fiber - Key Link Parameters - Radio Over Fiber Links - Microwave Photonics.

Digital Links – Introduction - Point–To–Point Links - System Considerations - Link Power Budget - Resistive Budget - Short Wave Length Band - Transmission Distance for Single Mode Fibers - Power Penalties - Nodal Noise and Chirping.

UNIT – 5: WDM Concepts and Components

WDM Concepts - Overview of WDM Operation Principles - WDM Standards – Mach -Zehender Interferometer – Multiplexer - Isolators and Circulators - Direct Thin Film Filters - Active Optical Components - MEMS Technology - Variable Optical Attenuators - Tunable Optical Fibers - Dynamic Gain Equalizers - Optical Drop Multiplexers - Polarization Controllers - Chromatic Dispersion Compensators - Tunable Light Sources.

Optical Amplifiers And Networks – Optical Amplifiers - Basic Applications and Types - Semiconductor Optical Amplifiers - EDFA.

Optical Networks: Introduction - SONET / SDH - Optical Interfaces - SONET/SDH Rings - High – Speed Light – Waveguides.

Course Outcomes:

CO1	Demonstrate knowledge on fundamentals of Optical Fiber Communication Fiber Losses Optical Sources and Detectors WDM components & SONET/SDH	PO1,PO2
CO2	Analyze transmission characteristics and various losses of optical fiber communications.	PO1,PO2,PO4
CO3	Analyze various characteristics of optical sources ,detectors ,couplers and connectors.	PO1, PO2
CO4	Demonstrate knowledge on optical receivers and analyze the behavior of analog and digital links.	PO1, PO2, PO4
CO5	Demonstrate knowledge on concepts of WDM and select appropriate techniques for optical amplifiers and networks.	PO1, PO2,PO5

Text Books:

1. Optical Fiber Communication, 4/e, 2008, Gerd Keiser, Tata McGraw-Hill, New Delhi.
2. Optical Fiber Communications, 3/e, 2007, John M. Senior,Pearson Education, New Delhi.

Reference Books:

1.Principles and Applications of Optical Communications, 2/e, 2010, Max Ming,Kang Liu,Tata McGraw-Hill.
2.Text book on optical fiber communication and its applications, 1/e, 2000, S.C.Gupta, Pearson /Prentice Hall of india, New Delhi.
3.Fundamentals of Optical Fiber communications, 2/e, 2009, Satish Kumar, Pearson/Prentice Hall of india, New Delhi.
4. Introduvtion to Fiber Optics, 1/e, 2008, Ajoy Ghatak, K. Thyagarajan, Cembridge University Press, New delhi.
5. Fiber Optic Communication Systems, 3/e, 2002, Govind P. Agarwal, John Wiley & Sons Inc, New delhi.

CO-PO Mapping

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	2	3	-	2		-	-	-	-	-	-	-
CO3	3	3	-	-	-	-	-	-	-	-	-	-
CO4	3	3	-	1	-	-	-	-	-	-	-	-
CO5	3	2	-	-	2	-	-	-	-	-	-	-
CO*	**2.8**	**2.6**	**-**	**1.5**	**2**	**-**	-	-	-	-	-	-

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13ECE 413 DIGITAL IMAGE PROCESSING

Course Educational Objectives:

CEO1: To develop knowledge in image fundamentals and analyze the steps involved in digital image processing.
CEO2: To provide the knowledge of image transforms for different applications.
CEO3: To understand the image enhancement techniques in spatial and frequency domain
CEO4: To inculcate skills to restore the degraded image and to extract the region of interest using segmentation algorithms.
CEO5: To develop an ability to understand the image compression procedures and color image processing.

UNIT - 1: Digital Image Fundamentals

Introduction to Image Processing - Fundamental Steps in Digital Image Processing - Components of Image Processing System - Image Sensing and Acquisition - Image Sampling and Quantization - Some Basic Relationships between Pixels - Arithmetic Operations - Set and Logical Operations - Image File Formats - Applications of Digital Image Processing.

UNIT - 2: Image Transforms

Unitary Transform - 2D DFT and Properties - Walsh Transform - Hadamard Transform - Discrete Cosine Transform - Discrete Sine Transform - Haar Transform - Slant Transform - KL Transform - Comparison of Different Image Transforms.

UNIT - 3: Image Enhancemnt in the Spatial and Frequency Domain

Basic Intensity Transformations Functions - Histogram Processing - Fundamentals of Spatial Filtering - Smoothing Spatial Filters - Sharpening Spatial Filters - Combining Spatial Enhancement Methods - Basics of Filtering in Frequency Domain - Image Smoothing using Frequency Domain Filters - Image Sharpening using Frequency Domain Filters - Gaussian High Pass Filters - Homomorphicfiltering.

UNIT - 4: Restoration & Segmentation

Noise Models - Restoration in the Presence of Noise only Spatial Filtering - Mean Order Statistic and Adaptive Filters - Estimating the Degradation Function - Inverse Filtering - Wiener Filtering - Constrained Least Squares Filtering. Point Line and Edge Detection – Thresholding - Region Based Segmentation - The use of Motion in Segmentation

UNIT - 5: Image Compression & Colour Image Processing

Need for Image Compression - Classification of Redundancy in Images - Image Compression Models - Classification of Image Compression Schemes - Run Length Coding - Arithmetic Coding - Block Truncation Coding - Transform Based Compression - Image Compression Standards - Scalar and Vector Quantization. Color Models - Pseudo Color Image Processing - Color Transformations - Smoothing and Sharpening - Image Segmentation based on Color

Course Outcomes:

On successful completion of the course the student will be able to		POs related to COs
CO1	Demonstrate knowledge on fundamentals of a digital image processing and analyze the different types of digital images.	PO1,PO2
CO2	Analyze spatial details of images using various transformation techniques.	PO1,PO2,PO3
CO3	Develop an appropriate technique of image enhancement in spatial and frequency domain.	PO1,PO2,PO3
CO4	Design filter for restoring the information from the degraded image. Application of the pre-defined filter for segmentation and boundary representation.	PO1,PO2,PO3
CO5	Illustrate various compression techniques, apply and analyze the concepts of color image processing.	PO1,PO2,PO3,PO4

Text Books:

1. Digital Image processing,3/e, 2010,R.C. Gonzalez & R.E. Woods, Addison Wesley/ Pearson education,PHI,New Delhi.
2.Fundamentals of Digital Image processing, 1/e, 2007, A.K.Jain , PHI,New Delhi .

Reference Books :

1. Digital Image Processing, 1/e, 2009, S.jayaraman, S.Esakkirajan, T.Veerakumar, Tata McGraw Hill, New Delhi.
2. Digital Image Processing using MAT LAB, 2/e, 2004, Rafael C. Gonzalez, Richard E Woods and Steven, PEA, New Delhi.
3. Digital Image Processing, 3/e, 2004, William K. Pratt, John Wilely, Pearson/Prentice Hall of india, New Delhi.
4. Digital Image Processing and Analysis, 1/e, 2006,B.chanda, Dutta Majumder, Pearson/Prentice Hall of india private Limited, New Delhi
5. Digital Image Processing,1/e, 2006, M.Anji Reddy, BS Publications, Hyderabad.

CO-PO Mapping

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	2	3	-	-	-	-	-	-	-	-	-
CO3	2	3	3	-	-	-	-	-	-	-	-	-
CO4	3	3	3	-	-	-	-	-	-	-	-	-
CO5	3	2	2	2	-	-	-	-	-	-	-	-
CO*	2.8	2.4	2.75	2	-	-	-	-	-	-	-	-

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13ECE 414A EMBEDDED SYSTEMS (Elective I)

Course Educational Objectives:

CE01: To understand the basics of an embedded system with developed applications

CE02: To design a different types of devices using advanced techniques

CE03: Students will learn different types of programming models and knowledge in Embedded C.

CE04: To understand operating systems concepts, types and choosing RTOS.

CE05: To design and implement and test an embedded system.

UNIT - 1: Introduction

History of Embedded Systems - Major Application Areas of Embedded Systems - Purpose of Embedded Systems - Core of the Embedded System - Sensors and Actuators - Embedded Firmware.

UNIT - 2: The 8051 Architecture

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

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 - Further Details on Interrupts.

Applications: Interfacing with Keyboards – Displays - D/A and A/D Conversions - Multiple Interrupts - Serial Data Communication

UNIT - 4 : Real-Time Operating Systems (RTOS) Based Embedded System Design

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

Communication interface - (Board level communication interfaces - Product level communication interfaces) - IO Types and Examples - Serial Communication Devices - Parallel Device – Ports - Sophisticated Interfacing Features in Device Ports - Wireless Devices - Timer and Counting Devices - Watchdog Timer - Real Time Clock - Networked Embedded Systems - Serial BusCommunication Protocols - Parallel Bus Device Protocols - Parallel Communication Network using ISA – PCI - PCI-X and Advanced Buses.

Course Outcomes:

On successful completion of the course the student will be able to		POs related to COs
CO1	Demonstrate knowledge on Basics of Embedded system and real time applications.	PO1
CO2	Demonstrate knowledge on Basics of 8051 microcontroller and analyse its usage.	PO1, PO2
CO3	Demonstrate knowledge on assembly language programming and select appropriate tools and techniques for various applications.	PO1, PO2,PO5
CO4	Design and analyze of RTOS system for various applications in embedded systems.	PO1, PO2,PO3
CO5	Gain the knowledge on principle of operations of communication network devices and buses	PO1,PO2

Text Books:

1. Introduction to Embedded System, 2 /e, 2003,Shibu KV, Tata McGraw Hill. New Delhi.
2. The 8051 Microcontroller,3/e, 2007, Kenneth J.Ayala, Thomson Delmar Learning, New Delhi.
3. Embedded system architecture, programming and design,sixthreprint, 2005, Rajkamal, Tata McGraw Hill. New Delhi.

Reference Books:

1. Micro Controllers(theory and applications),1/e, 2005, Ajay V Deshmukhi, Tata McGraw Hill. New Delhi.
2. An Embedded Software Primer, 1/e , 2007, David E. Simon, Pearson Education private limited,NewDelhi.
3. Microcontrollers architecture, programming and design, 1/e, 2007, Raj kamal, Pearson Education,NewDelhi.
4. Embedded System Design, 1/e, 2000, Frank Vahid, Tony Givargis, John Wiley, Tata McGraw Hill. New Delhi.
5. The 8051 microcontroller and embedded systems, 1/e, 2002, Muhammad ali mazdi, Janice Gillispie Mazidi, pearson private limited, New Delhi.

CO-PO Mapping

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-
CO3	2	3	-	-	2	-	-	-	-	-	-	-
CO4	2	3	3	-	-	-	-	-	-	-	-	-
CO5	3	2	-	-	-	-	-	-	-	-	-	-
CO*	**2.6**	**2.5**	**3**	**-**	**2**							

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13ECE 414B TELEVISION ENGINEERING (Elective I)

COURSE EDUCATIONAL OBJECTIVES:

CE01: To familiarize with the television standards and principles

CE02: To demonstrate knowledge on the concepts of signal transmission,propagation,principles of cameras and picture tubes

CE03: To know the operation of monochrome and color Television system

CE04: To analyse the operation of color signal decoding

CE05: To summarise the concepts of digital TV engineering

UNIT - 1: Introduction

TV Transmitter and Receivers - Synchronization. Television Pictures: Geometric form and Aspect Ratio - Image Continuity - Interlaced Scanning - Picture Resolution - Composite Video Signal: Horizontal and Vertical Sync - Scanning Sequence. Colour Signal Generation and Encoding: Perception of Brightness and Colours - Additive Colour Mixing - Video Signals for Colours - Luminance Signal - Colour Difference Signals - Encoding Of Colour Difference Signals - Formation Of Chrominance Signal PAL Encoder.

UNIT - 2: TV Signal Transmission and Propagation

Picture Signal Transmission - Positive and Negative Modulation - VSB Transmission - Sound Signal Transmission - Standard Channel BW - TV Transmitter - TV Signal Propagation - Interference - TV Broadcast Channels - TV Transmission Antennas.

TV Cameras : Camera Tube Types - Vidicon - Silicon Diode Array Vidicon - Monochrome TV Camera - Color Camera. CCD Image Sensors.

Picture Tubes : Monochromatic Picture Tube - Electrostatic Focussing - Beam Deflection - Picture Tube Characteristics and Specifications - Colour Picture Tubes. TV Standards: American 525 Line B&W TV System - NTSC Colour System - 625 -Line Monochrome System - B PAL Colour System - TV Standards.

UNIT - 3: Monochrome TV Receiver

RF Tuner - IF Subsystem - Video Amplifier - Sound Section - Sync Separation and Processing - Deflection Circuits - Scanning Circuits. PAL -D Colour Receiver: Electron Tuners - IF Subsystem - Y -Signal Channel - Chroma Decoder - Separation Of U & V Colour Phasors - Synchronous Demodulators - Subcarrier Generation - Raster Circuits.

UNIT - 4: Vision IF Subsystem

AGC - Noise Cancellation - Video and Intercarrier Sound Signal Detection - Vision IF Subsystem of Black and White Receivers - Colour Receiver IF Subsystem. Receiver Sound System: FM Detection - FM Sound Detectors - Typical Applications. TV Receiver Tuners: Tuner Operation - VHF And UHF Tuners - Digital Tuning Techniques - Remote Control of Receiver Functions.

UNIT - 5: Colour Signal Decoding

PAL – D Decoder - Chroma Signal Amplifiers - Separation of U and V Signals - Color Burst Separation - Burst Phase Discriminator - ACC Amplifier - Reference Oscillator - Indent and Colour Killer Circuits - RO Phase Shift and 180^{o} PAL – SWITCH Circuitry - U & V Demodulator- Colour Signal Mixing.

Satellite TV Technology: Cable TV – VCR - Video Disc Recording and Playback - Tele Text Broadcast Receiver – Digital Television

COURSE OUTCOMES:

On successful completion of the course the student will be able to		**POs related to COs**
CO1	Understand the concept of television standards, transmitter and receivers	PO1, PO2,PO3
CO2	Demonstrate the knowledge on signal transmission ,cameras and picture tubes	PO1, PO2, PO3,
CO3	Analyse the differences between monochrome and colour tv receiver	PO1, PO2, PO3,
CO4	Demonstrate the knowledge on colour signal decoding and IF sub system	PO1, PO2, PO3
CO5	Acquire the knowledge on different digitally operated TV receivers	PO1, PO2, PO3

Text Books:

1. Modern Television Practice – Principles, Technology And Service , 2 /e , 2002, R.R. Gulati, New Age International Publication, New Delhi.
2. Monochrome And Colour TV, 3/e ,2002 , R.R. Gulati ,New Age International Publication , New Delhi.

Reference Books:

1. Colour Television Theory And Practice, 6/e , 1998, S.P. Bali, Tata Mcgraw Hill,New Delhi.
2. Television Engineering and Video Systems, 1/e ,2007, R.G.Gupta, Tata Mcgraw Hill, New Delhi.
3. Basic Television and Video Systems, 1/e , 1999 , B. Grob and C.E. Herndon , Tata Mcgraw Hill, New Delhi.
4. Television and Video Engineering, 2/e , 1995, A M Dhake, Tata Mcgraw Hill, New Delhi.
5. Television Engineering Handbook, 1/e, 1957, Donald.G.Fink, Tata Mcgraw Hill, New Delhi.

CO-PO Mapping

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

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13ECE 414C BIO MEDICAL INSTRUMENTATION (Elective I)

Course Educational Objectives:

CEO1: To provide an overview of medical instrumentation system, Bio-amplifier and characteristics of medical instruments.
CEO2: To Describe the Cell structure**,** Bio-Potential and fibre optic temperature sensors.
CEO3: To analyze different Electrodes ,differenetial amplifiers and know the functions of ECG,EEG and EMG Machines.
CEO4: To know the functions of computer tomography.
CEO5: To understand and analyze patient care monitoring systems.

UNIT - 1: Introduction to Biomedical Instrumentation

Biometrics - Basic Design Specifications of Biomedical Instrumentation System in terms of Range - Linearity - Hystersis - Frequency Response - Accuracy - Signal to Noise Ratio - Stability Insolation Simplicity - Physiological System of Body: Biochemical System - Cardiovascular System - Respiratory System - Nervous System.

UNIT - 2: Physiology & Transducers

Cell and its Structure – Resting and Action Potential - Propagation of Action Potential - Nervous System: Functional Organisation of the Nervous System – Structure of Nervous System - Neurons - Synapse – Transmitters and Neural Communication - Basic Components of a Biomedical System - Transducers – Selection Criteria – Piezo Electric - Ultrasonic Transducers - Temperature Measurements - Fibre Optic Temperature Sensors.

UNIT - 3: Electrodes & Physiological Measurements

Electrodes – Limb Electrodes – Floating Electrodes – Pregelled Disposable Electrodes - Micro - Needle and Surface Electrodes – Amplifiers: Preamplifiers - Differential Amplifiers - Chopper Amplifiers – Isolation Amplifier.ECG – EEG – EMG – ERG – Lead Systems and Recording Methods – Typical Waveforms.

UNIT - 4: Non -Electrical Parameter Measurements

Measurement of Blood Pressure – Cardiac Output – Cardiac Rate – Heart Sound – Respiratory Rate – Gas Volume – Flow Rate of CO2 - O2 In Exhaust Air - PH of Blood - ESR - GSR Measurements – Plethysmography.
Medical Imaging :X - Ray Machine - Radio Graphic and Fluoroscopic Techniques – Computer Tomography – MRI – Ultrasonography – Endoscopy – Thermography – Different types of Biotelemetry Systems and Patient Monitoring – Electrical Safety.

UNIT -5 : Patient Care Monitoring

Elements of Intensive Care Unit - Diagnosis - Calibration and Reparability of Patient Monitoring Equipment - Instrumentation for Monitoring Patient - Pacemakers - Detibrillators and Computer Patient Monitoring System.

Assisting and Therapeutic Equipments: Pacemakers – Defibrillators – Ventilators – Nerve and Muscle Stimulators – Diathermy – Heart – Lung Machine – Audio Meters – Dialyzers.

	On successful completion of the course the student will be able to	**POs related to COs**
CO1	Understand medical instrumentation system, Bio-amplifier and characteristics of medical instruments.	PO1,PO2
CO2	Describes the Cell structure**,** Bio-Potential electrodes and Bio-Chemical electrodes.	PO1,PO2,PO6
CO3	Analyze the various parts different Electrodes ,differenetial amplifiers and know the functions of ECG,EEG and EMG Machines	PO1,PO2, PO5,PO6
CO4	Know the functions of x-ray, Computer tomography machines.	PO1,PO2, PO5,PO6
CO5	Understand and analyze Pacemaker, Defibrillator etc in Respiratory Instrumentation and Advanced 3D surgical techniques.	PO1,PO2, PO5,PO6

Text Books :

1. Bio Medical Instrumentation and Measurements , 2/e , 2002, Leslie Cromwell, Fred J.Weibell Erich A.Pfeiffer , Pearson Education , New Delhi.
2. Handbook of Bio Medical instrumentation , 3/e , 2003, R.S.Khandpur, Tata McGraw Hill Publishing Co Ltd , New Delhi.

Reference books:

1. Bio Medical Instrumentation , 3/e, 2003, M.Arumugam Anuradha Agencies, Pune.
2. Principles of Applied Bio-Medical Instrumentation , 1/e, 1975, L.A. Geddes and L.E.Baker, John Wiley & Sons, London.
3. Medical Instrumentation , 1/e, 1995, J.Webster ,John Wiley & Sons, London.
4. Principles of Medical Electronics and Bio medical Instrumentation , 2/e , 2000, C.Rajarao and S.K. Guha, Universities press (India) Ltd, Orient Longman ltd , India.
5. Electronics in Medicine and Bio medical Instrumentation, 1/e, 2006, Nandini.K .Jog, Prentice hall of India Pvt Ltd, New Delhi.

CO-PO Mapping

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

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13ECE 415A RADAR SYSTEMS (Elective II)
Course Educational Objectives:

CEO1: To provide knowledge on
- RADAR working principle
- Fundamentals of RADAR
- Frequencies and Applications
- RADAR Range Equation

CEO2: To analyze the Doppler Effect, CW and Frequency Modulated Radar and understand the concept of FM-CW Radar, FM-CW altimeter, Multiple Frequency CW Radar.
CEO3: To develop the knowledge on MTI and Pulse Doppler radars, delay line canceller filter characteristics, MTI Radar Parameters.
CEO4: To understand the concept of Tracking Radar, its types and Comparison of Tracking RADARs.
CEO5: To analyze the Radar Receivers performance in presence of Noise, and familiarizing the concepts of Duplexers, Beam Steering and Beam Width changes, feeders, displays used in RADAR systems.

UNIT - 1: Basics of Radar and Radar Equation

Introduction - Maximum Unambiguous Range - Simple Form of Radar Equation - Radar Block Diagram and Operation - Radar Frequencies and Applications - Prediction of Range Performance - Minimum Detectable Signal - Receiver Noise - Modified Radar Range Equation – SNR - Envelope Detector - False Alarm Time And Probability - Integration of Radar Pulses - Radar Cross Section of Targets (Simple Targets – Sphere - Cone-Sphere) - Transmitter Power - PRF and Range Ambiguities - System Losses (Qualitative Treatment) - Illustrative Problems.

UNIT - 2: CW and Frequency Modulated Radar

Doppler Effect - CW Radar – Block Diagram - Isolation Between Transmitter and Receiver - Non-Zero IF Receiver - Receiver Bandwidth Requirements - Applications of CW Radar - Illustrative Problems – FM CW Radar - Range and Doppler Measurement - Block Diagram and Characteristics (Approaching/ Receding Targets) – FM CW Altimeter - Multiple Frequency CW Radar.

UNIT - 3: MTI and Pulse Doppler Radar

Introduction – Principle - MTI Radar with Power Amplifier Transmitter and Power Oscillator Transmitter - Delay Line Cancellers – Filter Characteristics - Blind Speeds - Double Cancellation - and Staggered PRFs - Range Gated Doppler Filters - MTI Radar Parameters - Limitations to MTI Performance - MTI versus Pulse Doppler Radar.

UNIT - 4: Tracking Radar

Tracking with Radar - Sequential Lobing - Conical Scan - Monopulse Tracking Radar – Amplitude Comparison Monopulse (One- and Two coordinates) - Phase Comparison Monopulse - Tracking in Range - Acquisition and Scanning Patterns - Comparison of Trackers.

UNIT - 5: Detection of Radar Signals in Noise and Radar Receivers

Introduction - Matched Filter Receiver – Response Characteristics and Derivation - Correlation Function and Cross Correlation Receiver - Efficiency of Non-Matched Filters - Matched Filter With Non-White Noise - Noise Figure and Noise Temperature - Displays – Types - Duplexers – Branch Type and Balanced Type - Circulators as Duplexers – Introduction to Phased Array Antennas – Basic Concepts - Radiation Pattern - Beam Steering and Beam Width Changes - Series Versus Parallel Feeds - Applications - Advantages and Limitations.

Course Outcomes:

On successful completion of the course the student will be able to,		PO MAPPING
CO.1	Demonstrate the knowledge of fundamental concepts and terminology in RADAR, Analyze and design the Radar range through RADAR Range equation in various forms.	PO1, PO2, PO3
CO.2	Apply the Doppler Effect concept in CW RADAR and FM CW RADAR.	PO1, PO2
CO.3	Demonstrate knowledge on operation of MTI and pulse Doppler radar and analyze the delay line canceller filter characteristics	PO1, PO2
CO.4	Understand the RADAR concept to tracking radar systems and comparing different RADAR Trackers.	PO1, PO2
CO.5	Analyze RADAR signal reception in presence of NOISE and understand the Receiver concepts	PO1, PO2, PO3

Text Books:

1. Introduction to Radar Systems, 2 /e, 2007, Merrill I. Skolnik, Tata McGraw Hill. New Delhi.
2. Introduction to Radar Systems, 3 /e, 2001, Merrill I. Skolnik, Tata McGraw Hill. New Delhi.

Reference Books:

1. Understanding Radar Systems, 1992, Simon Kigsley, Tata McGraw Hill, UK.
2. Radar Principals, Technology, Applications, 2004, Byron Edde, Pearson Education, New Delhi.
3. Radar Principles, 1998, Peyton Z. Peebles, John Wiley & Sons, NewYork.
4. Radar Systems, 1/e, 2008, V.S. Bagad, Technical Publications, Pune.
5. Microwave and Radar Engineering, 2003, M. Kulakarni, Umesh Publications.

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
CO.1	3	3	2	-	-	-	-	-	-	-	-	-
CO.2	3	2	-	-	-	-	-	-	-	-	-	-
CO.3	3	2	-	-	-	-	-	-	-	-	-	-
CO.4	3	1	-	-	-	-	-	-	-	-	-	-
CO.5	3	2	2	-	-	-	-	-	-	-	-	-
CO	3	2	2	-	-	-	-	-	-	-	-	-

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13ECE 415B MODERN DIGITAL COMMUNICATION TECHNIQUES (Elective II)

Course Educational Objectives:

CEO1: To provide overview & concept on fundamental signal processing and analysis of linear systems.

CEO2: To understand the communication system techniques from end-to-end, i.e., from sampling to switching and error analysis

CEO3: To develop skills on working of spread spectrum modulations system & analysis with their properties

CEO4: To know the generations of spread spectrum signals and calculate energy and bandwidth.

CEO5: To develop skills on spread spectrum receivers and applications to communication systems.

UNIT – 1: Fundamentals of Signal Processing

Linear System Analysis - Impulse Response - Transfer Functions and their Relations - Time Domain and Frequency Domain Analysis of Linear Systems with Random Inputs - System and Signal Bandwidth - Optimum Filtering - Wiener Filters - Matched Filters.

Characterization of Communication Signals and Systems: Representation of Band Pass Signals and Systems - Signal Space Representation - Representation of Digitally Modulated Signals.

UNIT - 2: Digital Modulation Techniques

Factors that Influencing Digital Modulation Techniques - Linear Modulation Techniques – BPSK – DPSK - QPSK - OQPSK - ∏/4 QPSK - Constant Envelope Modulation Techniques - MSK - GMSK - Linear and Constant Envelope Modulation Techniques – M ary PSK M ary QAM.

UNIT - 3: Fundamentals of Spread Spectrum

General Concepts - Types Of Spread Spectrum Signals - Analysis of Direct Sequence - Frequency Hopping - Time Hopping and Comparisions.

Analysis of Direct Sequence Spread Spectrum Systems: Properties of PN Sequences - Classes of Periodic Sequences - Properties of M – Sequences - Partial Co relation - Spreading & Dispreading of PN Signals.

UNIT - 4: Generation of Spread Spectrum Signals

Interference Rejection - Output Signal to Noise Ratio - Antijam Characteristics - Energy and Bandwidth Efficiency. Shift Register Sequence Generators - Discrete Frequency Synthesizers - Generation of Gold Sequences and their Correlation Properties - Generation of OVSF Codes and their Properties.

UNIT - 5: Synchronization of Spread Spectrum Systems

Coherent Direct - Sequence Receivers - Carrier Tracking - Coherent & Non Coherent - Delay -Lock Loop Analysis - Tau -Dither Loop - Acquisition of Spread Spectrum Signals and Matched Filters for PN Sequences - Applications of Spread Spectrum Signals to Communications.

Course Outcomes:

On successful completion of the course the student will be able to		POs related to COs
CO1	Demonstrate k**nowledge** on fundamentals of signal processing, **analyze** the linear systems in time & frequency domain and **design** wiener filters & matched filters	**PO1, PO2, PO3.**
CO2	Develop skills on M-ary modulations techniques from end-to-end, from sampling to switching and understand error **analysis**	**PO1, PO4.**
CO3	Demonstrate **knowledge** on working of spread spectrum modulations system and **analyze** their properties of different classes of periodic sequences.	**PO1, PO2.**
CO4	Understand the generations of spread spectrum signals and **calculate/formulate** SNR, energy and bandwidth for different codes such as gold codes, OVSF codes with their properties	**PO1, PO3.**
CO5	Develop skills on spread spectrum receivers, **design** a receiver to meet out the required Noise performance and applications which are used **modern** communication systems	**PO1, PO3, PO5.**

Text Books:

1.Modern Communications and Spread Spectrum , 1/e, 1986, George R. Cooper & Clare D. Mcgillem, Mcgraw Hill, New Delhi.
2.Digital Communications , 4/e, 2012 , John G. Proakis, Tata Mcgraw Hill. New Delhi.

Reference Books:

1.Wireless Digital Communications, Modulation & Spread Spectrum Applications, 1/e , 1999 , Dr.Kamilo Feher, PHI, New Delhi.
2.Digital Communication , Fundamentals and Applications, 2/e, 2002, Bernard Sklar, Pearson Education, Noida.
3.Wireless Communications, 2/e, 2002, Theodore S.Rappaport, Pearson Education , New Delhi.
4.Communication System Engineering , 1/e , 2002 , Proakis , Salehi, Prentice Hall Publications , New Delhi.
5.Digital Communications, 3/e, 1995, John G. Proakis, Tata Mcgraw Hill, New Delhi.

CO-PO Mapping

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

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	4	**-**	**3**

13ECE 415C DSP PROCESSORS AND ARCHITECTURES (Elective-II)

Course Educational Objectives:

CEO1: To provide knowledge on
- Sampling process
- Discrete time sequences
- D/A conversion errors
- Multi-rate signal processing

CEO2: To develop skill to analyze data addressing capabilities, Addressing modes of the TMS320 processors.
CEO3: To develop skill to design IIR filters, FIR filters, Multi-rate systems
CEO4: To inculcate skill to investigate the effect of memory space organization, programmed I/O.
CEO5: To provide knowledge on the basics of Synchronous interface and Biotelemetry system.

UNIT-1: Review of Digital Signal Processing

The Sampling Process - Discrte Time Sequences - Discrete Fourier Transform and FFT - Linear Time – Invariant Systems - Digital Filters - Decimation and Interpolation - Analysys and Design Tool for DSP Systems.

Computational Accuracy in DSP Implementations: Number Formats for Signals and Coefficients in DSP Systems - Dynamic Range and Precision - Sources of Error in DSP Implementations - A/D Conversion Errors - DSP Computational Errors - D/A Conversion Errors - Compensating Filter.

UNIT-2: Architectures for Programmable DSP Devices

Basic Architectural Features - DSP Computational Building Blocks - Bus Architecture and Memory - Data Addressing Capabilities - Address Generation Unit - Programmability and Program Execution- Speed issues- Features for external interfacing.
Programmable Digital Signal Processors: Introduction - Commercial Digital Signal Processing Devices -The Architecture of TMS320C54xx Digital Signal Processors - Addressing Modes of the TMS320C54xx Processors - Memory Spaces of TMS320C54xx Processors - Program Control - TMS320C54xx Instructions and Programming – On Chip Peripherals – Interrupts - Pipeline Operation of the TMS320C54xx Processors.

UNIT-3: Implementation of Basic DSP Algorithms

Introduction - The Q-notation - FIR Filters - IIR Filters - Interpolation Filters - Decimation Filters - PID Controller - Adaptive Filters - 2D Signal Processing.
Implemenation of FFT Algortihms: Introduction - FFT Algorithm for DFT Computation - Butterfly Computation - Overflow and Scaling - Bit-Reversed Index Generation - An 8-point FFT Implementation of TMS320C54xx - Computation of Signal Spectrum.

UNIT-4: Interfacing Memory And Parallel IO Peripherals

Introduction - Memory Space Organization of the TMS320C54xx Devices - Memory and I/O Signals of the TMS320C54xx Devices - Memory Interface - Parallel I/O - Programmed I/O - Interrupts and I/O - Direct Memory Access (DMA).

UNIT-5: Interfacing Serial Converters to a Programmable DSP Device

Introduction - Synchronous Serial Interface between the DSP and an AIC- A Multi-channel Buffered Serial Port (McBSP) - The McBSP Programming -A CODEC Interface Circuit -CODEC Programming - A CODEC - DSP Interface.

Example Applications: Introduction - DSP System - DSP Based Biotelemetry System - A Speech Processing System - An Image Processing System - A Position Control System for a Hard Disk Drive - DSP Based Power Meter.

Course Outcomes:

On successful completion of the course the student will be able to		**POs related to COs**
CO1	Demonstrate knowledge on fundamentals of discrete time sequences	**PO1,pO2**
CO2	Analyze data addressing capabilities, Addressing modes of the TMS320 processors.	**PO1,PO2,PO4**
CO3	Analyze the behavior of IIR filters, FIR filters, Multi-rate systems	**PO1, PO2, PO4.**
CO4	Analyze the memory space organization, programmed I/O	**PO1, PO2**
CO5	Demonstrate knowledge on signal converters and programmable DSP device.	**PO1, PO2**

Text Books:

1. Digital Signal Processing, 2/e, 2006, Avtar Singh and S.Srinivasan, Thompson Publications, Banglore.
2. DSP Processor Fundamentals Archtecture & Features, 2000, Lapsley et al, Wiely India, Delhi.

Reference Books:

1. Digital Signal Processors Archtecture,programming and applications, 2/e, 2004, B.Venkata ramani and M.Bhaskar, TMH, Delhi
2. Architecture for Digital Signal Processing, 1/e, 1998, Peter Pirsch, John Wiley, New York, USA.
3. Real-Time Digital Signal Processing, Implementations and Applications, 3/e, 2013, Sen M. Kuo, Bob H. Lee, Wenshun Tian, John Wiley & Sons, Noida.
4. Digital Signal Processing with C6713 and C6416 DSK, 2/e, 2008, Rulph Chassaing, John Wiley Publications, New Jersy, Canada.
5. Digital Signal Processors,Architectures, Implementations and Applications, 1/e, 2005, Sen M. Kuo, Woon-Seng Gen, Pearson Education, Delhi.

CO-PO Mapping

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

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IV Year B.Tech I semester	**L**	**P**	**C**
	-	**3**	**2**

13ECE 416 MICROWAVE AND OPTICAL COMMUNICATION LAB

Course Educational Objectives:

CEO1: To conduct the experiment on Reflex Klystron characteristics.

CEO2: To perform the different experiments on klystron Microwave Bench.

CEO3: Demonstrate the Gunn Diode characteristics.

CEO4: Ability to perform the Optical experiments to gain the knowledge on Optical fiber Communications.

Minimum twelve experiments to be conducted

Part-A

1. Reflex Klystron Characteristcs.
2. Gunn Diode Characteristics
3. Measurement of Waveguide Parameters.
4. Study of Waveguide Attenuator.
5. Study of Circulator/Isolator.
6. Study of Directional Coupler and Extraction Of S-Parameter.
7. Study of E-Plane, H-Plane & Magic Tee. Extraction of S-Parameter.
8. Field Intensity Measurement of A Horn Antenna.

Part-B

1. Characteristics of LED
2. Measurement of Numerical Aperture
3. Characteristics of LASER Diode
4. Intensity Modulation of LASER Output Through an Optical Fiber
5. Measurement of Data Rate for Digital Optical Link
6. Measurement of Losses for Analog Optical Link

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

Course Outcomes		POs related to COs
CO1	Demonstrate knowledge on MICROWAVE BENCH and GUNN setup.	PO1
CO2	Analyze the modes from Reflex Klystron Characteristics Gunn diode characteristics, waveguide parameters, Insertion loss, Isolation and fixed attenuators, Directional coupler, Magic TEE.	PO2
CO3	Follow ethical principles in analyzing the different microwave components and optical parameters.	PO8
CO4	Do experiments effectively as an individual and as a member in a group.	PO9
CO5	Communicate verbally and in written form, the understandings about the experiments.	PO10
CO6	Continue updating their skill related to Optical and Microwave communications in various applications during their life time.	PO12

CO-PO Mapping

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	**3**	-	-	-	-	-	-	-	-	-	-	-
CO2	-	**3**	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	-	-	-	**3**	-	-	-	-
CO4	-	-	-	-	-	-	-	-	**3**	-	-	-
CO5	-	-	-	-	-	-	-	-	-	**3**	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	**3**

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IV Year B.Tech I semester	**L**	**P**	**C**
	-	**3**	**2**

13ECE 417 DIGITAL SIGNAL PROCESSING AND IMAGE PROCESSING LAB

Course Educational Objectives:

CEO1: Gain the knowledge on MATLAB tool and architecture of DSP chips – TMS 320C 5X/6X Instructions

CEO2: To analyze the linear and circular convolution and sampling of input signals.

CEO3: To design FIR and IIR filter and implement on DSP Hardware.

CEO4: To analyze the frequency response of low and high pass filters

CEO5: To analyze and perform the image smoothening and sharpening

1. To Study the Architecture of DSP Chips – TMS 320C 5X/6X Instructions.
   Introduction To MATLAB.
2. To Verify Linear and Circular Convolution.
3. Sampling of Input Signal And Display.
4. To Design FIR Filter (LP & HP) Using The Windowing Technique on DSP Hardware.
   A) Rectangular Window
   B) Triangular Window
   C) Kaiser Window
5. To Implement IIR Filter (LP/HP) on DSP Hardware.
6. Sampling and Effect of Aliasing.
7. MATLAB Program to Generate Continuous and Discrete Signal and Sum of Sinusoids.
8. MATLAB Program to find the Frequency Response of Analog LP/HP Filters.
9. FFT Algorithm and Compute FFT of a Signal
10. Spectrum Analysis using FFT.
11. Image Smoothening in Spatial and Frequency Domain
12. Image Sharpening in Spatial and Frequency Domain.

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

Course Outcomes		POs related to COs
CO1	Demonstrate knowledge on programming in MATLAB and CCS for signal and image related applications.	PO1
CO2	Analyze frequency and spatial representation of signals and images under various operational conditions.	PO2
CO3	Design and develop algorithms for implementation of filters (FIR, IIR) and sampling of signals .	PO3
CO4	Select appropriate programming tool for implementation of image and signal.	PO5
CO5	Follow ethical principles in designing, simulating of MATLAB tool and CCS.	PO8
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	Continue updating their skill related to MATLAB tool and CCS.	PO12

CO-PO Mapping

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	3	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	3	-	-	-	-
CO6	-	-	-	-	-	-	-	-	3	-	-	-
CO7	-	-	-	-	-	-	-	-	-	3	-	-
CO8	-	-	-	-	-	-		-	-	-	-	3

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B.Tech IV-I Semester	**L**	**P**	**C**
	2	**-**	**3**

13ECE 418 PROJECT SEMINAR

Course Educational Objectives:

CEO1: To develop the ability to solve a technical problem for betterment of the society and Industry

CEO2: The main objective of the project seminar is for the students to learn and experience all issues related to the society.

The aim of the project seminar work is to address the issues and principles of a societal and industrial problems and present it as a seminar or papser presentation to the subject experts such as external and internal examiners constituted by the Head of the Department. A project seminar report has to be prepared and presented to their guides.

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 seminar topic	PO1
CO2	Identify, analyze and formulate complex problem chosen for project seminar to attain substantiated conclusions.	PO2
CO3	Design solutions to the chosen project problem.	PO3
CO4	Undertake investigation of problem to provide valid conclusions	PO4
CO5	Use the appropriate techniques, resources and modern engineering tools necessary for project seminar.	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 seminar.	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 seminar. report.	PO10
CO11	Demonstrate knowledge and understanding of cost and time analysis required for carrying out the project seminar.	PO11
CO12	Engage in lifelong learning to improve knowledge and competence in the chosen area of the project seminar	PO12

CO-PO MAPPING

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

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13ECE 421 MOBILE COMMUNICATION AND NETWOKS

Course Educational objectives:
CEO1: To provide knowledge on Basics of Cellualr concepts, interference and data serives
CEO2: To Analyze the wireless network architecute and its operation.
CEO3: To develop skill to understand the types of antennas and their functions
CEO4: To understand the basics of multiple access techniques and WLAN technology.
CEO5: To understand the concepts of Bluetooth and L2CAP Protocol.

UNIT – 1: Introduction

Cellular concepts - Frequency reuse - Interference & System Capacity - Trunked Radio System - History and Evolution Different Generations of Wireless Cellular Networks. Difference between wireless and Fixed Telephone Networks - Development of Wireless Networks - Traffic Routing in Wireless Networks - Wireless Data Services: ISDN - BISDN - ATM - CDPD - and SS7.

UNIT – 2: Wireless Network Architecture and Operation

Cell fundamentals - Handoff stratagies & Types - Capacity Expansion Techniques - Cellular Backbone Networks - Mobility Management - Radio resources and Power management -Wireless Network Security.

UNIT – 3: Cell Site And Mobile Antennas:

Sum & Difference Patterns and their Synthesis - Omni Directional Antennas - Directional Antennas for Interference Reduction - Space Diversity Antennas - Umbrella Pattern Antennas - Minimum Separation of Cell Site Antennas - High Gain Antennas.

Channel Assignment - Digital Cellular Networks:

Numbering and Grouping - Setup Access and Paging Channels Channel Assignments to Cell Sites and Mobile Units - Channel Sharing and Borrowing - Overlaid Cells - Non Fixed Channel Assignment.

UNIT – 4: Global System for Mobile
GSM - TDMA - CDMA Techniques - System Overview - Network and System Architecture - Concepts - Identifiers - Mobile IP Operation of Mobile IP - Address - Registration - Tunneling - WAP Architecture - Overview - WML Scripts - WAP Service - WAP Session Protocol - Wireless Transaction - Wireless Datagram Protocol.
Wireless LAN Technology: Infrared LANs - Spread spectrum LANs - Narrow Bank Microwave LANs - IEEE 802 Protocol Architecture - IEEE 802 Architecture and Services - 802.11 Medium Access Control - 802.11 Physical Layer.

UNIT – 5: Blue Tooth & Modulation Techniques:
Overview - Radio specificatioWn - Base band specification - Links manager specification - Logical link control and adaptation protocol. Introduction to WLL Technology.
Wireless Modulation techniques and Hardware - Characteristics of air interface - Path loss models - wireless coding techniques - Digital modulation techniques - OFDM - UWB radio techniques - Diversity techniques - Typical GSM Hardware.

Course Outcomes:

On successful completion of the course the student will be able to		POs related to COs
CO1	Demonstrate knowledge on History and Evolution Different generations of wireless cellular networks and cellular concepts.	**PO1,pO2**
CO2	Analyze the cellular Handoff strategies & types, Capacity expansion techniques and wireless networks.	**PO1,PO2**
CO3	Investigate and analyze the Sum and difference patterns and their synthesis for different antenna patterns and channel assignments.	**PO1, PO2, PO3,PO4.**
CO4	Investigate and analyze Wireless LAN Technology and GSM,TDMA,CDMA,WAP etc.	**PO1, PO2**
CO5	Demonstrate knowledge on WLL Technology Wireless Modulation techniques and Hardware, Characteristics of air interface, Path loss models, wireless coding techniques, Digital modulation techniques.	**PO1, PO2**

Text Books:

1. Wireless Telecom Systems and networks, 2/e, 2006, Mullet - Thomson Learning Pvt Ltd, New Delhi .
2. Wireless Communications, Principles – Practice, 2/e, 2002, Theodore S. Rappaport, Prentice Hall India.

Reference Books:

1. Mobile Cellular Telecommunication, 2/e, 2009, Lee W.C.Y, McGrawHill, Noida.
2. Wireless communication, 2/e, 2007, D P Agrawal, Thomson learning .
3. MIMO-OFDM for LTE - Wi-Fi and WiMAX Coherent versus Non-coherent and Cooperative Turbo-transceivers: Prof. Lajos Hanzo - Dr. Yosef (Jos) Akhtman and Dr. Li Wang.
4. Wireless Communication & Networks, 1/e, 2007, Vijay K. Garg, Morgan Kautmann Pubhlisher, San Francisa.
5. Modern Wireless Communications, 2/e, 2004, Simon Haykin and Michael, Pearson Education, New Delhi.

CO-PO Mapping

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-
CO3	3	2	2	2	-	-	-	-	-	-	-	-
CO4	3	3	-	-	-	-	-	-	-		-	-
CO5	3	2	-	-	-	-	-	-	-	-	-	-
CO*	3	2.4	2	2	-	-	-	-	-	-	-	-

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13ECE 422A SATELLITE COMMUNICATIONS (Elective III)

Course Educational Objectives:

CEO1: To provide knowledge on principles of Satellite Communication and Orbital Mechanics
CEO2: To develop skill to analyze the space segment components of satellite
CEO3: To acquire knowledge for analysis and preparation of Link Budget for a specified C/N ratio.
CEO4: To be able to develop the skills, analyze and design earth station antennas and equipments
CEO5: To understand the concept of satellite navigation and GPS system principles

UNIT – 1: Overview of Satellite Systems

Introduction- Basic concepts of Satellite communications - Frequency allocations for satellite systems. Advantages and applications of satellite communications over other communications
Orbital Aspects of Satellite Communications: Orbitals – Mechanics - Look Angle Determination - Orbit Perturbations - Orbital Determination - Launches and Launch Vehicles - Orbital Effects in Communication Systems Performance.

UNIT – 2: The Space Segment

Introduction - Spacecraft Subsystems - Attitude and Orbit Control Systems – Telemetry - Tracking and Command - Power Systems - Communication Subsystems.

UNIT – 3: Satellite Link Design

Basic Transmission Theory - System Noise Temperature and G/T Ratio - Design of Down Links - Up Link Design - Design of Satellite Link for Specified C/N.

UNIT – 4: Earth Station Technology

Earth Station Design - Design of Large Antennas – Tracking - Small Earth Station Antennas - Equipment for Earth Stations.

UNIT – 5: Satellite Applications

INTELSAT Series – INSAT – VSAT - Non Geostationary Satellites - Mobile Satellite Services: GSM – GPS – INMARSAT – LEO – MEO - Satellite Navigational System. Direct Broadcast Satellites (DBS) - Direct to Home Broadcast (DTH) - Digital audio broadcast (DAB) - World Space Services - Business TV(BTV) – GRAMSAT - Specialized services – E mail - Video conferencing - Internet.

Course Outcomes:

On successful completion of the course the student will be able to		POs related to COs
CO1	Demonstrate knowledge on basic concepts in satellite communication and application over other communication systems. Discuss the orbital mechanics and launch methodologies	PO1,PO2
CO2	Demonstrate knowledge on various space subsystems and explain the different subsystems of earth segment.	PO1,PO2
CO3	Demonstrate knowledge on basic transmission theory, system noise temperature. Design of down links and up links for satellite communication.	PO1,PO2,PO3
CO4	Design and development of large antennas and tracking the small earth station Antennas for communication.	PO1,PO2,PO3
CO5	Demonstrate knowledge on various satellite applications and explain some of its uses in real time.	PO1,PO2,PO5

Text books:

1. Satellite Communications , 2/e, 2006, Timothy Pratt, Charles Bostian, JeremyAllnutt, John willey, New Delhi.
2. Satellite Communications , 4/e, 2001, Dr D.C. Agrwal, Khanna Publications, Delhi.

Reference books:

1. Satellite Communication Systems Engineering , 2/e, 2003, W. L. Pritchard, H. G. Suyderhoud and R. A. Nelson , Pearson, New Delhi.
2. Satellite Communications , 3/e, 2001, Dennis Roddy, Mc Graw Hill, Noida.
3. Satellite Communications, 1/e, 2000, Robert M Gagliardi, CBS, New Delhi.
4. Fundamentals of Satellite Communication, 1/e, 2006, K N Raja Rao, Prentice-Hall of india, New Delhi.
5. Satellite Communications, 1/e, 2009, V S Bagad, Technical Publications, Pune.

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
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	3	3	-	-	-	-	-	-	-	-	-	-
CO.3	2	2	3	-	-	-	-	-	-	-	-	-
CO.4	2	2	3	-	-	-	-	-	-	-	-	-
CO.5	3	2	-	-	3	-	-	-	-	-	-	-
CO	2.6	2.4	3	-	3	-	-	-	-	-	-	-

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13ECE 422B INFORMATION CODING AND TECHNIQUES (Elective III)

Course Educational Objectives:

CEO1: To provide knowledge on Entropy and Mutual Information.
CEO2: To develop skill to analyze the Optima codes, Huffman codes and channel capacity
CEO3: To acquire knowledge on conditional entropy and mutual information.
CEO4: To be able to develop the skills regarding block codes and Turbo codes
CEO5: To understand the concept of convolutional codes and decoding algorithms.

UNIT – 1: Information

Entropy: Memory less sources - Markov sources - Entropy of a discrete Random variable – Joint - Conditional and relative entropy - Mutual Information and Conditional Mutual information. Chain relation for entropy- relative entropy and Mutual Information.

UNIT - 2: Loss less Source Coding

Uniquely decodable codes - Instantaneous codes - Kraft's inequality - Optimal codes - Huffman code - Shannon's Source Coding Theorem. Asymptotic Equipartition Property (AEP) - High probability sets and typical sets - Method of typical sequence as a combinatorial approach for bounding error probabilities.Channel Capacity- Capacity computation for some simple channels

UNIT – 3: Coding Theorems

Arimoto - Blahut algorithm - Fano's inequality - Proof of Shannon's Channel Coding Theorem and its converse. Differential Entropy - Joint- relative and Conditional differential entropy - Mutual information.Mutual information and Capacity calculation for Band limited Gaussian channels - Shannon limit - Parallel Gaussian Channels - Capacity of channels with colored Gaussian noise.

UNIT – 4: Channel Coding-1

Linear Block Codes – Error Detecting and Correcting Capability - Cyclic Codes – Well -Known Block Codes. Reed Solomon Codes - Interleaving and Concatenated Codes - Coding and Interleaving Applied to the Compact Disc Digital Audio System - Turbo Codes.

UNIT – 5: Channel Coding-2

Convolutional Encoding - Convolutional Encoder Representation - Formulation of the Convolutional Decoding Problem - Properties of Convolutional Codes - Other Convolutional Decoding Algorithms.

Course Outcomes:

On successful completion of the course the student will be able to		POs related to COs
CO1	Demonstrate knowledge on basic concepts of Entropy and Mutual Information	PO1,PO2
CO2	Demonstrate knowledge on lossless source coding and computational capacity	PO1,PO2
CO3	Demonstrate knowledge on basic of Shannon's Channel Coding Theorem and Differential Entropy .	PO1,PO2
CO4	Demonstrate knowledge on Linear Block codes, Error detection and correction and Turbo codes.	PO1,PO2
CO5	Demonstrate knowledge on convolutional encoding and decoding.	PO1,PO2

Text Books:

1.Digital Communications:Fundamentals and Application, 2/e, 2007, Bernard sklar, Pearson Edition, New delhi.
2.The Theory of Information & Coding, 2/e, 1977, R. J. McEliece, Addison Wesley Publishing Co.

References Books:

1. Special Issue on Rate Distortion Theory, IEEE Signal Processing Magazine, November 1998.
2. Elements of Information Theory, 2/e, 2006, S.Thomas M. Cover and Joy A. Thomas, John Wiley & Sons, New delhi.
3. Information Theory - Inference and Learning Algorithms, 2/e, 2003, David J. C. MacKay, Cambridge University Press.
4. Communication Systems**:** Analog and Digital Communication, 1/e, 1995, R.P.Singh and S.D Sapre, McGraw Hill, Noida.
5. Rate Distortion Theory A Mathematical Basis for Data Compression, 2/e, 2007, T. Bergu, PH Inc, 1971.

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
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	3	3	-	-	-	-	-	-	-	-	-	-
CO.3	2	2	-	-	-	-	-	-	-	-	-	-
CO.4	2	2	-	-	-	-	-	-	-	-	-	-
CO.5	3	2	-	-	-	-	-	-	-	-	-	-
CO	2.6	2.4	-	-	-	-	-	-	-	-	-	-

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13ECE 422C IMAGE & VIDEO PROCESSING (Elective III)

Course Educational Objectives:

CEO1: To develop knowledge on baics of sampling and Image transforms.
CEO2: To provide the knowledge of image Enhancement and Filtering applications
CEO3: To understand the Image restoration techniques and Segmentation methods
CEO4: To inculcate skills to understand the image compression procedures and coding algorithms.
CEO5: To develop skills to understand the concepts of digital video and video compression standards

UNIT - I: Image Representation

Gray scale and color Images - image sampling and quantization. Two dimensional orthogonal transforms: DFT – WHT - Haar transform – KLT - DCT.

UNIT - II: Image Enhancement

Filters in spatial and frequency domains – Histogram based processing - Homomorphic filtering. Edge detection - Non parametric and model based approaches - LOG filters - Localization problem.

UNIT - III: Image Restoration

Degradation Models – PSF - Circulant and block - Circulant matrices- Deconvolution- Restoration using inverse filtering - Wiener filtering and maximum entropy - Based methods.
Image Segmentation: Pixel classification - Bi-level Thresholding - Multi-level Thresholding - P-tile method - Adaptive Thresholding - Spectral & spatial classification - Edge detection - Hough transform - Region growing.

UNIT - IV: Fundamental Concepts of Image Compression

Compression models - Information theoretic perspective- Fundamental coding theorem.
Lossless Compression: Huffman Coding - Arithmetic coding - Bit plane coding - Run length coding - Lossy compression: Transform coding - Image compression standards.

UNIT - V: Video Processing

Representation of Digital Video – Spatio temporal sampling - Motion Estimation.Video Filtering - Video Compression - Video coding standards.

Course Outcomes:

On successful completion of the course the student will be able to		POs related to COs
CO1	Demonstrate knowledge on fundamentals of a digital image processing and various transforms.	PO1,PO2
CO2	Develop an appropriate techniques to analyze image enhancement in spatial and frequency domain.	PO1,PO2,PO3
CO3	. Design filter for restoring the information from the degraded image. Application of the pre-defined filter for segmentation and boundary representation.	PO1,PO2,PO3
CO4	Illustrate various compression techniques, apply and analyze the concepts of color image processing.	PO1,PO2,PO3
CO5	Demonstrate knowledge on digital video and video compression standards	PO1,PO2,PO3,PO4

Text Books:

1.Digital Image Processing, 2/e, 2002, R. C. Gonzalez, R. E. Woods, Pearson Education, NewDelhi.
2. Digital Video Processing, 2/e, 1995, A. M. Tekalp, Prentice Hall, NewDelhi

Reference Books:

1. Digital image processing, 1/e, 1989, W. K. Pratt, Prentice Hall, NewDelhi
2. Digital Image Processing , Vols. 1 and 2, 1986, A. Rosenfold and A. C. Kak, Prentice Hall, NewDelhi
3. Digital Image Restoration, 2/e, 1977, H. C. Andrew and B. R. Hunt, Prentice Hall, NewDelhi
4. Machine Vision , International Edition, 1995, R. Jain, R. Kasturi and B.G. Schunck, McGrawHill, NewDelhi
5. Handbook of Image & Video Processing, 2000, A. Bovik, Academic Press.

CO-PO Mapping

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	2	3	-	-	-	-	-	-	-	-	-
CO3	2	3	3	-	-	-	-	-	-	-	-	-
CO4	3	3	3	-	-	-	-	-	-	-	-	-
CO5	3	2	2	2	-	-	-	-	-	-	-	-
CO*	2.8	2.4	2.75	2	-	-	-	-	-	-	-	-

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13ECE 423A DIGITAL DESIGN THROUGH VERILOG HDL (Elective IV)

Course Objectives:

CEO1: The course intends to provide an overview of the principles, language constructs and programming fundamentals of Verilog HDL.
CEO2: To design the digital systems using Gate level, Data flow and Switch level modeling styles.
CEO3: To design the digital systems using Gate level, Data flow and Behavioral modeling styles.
CEO4: To understand the concepts of Switch level modeling and User Defined Primitives.
CEO5: To get the knowledge on Task, Functions, Compiler Directives and Delay models.

UNIT - 1: Introduction to Verilog with Programmable ICs

Overview of Verilog - Digital Design Methodology with Verilog HDL - Lexical Conventions - Data Types – Parameters - Operands & Operators - System tasks and Compiler Directives.
Programmable IC Technology: FPGA - Look Up Tables (LUT) - Partitioning a circuit among LUT - Programmable Interconnects(Switch Matrices) - Configurable Logic Block (CLB) - Programming an FPGA - IC Technology comparison.

UNIT - 2: Gate Level & Behavioural Modelling

Introduction - AND Gate Primitive - Other Gate Primitives - Illustrative Examples – Tri State Gates - Array of Instances of Primitives - Design of Flip flops with Gate Primitives – Delays - Strengths and Contention Resolution - Net Types - Design of Basic Circuits - Exercises.
Behavioral Modeling: Introduction - Operations and Assignments - Functional Bifurcation - Initial Construct - Always Construct – Examples - Assignments with Delays - Wait construct - Multiple Always Blocks. Designs at Behavioral Level - Blocking and Non blocking Assignments. case- If-Assign- Repeat – For loop – Disable – While – Forever - Constructs. Parallel blocks – Force -Release Construct - Event.

UNIT - 3: Dataflow & Swith Level Modelling

Data Flow Level & Switch Level Modeling: Introduction - Continuous Assignment Structures - Delays and Continuous Assignments - Assignment to Vectors - Operators.
Switch Level Modeling: Introduction - Basic Transistor Switches - CMOS Switch - Bi-directional Gates - Time Delays with Switch Primitives - Instantiations with Strengths and Delays - Strength Contention with Trireg Nets - Exercises.
User-Defined Primitives (UDP): Defining a UDP - Combinational UDP - Sequential UDP - Examples

UNIT - 4: System Task Functions and Compiler Directives

Differences between Tasks & Functions - Disable Statements - Named Events - Hierarchical path name - Timing and Delays: Types of Delay models - Path delay modeling - Compiler Directives.

UNIT - 5: Verilog Models

Serial Adder - Moore & Mealy machines for Sequence Detector - Static RAM Memory - A simplified 486 Bus Model - Interfacing Memory to a Micro Processor Bus.

Course Outcomes:

On successful completion of the course the student will be able to		POs related to COs
CO1	Demonstrate Knowledge on Verilog HDL and analyze the language constructs to write HDL programs through various levels of abstraction.	PO1, PO2
CO2	Analyze and Design the combinational and sequential systems using gate level primitives and dataflow modeling.	PO1, PO2, PO3,PO4 PO5
CO3	Analyze and Design the combinational and sequential systems using high level of abstraction like behavioral modeling.	PO1, PO2, PO3, PO4, PO5
CO4	Create and use UDPs as well as switch level modeling in designing digital systems. Distinguigh UDPs with switch level.	PO1, PO2, PO3, PO4, PO5
CO5	Demonstrate knowledge on Task, Functions, Compiler Directives and use them in designing digital systems using Verilog HDL. Differentiate the task and functions.	PO1, PO2, PO3, PO4, PO5

Text Books:

1.Verilog HDL , 2/e, 2003, Samir Palnitkar, Pearson Education, NewDelhi.
2.A Verilog Primer , 3/e, 2003, J.Bhaskar, BS Publications, Hyderabad.

References Books:

1. Digital Design, 2/e, 2011, Frank Vahid, John Wiely, NewDelhi.
2. Fundamentals of Logic Design with Verilog, 2/e, 2005, Stephen.Brown and Zvonko Vranesic, Tata McGraw Hill - NewDelhi.
3. Verilog Digital System Design, 2/e, 2006, Zainalabedin Navabi, Tata McGraw Hill, Noida
4. Modeling Synthesis and Rapid Prototyping with the Verilog HDL, 2/e, 1999, M.D.Ciletti, Prentice-Hall, Newjersey - USA (Indian Edition).
5. Digital System Design with SystemVerilog, 1/e, 2010, Mark Zowilski, Pearson Education, NewDelhi

CO-PO Mapping

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	2	3	3	2	2	-	-	-	-	-	-	-
CO3	2	2	3	2	2	-	-	-	-	-	-	-
CO4	3	2	3	2	2	-	-	-	-	-	-	-
CO5	2	2	2	3	3	-	-	-	-	-	-	-
CO*	2.4	2.2	2.75	2.25	2.25	-	-	-	-	-	-	-

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13ECE 423B ARTIFICIAL NEURAL NETWORKS (Elective IV)

Course Educational Objectives:

CEO1: To provide in depth knowledge on the artificial neural networks and their applications in different fields.

CEO2: To acquire knowledge on different networks and training algoirthms

CEO3: To explain the working of MRI algorithm and counter propogation network

CEO4: To understand the concept of continuous and discrete hopfields networks

CEO5: To apply Neural networks to practical problems and to find solutions

UNIT - 1 : Introduction To Artificial Neural Networks

Introduction - Artificial Neural Networks - Historical Development of Neural Networks - Biological Neural Networks - Comparison Between Brain and the Computer - Comparison Between Artificial and Biological Neural Networks - Network Architecture - Setting the Weights - Activation Functions - Learning Methods.

Fundamental Models: Introduction - McCulloch – Pitts Neuron Model - Architecture - Learning Rules - Hebbian Learning Rule - Perceptron Learning Rule - Delta Learning Rule (Widrow-Hoff Rule or Leastmean Squre (LMS) rule - Competitive Learning Rule - Out Star Learning Rule - Boltzmann Learning - Memory Based Learning.

UNIT - 2: Feed Forward Networks

Introduction - Single Layer Perceptron Architecture - Algorithm - Application Procedure - Perception Algorithm for Several Output Classes - Perceptron Convergence Theorem - Brief Introduction to Multilayer Perceptron networks - Back Propagation Network (BPN) - Generalized Delta Learning Rule - Back Propagation rule - Architecture - Training Algorithm - Selection of Parameters - Learning in Back Propagation - Application Algorithm - Local Minima and Global Minima - Merits and Demerits of Back Propagation Network - Applications - Radial Basis Function Network (RBFN) - Architecture - Training Algorithm for an RBFN with Fixed Centers.

UNIT - 3: Adaline and Madaline Networks Introduction –

Adaline Architecture - Algorithm - Applications - Madaline - Architecture - MRI Algorithm - MRII Algorithm.

Counter Propagation Networks: Winner Take – all learning - Out star learning - Kohonen Self organizing network - Grossberg layer Network - Full Counter Propagation Network (Full CPN) - Architecture - Training Phases of Full CPN - Training Algorithm - Application Procedure - Forward Only counter Propagation Network - Architecture - Training Algorithm - Applications - Learning Vector Quantizer (LVQ).

UNIT - 4: Associative Memory Networks - I

Types - Architecture - Continuous and Discrete Hopfield Networks - Energy Analysis - Storage and Retrival Algorithms - Problems with Hopfield Networks.

Associative Memory Networks – II: Boltzman Machine - Bidirectional Associative Memory - Adaptive Resonance Theory Networks Introduction - Architecture - Algorithm.

UNIT - 5: Applications of Neural Networks:

Implementation of A/D Converter using Hopfield Network - Solving Optimization Problems - Solving Simultaneous Linear Equation - Solving Traveling Salesman Problems using Hopfield Networks - Application in Pattern Recognition - Image Processing.

COURSE OUTCOMES:

On successful completion of the course the student will be able to		**POs related to COs**
CO1	An ability to apply knowledge of artificial neural networks and fundamental models.	PO1, PO2
CO2	Perform the testing of different networks and fundamental algorithms	PO1, PO2
CO3	Learning basics of counter propogation networks	PO1, PO2,PO3
CO4	Understand the concepts of continouous and discrete Hodfield networks	PO1, PO2
CO5	Perform the testing and training of neural networks using learning rules	PO1, PO2,PO3

Text Books:

1. Introduction to Artificial Neural Systems,3/e, 2003, J.M.Zurada, Jaico Publishers, New Delhi.
2. Introduction to Neural Networks Using MATLAB 6.0, 2/e, 2003, S.N. Shivanandam, S. Sumati , S. N. Deepa, Tata McGraw Hill, Noida.

References books:

1.Elements of Artificial Neural Networks - Kishan Mehrotra, 2/e, 2003, Chelkuri K. Mohan and Sanjay Ranka, Pearson Education, New Delhi.
2.Artificial Neural Network, 2/e, 2004, Simon Haykin, Pearson Education, New Delhi.
3.Fundamental of Neural Networks, 1/e, Laurene Fausett, Pearson Education, New Delhi.
4.Artificial Neural Networks, 3/e, 2003, B. Yegnanarayana, Prentice Hall India, New Delhi.

CO-PO Mapping

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-
CO3	2	2	2	-	-	-	-	-	-	-	-	-
CO4	3	2	-	-	-	-	-	-	-	-	-	-
CO5	3	2	2	-	-	-	-	-	-	-	-	-
CO*	2.8	2	2	-	-	-	-	-	-	-	-	-

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13ECE 423C ADVANCED COMPUTER ARCHITECTURE (Elective IV)

Course Educational Objectives:

CEO1: To understand the basics of fundamental computer units.
CEO2: To gain the knowledge on parallel computers and instruction level parallelism.
CEO3: To acquire knowledge memory concepts, functional principles and design of memory hierarchy.
CEO4: To obtain the concepts of multiprocessors.
CEO5: To be able to define the advanced processors and functionality.

UNIT - 1: Fundamentals

Fundamentals of Computer design - Technology trends – Cost - Measuring and reporting performance quantitative principles of computer design - Instruction set principles and examples - classifying instruction set - Memory addressing - Type and size of operands - Addressing modes for signal processing - Operations in the instruction set instructions for control flow - Encoding an instruction set - The role of compiler

UNIT – 2: Instruction Level Parallel Processors

Instruction level parallelism (ILP) - Over coming data hazards - Reducing branch costs – High performance instruction delivery - Hardware based speculation - Limitation of ILP - ILP software approach - Compiler techniques - Static branch protection - VLIW approach, H-W support for more ILP at compile time - H-W verses S-W solutions

UNIT – 3: Storage systems

Storage systems - Types – Buses Memory hierarchy design - Cache performance - Reducing cache misses penalty and miss rate – Virtual memory - Protection and examples of VM – RAID - Errors and failures

UNIT – 4: Distributed and Shared Memory Architectures

Multiprocessors and thread level parallelism - Symmetric shared memory architectures - Distributed shared memory – Synchronization - Multi threading - Bench marking a storage device designing a I/O system

UNIT - 5: Networks and Clusters

Inter connection networks and clusters - Inter connection network media – Practical issues in inter connecting networks - Examples – Clusters - Designing a cluster

Course Outcomes:

On successful completion of the course the student will be able to		POs related to COs
CO1	Able to know the functional units, classification and difference between uni-bus and multi-bus systems.	PO1, PO2
CO2	Demonstrate and the classification of parallel computers. Analyze the complex issues related to data hazard and branch penalties.	PO1, PO2, PO4
CO3	Classification of memory. Identify cache and memory related issues in multi-processors and design of memory hierarchy.	PO1, PO2, PO3
CO4	Demonstrate the multiprocessors architecture and its classifications.	PO1, PO2
CO5	Acquire knowledge on interconnection networks and issues in interconnecting networks.	PO1, PO2

Text Books:

1. Computer Architecture a Quantitative Approach, 3/e, 2003, John L.Hennessy & David A.Patterson Morgan Kufmann, USA.
2. Advanced Computer Architecture, 2/e, 2004, Kai Hwang and Jotwani, McGrawHill, New Delhi.

Reference Books:

1.Computer Architecture and Parallel Processing , International Edition, 1985, Kai Hwang and A.Briggs McGrawHill, New Delhi.
2. Advanced Computer Architectures, 2/e, 1997, DezsoSima, Terence Fountain, Peter Kacsuk Pearson, New Delhi.
3. Parallel Computer Architecture A Hardware/Software Approch, 2/e, 2003, David E.Culler, Jaswinder Pal singh with Anoop Gupta, Elsevier.
4.Computer Organization, 5/e, 2003, Carl Hamacher, Zvonks Vranesic, SafeaZaky, McGraw Hill, New Delhi
5.Computer System Architecture, 3/e, 1999, M.Moris Mano , Pearson Education, New Delhi.

CO-PO Mapping

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

SREENIVASA INSTITUTE of TECHNOLOGY and MANAGEMENT STUDIES

(Autonomous)

B.Tech IV-II Semester	**L**	**P**	**C**
	-	**-**	**4**

13ECE 424 COMPREHENSIVE EXAMINATION

As per the Regulation 2013, There shall be one comprehensive examinations will be conducted. One at the end of IV year II Semester. It has 100 objective questions for 100 marks on the subjects studied in the respective semesters.

A student shall acquire 1 credit assigned to the comprehensive examination only when he/she secures 40% or more marks. In case, if a student fails in comprehensive online examination, he shall reappear at the next supplementary examination when offered.

SREENIVASA INSTITUTE of TECHNOLOGY and MANAGEMENT STUDIES

(Autonomous)

B.Tech IV-II Semester	**L**	**P**	**C**
	18	**-**	**10**

13ECE 425 PROJECT WORK

Course Educational Objectives:

CEO1: To develop the ability to undertake problem identification, formulation and solution.
CEO2: To demonstrate the ability to engage in design and to execute to an appropriate professional standard.
CEO3: To develop the capacity to undertake lifelong learning.
CEO4: To develop the ability to communicate effectively, not only with engineers but also with the community at large.
CEO5: To develop an understanding of the social, cultural, global and environmental responsibilities of the professional Engineer, and the principles of sustainable design and development

PROJECT WORK:

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, a management 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 this course, the students should 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 3and 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

CO-PO Mapping

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	**3**	-	-	-	-	-	-	-	-	-	-	-
CO2	-	**3**	-	-	-	-	-	-	-	-	-	-
CO3	-	-	**3**	-	-	-	-	-	-	-	-	-
CO4	-	-	-	**3**	-	-	-	-	-	-	-	-
CO5	-	-	-	-	**3**	-	-	-	-	-	-	-
CO6	-	-	-	-	-	**3**	-	-	-	-	-	-
CO7	-	-	-	-	-	-	**3**	-	-	-	-	-
CO8	-	-	-	-	-	-		**3**	-	-	-	-
CO9	-	-	-	-	-	-	-	-	**3**	-	-	-
CO10	-	-	-	-	-	-	-	-	-	**3**	-	-
C011	-	-	-	-	-	-	-	-	-	-	**3**	-
CO12	-	-	-	-	-	-	-	-	-	-	-	**3**