



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES

(AUTONOMOUS)

**Dr. Visweswaraiiah Road, (Bangalore-Tirupathi Bye-pass Road),
Murukambattu, Chittoor – 517127, Andhra Pradesh, India.**

B.Tech Course Structures and Syllabi Under R23 Regulations

(Applicable for 2023-2024 Regular Students & 2024-2025 Lateral Students)

**Department of
Computer Science & Engineering**



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
(Accredited by NBA)

B. Tech R23-COURSE STRUCTURE AND SYLLABI

Semester I(First Year)

S.No	Course Code	Course Title	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks			
			L	T	P	C	I	E	Total	
1	23HSM111T	Communicative English	2	-	-	2	30	70	100	
2	23BSC114T	Linear Algebra and Calculus	2	1	-	3	30	70	100	
3	23ESC112T	Basic Electrical and Electronics Engineering	2	1	-	3	30	70	100	
4	23ESC113T	Engineering Graphics	1	-	4	3	30	70	100	
5	23ESC114T	Introduction to Programming	2	1	-	3	30	70	100	
6	23HSM112L	Communicative English Lab	-	-	2	1	30	70	100	
7	23ESC115L	Computer Programming Lab	-	-	3	1.5	30	70	100	
8	23ESC116L	Electrical and Electronics Engineering Workshop	-	-	3	1.5	30	70	100	
9	23ESC118L	IT Workshop	-	-	2	1	30	70	100	
10	23HSM114L	NSS/NCC/Scouts & Guides/Community Service	-	-	1	0.5	-	-	100	
Contact Hours per week			9	3	15	-	-	-	-	
Total Hours per week			27				-	-	-	-
Total credits							19.5	-	-	-
Total Marks								270	630	1000

Semester II (First Year)

S.No	Course Code	Course Title	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks			
			L	T	P	C	I	E	Total	
1	23BSC121T	Differential Equations and Vector Calculus	2	1	-	3	30	70	100	
2	23BSC111T	Applied Chemistry	3	-	-	3	30	70	100	
3	23BSC113T	Engineering Physics	3	-	-	3	30	70	100	
4	23ESC111T	Basic Civil and Mechanical Engineering	3	-	-	3	30	70	100	
5	23CSE121T	Data Structures	2	1	-	3	30	70	100	
6	23BSC115L	Applied Chemistry Lab	-	-	2	1	30	70	100	
7	23BSC117L	Engineering Physics Lab	-	-	2	1	30	70	100	
8	23ESC117L	Engineering Workshop	-	-	3	1.5	30	70	100	
9	23CSE122L	Data Structures Lab	-	-	3	1.5	30	70	100	
10	23HSM113L	Health and wellness, Yoga and Sports	-	-	1	0.5	-	-	100	
Contact Hours per week			13	2	11	-	-	-	-	
Total Hours per week			26				-	-	-	-
Total Credits							20.5	-	-	-
Total Marks								270	630	1000



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Semester III (Second Year)

S.No	Course Code	Course Title	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
			L	T	P	C	I	E	Total
1	23BSC232T	Discrete Mathematics & Graph Theory	2	1	-	3	30	70	100
2	23HSM231A 23HSM231B 23HSM231C	Managerial Economics and Financial Analysis / Business Environment / Organizational Behavior	2	-	-	2	30	70	100
3	23ESC232T	Digital Logic & Computer Organization	2	1	-	3	30	70	100
4	23CSE231T	Advanced Data Structures & Algorithm Analysis	2	1	-	3	30	70	100
5	23CSE232T	Object Oriented Programming Through Java	2	1	-	3	30	70	100
6	23CSE233L	Advanced Data Structures and Algorithm Analysis Lab	-	-	3	1.5	30	70	100
7	23CSE234L	Object Oriented Programming Through Java Lab	-	-	3	1.5	30	70	100
8	23CSE235L	Python Programming (SKILL ENHANCEMENT COURSE)	-	1	2	2	30	70	100
9	23MAC231U	Environmental Science	2	-	-	-	30	-	P
Contact Hours per week			12	5	8	-	-	-	-
Total Hours per week			25			-	-	-	-
Total Credits						19	-	-	-
Total Marks							270	560	800

Semester IV (Second Year)

S.No	Course Code	Course Title	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
			L	T	P	C	I	E	Total
1	23BSC243T	Probability & Statistics	2	1	-	3	30	70	100
2	23HSM234T	Universal Human Values-Understanding Harmony & Ethical Human Conduct	2	1	-	3	30	70	100
3	23CSE241T	Database Management Systems	2	1	-	3	30	70	100
4	23CSE242T	Operating Systems	2	1	-	3	30	70	100
5	23CSE243T	Software Engineering	2	1	-	3	30	70	100
6	23CSE245L	Database Management Systems Lab	-	-	3	1.5	30	70	100
7	23CSE246L	Operating Systems Lab	-	-	3	1.5	30	70	100
8	23CSE247L	Full Stack Development-I (SKILL ENHANCEMENT COURSE)	-	1	2	2	30	70	100
9	23ESC241I	Design Thinking & Innovation	1	-	2	2	30	70	100
Contact Hours per week			11	6	10	-	-	-	-
Total Hours per week			27			-	-	-	-
Total Credits						22	-	-	-
Total Marks							270	630	900
Mandatory Community Service Project Internship of 06-08 Weeks Duration During Summer Vacation									



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Semester V (Third Year)

S.No	Course Code	Course Title	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
			L	T	P	C	I	E	Total
1	23CAI354T	Artificial Intelligence: Principles and Techniques	3	-	-	3	30	70	100
2	23CSE351T	Automata Theory and Compiler Design	3	-	-	3	30	70	100
3	23CSE352T	Computer Networks & Internet Protocols	3	-	-	3	30	70	100
4	PE-I	Professional Elective-I	3	-	-	3	30	70	100
5	OE-I	Open Elective-I	3	-	-	3	30	70	100
6	23ESC351T	Introduction to Quantum Technology & Applications	3	-	-	3	30	70	100
7	23CAI355L	Artificial Intelligence Lab	-	-	3	1.5	30	70	100
8	23CSE355L	Computer Networks & Internet Protocols Lab	-	-	3	1.5	30	70	100
9	23CSE356L	Full Stack Development-II (SKILL ENHANCEMENT COURSE)	-	1	2	2	30	70	100
10	23ESC352L	Tinkering Lab	-	-	2	1	30	70	100
11	23CSE351P	Evaluation of Community Service Project	-	-	-	2	-	100	100
Contact Hours per week			18	01	10	-	-	-	-
Total Hours per week			29			-	-	-	-
Total Credits						26	-	-	-
Total Marks							300	800	1100

Semester VI (Third Year)

S.No	Course Code	Course Title	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
			L	T	P	C	I	E	Total
1	23CSM241T	Machine Learning	3	-	-	3	30	70	100
2	23CSE361T	Cloud Computing	3	-	-	3	30	70	100
3	23CSE362T	Cryptography & Network Security	3	-	-	3	30	70	100
4	PE-II	Professional Elective-II	3	-	-	3	30	70	100
5	PE-III	Professional Elective-III	3	-	-	3	30	70	100
6	OE-II	Open Elective-II	3	-	-	3	30	70	100
7	23CSM243L	Machine Learning Lab	-	-	3	1.5	30	70	100
8	23CSE363L	Cryptography & Network Security Lab	-	-	3	1.5	30	70	100
9	23HSM241L	Soft skills (SKILL ENHANCEMENT COURSE)	-	1	2	2	30	70	100
10	23MAC351U	Technical Paper Writing & IPR	2	-	-	-	30	-	P
11	23CSE361P	Domain Specific Workshop	-	-	-	-	50	-	-
Contact Hours per week			20	01	08	-	-	-	-
Total Hours per week			29			-	-	-	-
Total Credits						23	-	-	-
Total Marks							350	630	900



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Semester VII (Fourth Year)

S.No	Course Code	Course Title	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
			L	T	P	C	I	E	Total
1	23CSM362T	Deep Learning	3	-	-	3	30	70	100
2	ME	Management Elective	2	-	-	2	30	70	100
3	PE-IV	Professional Elective-IV	3	-	-	3	30	70	100
4	PE-V	Professional Elective-V	3	-	-	3	30	70	100
5	OE-III	Open Elective-III	3	-	-	3	30	70	100
6	OE-IV	Open Elective-IV	3	-	-	3	30	70	100
7	23CAI474L	Prompt Engineering (SKILL ENHANCEMENT COURSE)	-	1	2	2	30	70	100
8	23MAC471U	Gender Sensitization	2	-	-	0	30	-	P
9	23CSE471P	Evaluation Industry Internship	-	-	-	2	-	100	100
Contact Hours per week			19	01	02	-	-	-	-
Total Hours per week			22			-	-	-	-
Total Credits						21	-	-	-
Total Marks							240	590	800

Semester VIII (Fourth Year)

S.No	Course Code	Course Title	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
			L	T	P	C	I	E	Total
1	23CSE481P	Internship	-	-	24	4	-	100	100
2	23CSE482P	Project Work	-	-	-	8	30	70	100
Contact Hours per week			-	-	24	-	-	-	-
Total Hours per week			24			-	-	-	-
Total Credits						12	-	-	-
Total Marks							30	170	200

Note:

1. A student is permitted to register for Honours or a Minor in IV semester after the results of III Semester are declared and students may be allowed to take maximum two subjects per Semester pertaining to their Minor from V Semester onwards.
2. A student shall not be permitted to take courses as Open Electives / Minor / Honours with content substantially equivalent to the courses pursued in the student's primary major.
3. Minor & Honour tracks shall be offered for 18 credits over and above 163 Credits 05 theory courses of 3 credits each, practical courses of 1.5 credits each or project for 3 credits for Minors and Honours.
4. A student is permitted to select a Minor program only if the institution is already offering a Major degree program in that discipline.
5. One Industry Visit is Mandatory either in 3rd or 4th year Student will undergo ONE WEEK WORKSHOP (domain specific) after the end of the FIFTH Semester examination and it will be reflected in SIXTH semester for zero credits.
6. One Expert Lecturer in every semester (domain Specific) is mandatory.



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B. Tech R23-COURSE STRUCTURE AND SYLLABI

Professional Elective-I –Semester V (Third Year)

S.No	Course Code	Course Title	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
			L	T	P	C	I	E	Total
1	23ECE354T	Microprocessors & Microcontrollers	3	-	-	3	30	70	100
2	23CSE354A	Data Warehousing & Data Mining	3	-	-	3	30	70	100
3	23CSE354B	Object Oriented Analysis and Design	3	-	-	3	30	70	100
4	23CSE354D	Soft Computing	3	-	-	3	30	70	100

Professional Elective-II –Semester VI (Third Year)

S.No	Course Code	Course Title	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
			L	T	P	C	I	E	Total
1	23ECE364C	Embedded Systems Design	3	-	-	3	30	70	100
2	23CSE363A	Introduction to Cyber Security	3	-	-	3	30	70	100
3	23CSE363B	DevOps	3	-	-	3	30	70	100
4	23CSE363C	Software Testing Methodologies	3	-	-	3	30	70	100

Professional Elective-III –Semester VI (Third Year)

S.No	Course Code	Course Title	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
			L	T	P	C	I	E	Total
1	23CAI353T	Natural Language Processing	3	-	-	3	30	70	100
2	23CSE364B	Distributed Operating System	3	-	-	3	30	70	100
3	23CSE364C	Mobile Adhoc Networks	3	-	-	3	30	70	100
4	23CSE364D	Software Project Management	3	-	-	3	30	70	100

Professional Elective-IV –Semester VII (Fourth Year)

S.No	Course Code	Course Title	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
			L	T	P	C	I	E	Total
1	23CSE354C	Internet of Things	3	-	-	3	30	70	100
2	23CSE471A	Augmented Reality & Virtual Reality	3	-	-	3	30	70	100
3	23CSE471B	Block Chain Technology	3	-	-	3	30	70	100
4	23CSE471C	Software Architecture & Design Patterns	3	-	-	3	30	70	100

Professional Elective-IV –Semester VII (Fourth Year)

S.No	Course Code	Course Title	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
			L	T	P	C	I	E	Total
1	23CSE364A	Computer Vision	3	-	-	3	30	70	100
2	23CSE472A	Agile methodologies	3	-	-	3	30	70	100
3	23CSE472B	Cyber Physical Systems	3	-	-	3	30	70	100
4	23CSE472D	Metaverse	3	-	-	3	30	70	100



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Open Elective- I- Semester- V (Third Year)

S.No	Course Code	Offered Department	Course Title	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
				L	T	P	C	I	E	Total
1	23OCE351A	CE	Green Buildings	3	-	-	3	30	70	100
2	23OCE351B		Construction Technology and Management	3	-	-	3	30	70	100
3	23OEE351A	EEE	Electrical Safety Practices and Standards	3	-	-	3	30	70	100
4	23OEC351A	ECE	Electronic Circuits	3	-	-	3	30	70	100
5	23OME351A	ME	Sustainable Energy Technologies	3	-	-	3	30	70	100
6	23OSH351A	Mathematics	Mathematics for Machine Learning and AI	3	-	-	3	30	70	100
7	23OSH351B	Physics	Materials Characterization Techniques	3	-	-	3	30	70	100
8	23OSH351C	Chemistry	Chemistry of Energy Systems	3	-	-	3	30	70	100
9	23OSH351D	Humanities	English for Competitive Examinations	3	-	-	3	30	70	100
10	23OSH351E		Entrepreneurship and New Venture Creation	3	-	-	3	30	70	100

Open Elective- II- Semester- VI (Third Year)

S.No	Course Code	Offered Department	Course Title	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
				L	T	P	C	I	E	Total
1	23OCE361A	CE	Disaster Management	3	-	-	3	30	70	100
2	23OCE361B		Sustainability in Engineering Practices	3	-	-	3	30	70	100
3	23OEE361A	EEE	Renewable Energy Sources	3	-	-	3	30	70	100
4	23OEC361A	ECE	Digital Electronics	3	-	-	3	30	70	100
5	23OME361A	ME	Principles of Automation and Robotics	3	-	-	3	30	70	100
6	23OSH361A	Mathematics	Optimization Techniques for Engineers	3	-	-	3	30	70	100
7	23OSH361B		Mathematical Foundation of Quantum Technologies	3	-	-	3	30	70	100
8	23OSH361C	Physics	Physics Of Electronic Materials And Devices	3	-	-	3	30	70	100
9	23OSH361D	Chemistry	Chemistry of Polymers And Applications	3	-	-	3	30	70	100
10	23OSH361E	Humanities	Academic Writing and Public Speaking	3	-	-	3	30	70	100



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B. Tech R23-COURSE STRUCTURE AND SYLLABI

Open Elective- IV- Semester- VII (Fourth Year)

S.No	Course Code	Offered Department	Course Title	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
				L	T	P	C	I	E	Total
1	23OCE471A	CE	Building Materials and Services	3	-	-	3	30	70	100
2	23OCE471B		Environmental Impact Assessment	3	-	-	3	30	70	100
3	23OEE471A	EEE	Smart Grid Technologies	3	-	-	3	30	70	100
4	23OEC471A	ECE	Fundamental of Microprocessors and Controllers	3	-	-	3	30	70	100
5	23OME471A	ME	3D Printing Technologies	3	-	-	3	30	70	100
6	23OSH471A	Mathematics	Wavelet transforms and its Applications	3	-	-	3	30	70	100
7	23OSH471B	Physics	Smart Materials And Devices	3	-	-	3	30	70	100
8	23OSH471C		Introduction to Quantum Mechanics	3	-	-	3	30	70	100
9	23OSH471D	Chemistry	Green Chemistry And Catalysis For Sustainable	3	-	-	3	30	70	100
10	23OSH471E	Humanities	Employability Skills	3	-	-	3	30	70	100

Open Elective- IV- Semester- VII (Fourth Year)

S.No	Course Code	Offered Department	Course Title	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
				L	T	P	C	I	E	Total
1	23OCE472A	CE	Geo-Spatial Technologies	3	-	-	3	30	70	100
2	23OCE472B		Solid Waste Management	3	-	-	3	30	70	100
3	23OEE472A	EEE	Electric Vehicles	3	-	-	3	30	70	100
4	23OEC472A	ECE	Transducers and Sensors	3	-	-	3	30	70	100
5	23OME472A	ME	Fundamentals of Quality Management	3	-	-	3	30	70	100
6	23OSH472A	Mathematics	Financial Mathematics	3	-	-	3	30	70	100
7	23OSH472B	Physics	Sensors And Actuators For Engineering Applications	3	-	-	3	30	70	100
8	23OSH472C	Chemistry	Chemistry Of Nanomaterials and Applications	3	-	-	3	30	70	100
9	23OSH472D	Humanities	Literary Vibes	3	-	-	3	30	70	100
10	23OPEN472	OPEN	Introduction to Quantum Computing	3	-	-	3	30	70	100



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B. Tech R23-COURSE STRUCTURE AND SYLLABI

Management Science Elective-Semester VII (Fourth Year)

S.No	Course Code	Course Title	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
			L	T	P	C	I	E	Total
1	23HSM471A	Business Ethics and Corporate Governance	3	-	-	3	30	70	100
2	23HSM471B	E-Business	3	-	-	3	30	70	100
3	23HSM471C	Management Science	3	-	-	3	30	70	100

Semester Wise Credit Mapping

S.No.	Subject Area	Credit Mapping								Total Credits
		I	II	III	IV	V	VI	VII	VIII	
1	HSMC	3.5	0.5	2	3	-	-	2	-	11
2	BSC	3	11	3	3	-	-	-	-	20
3	ESC	13	4.5	3	2	4	-	-	-	26.5
4	PCC	-	4.5	9	12	12	12	3	-	52.5
5	SEC	-	-	2	2	2	2	2	-	10
6	PEC	-	-	-	-	3	6	6	-	15
7	OEC	-	-	-	-	3	3	6	-	12
8	PWC	-	-	-	-	2	-	2	12	16
9	AC	-	-	Y	-	-	Y	Y	-	-
TOTAL		19.5	20.5	19	22	26	23	21	12	163

NOTE:

1. HSMC - Humanities, Social Science and Management Science Courses
2. BSC - Basic Science Courses
3. ESC - Engineering Science Courses
4. PCC - Professional Core Courses
5. SEC - Skill Enhancement Course
6. PEC - Professional Elective Courses
7. OEC - Open Elective Courses
8. PWC - Project Work Courses
9. AC - Audit Courses



Academic Regulations (R23) for B. Tech (Regular-Full time)

(Effective for the students admitted into I year from the Academic Year
2023-2024 onwards)

1. AWARD OF THE DEGREE

- (a) Award of the B.Tech. Degree / B.Tech. Degree with a Minor if he/she fulfils the following:
- (i) Pursues a course of study for not less than four academic years and not more than eight academic years. However, for the students availing Gap year facility this period shall be extended by two years at the most and these two years would in addition to the maximum period permitted for graduation (Eight years).
 - (ii) Registers for **160 credits and secures all 160 credits.**
- (b) **Award of B.Tech. degree with Honors**
A student will be declared eligible for the award of the B.Tech. with Honors if he/she fulfils the following:
- (i) Student secures additional 15 credits fulfilling all the requisites of a B.Tech. program i.e., 160 credits.
 - (ii) Registering for Honors is optional.
 - (iii) Honors is to be completed simultaneously with B.Tech. programme.

2. Students, who fail to fulfil all the academic requirements for the award of the degree within eight academic years from the year of their admission, shall forfeit their seat in B.Tech. course and their admission stands cancelled. This clause shall be read along with clause 1 a) i).

3. ADMISSIONS

Admission to the B. Tech Program shall be made subject to the eligibility, qualifications and specialization prescribed by the A.P. State Government/University from time to time. Admissions shall be made either based on the merit rank obtained by the student in the common entrance examination conducted by the A.P. Government/University or any other order of merit approved by the A.P. Government/University, subject to reservations as prescribed by the Government/University from time to time.

4. PROGRAM RELATED TERMS

Credit: A unit by which the course work is measured. It determines the number of hours of instruction required per week. One credit is equivalent to one hour of teaching (Lecture/Tutorial) or two hours of practical work/field work per week.

Credit definition:

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

- a) **Academic Year:** Two consecutive (one odd + one even) semesters constitute one academic year.
- b) **Choice Based Credit System (CBCS):** The CBCS provides a choice for students to select from the prescribed courses.

5. SEMESTER/CREDITS:

- i) A semester comprises 90 working days and an academic year is divided into two semesters.
- ii) The summer term is for eight weeks during summer vacation. Internship/ apprenticeship / work-based vocational education and training can be carried out during the summer term, especially by students who wish to exit after two semesters or four semesters of study.
- iii) Regular courses may also be completed well in advance through MOOCs satisfying prerequisites.

6. STRUCTURE OF THE UNDERGRADUATE PROGRAMME

All courses offered for the undergraduate program (B. Tech.) are broadly classified as follows:

S.No.	Category	Breakup of Credits (Total 160)	Percentage of total credits	AICTE Recommendation (%)
1.	Humanities and Social Science including Management (HM)	13	8 %	8 – 9%
2.	Basic Sciences (BS)	20	13 %	12 - 16%
3.	Engineering Sciences (ES)	23.5	14%	10 – 18%
4.	Professional Core (PC)	54.5	34 %	30 – 36%
5.	Electives – Professional (PE) & Open (OE); Domain Specific Skill Enhancement Courses (SEC)	33	21 %	19 - 23%
6.	Internships & Project work (PR)	16	10 %	8 – 11%
7.	Mandatory Courses (MC)	Non-credit	Non-credit	-

7. COURSE CLASSIFICATION:

All subjects/ courses offered for the undergraduate programme in Engineering & Technology (B.Tech. degree programmes) are broadly classified as follows:

S.No.	Broad Course Classification	Course Category	Description
1.	Foundation Core Courses	Foundation courses	Includes Mathematics, Physics and Chemistry. Fundamental engineering courses; humanities, social sciences, and management courses
2.	Core Courses	Professional Core Courses (PC)	Includes subjects related to the parent discipline / department / branch of Engineering.
3.	Elective Courses	Professional Elective Courses (PE)	Includes elective subjects related to the parent discipline/department/ branch of Engineering
		Open Elective Courses (OE)	Elective subjects which include interdisciplinary Subjects or subjects in an area outside the parent discipline/ department/ branch of Engineering
		Domain Specific skill Enhancement Courses (SEC)	Interdisciplinary/Job-oriented/domain courses which are relevant to the industry
4.	Project & Internships	Project	B.Tech. Project or Major Project
		Internships	Summer Internships - Community based and Industry Internships; Industry oriented Full Semester Internship
5.	Audit Courses	Mandatory non-credit Courses	Covering subjects of developing desired attitude among the learners

8. PROGRAMME PATTERN

- i. Total duration of the of B. Tech (Regular) Programme is four academic years.
- ii. Each academic year of study is divided into two semesters.
- iii. Minimum number of instruction days in each semester is 90 days.

- iv. There shall be mandatory student induction program for freshers, with a three- week duration before the commencement of first semester. Physical activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Visits to local Areas, Familiarization to Dept./Branch & Innovations etc., are included as per the guidelines issued by AICTE.
- v. Health/wellness/yoga/sports and NSS /NSS /Scouts & Guides / Community service activities are made mandatory as credit courses for all the undergraduate students.
- vi. Courses like Environmental Sciences, Indian Constitution, Technical Paper Writing & IPR are offered as non-credit mandatory courses for all the undergraduate students.
- vii. Design Thinking for Innovation & Tinkering Labs are made mandatory as credit courses for all the undergraduate students.
- viii. Increased flexibility for students through an increase in the elective component of the curriculum, with 05 Professional Elective courses and 04 Open Elective courses.
- ix. Professional Elective Courses, include the elective courses relevant to the chosen specialization/branch. Proper choice of professional elective courses can lead to students specializing in emerging areas within the chosen field of study.
- x. A total of 04 Open Electives are offered in the curriculum. A student can complete the requirement for B.Tech. Degree with a Minor within the 160 credits by opting for the courses offered through various verticals/tracks under Open Electives.
- xi. While choosing the electives, students shall ensure that they do not opt for the courses with syllabus contents similar to courses already pursued.
- xii. A pool of interdisciplinary/job-oriented/domain skill courses which are relevant to the industry are integrated into the curriculum of all disciplines. There shall be 05 skill-oriented courses offered during III to VII semesters. Among the five skill courses, four courses shall focus on the basic and advanced skills related to the domain/interdisciplinary courses and the other shall be a soft skills course.
- xiii. Students shall undergo mandatory summer internships, for a minimum of eight weeks duration at the end of second and third year of the programme. The internship at the end of second year shall be community oriented and industry internship at the end of third year.
- xiv. There shall also be mandatory full internship in the final semester of the programme along with the project work.
- xv. Undergraduate degree with Honors is introduced by the Institution for the students having good academic record.

- xvi. Departments shall take measures to implement Virtual Labs (<https://www.vlab.co.in>) which provide remote access to labs in various disciplines of Engineering and will help student in learning basic and advanced concept through remote experimentation. Student shall be made to work on virtual lab experiments during the regular labs.
- xvii. Institution shall assign a faculty advisor/mentor after admission to a group of students from same department to provide guidance in courses registration/career growth/placements/opportunities for higher studies/GATE/other competitive exams etc.
- xviii. Preferably 25% of course work for the theory courses in every semester shall be conducted in the blended mode of learning.

9. EVALUATION PROCESS

The performance of a student in each semester shall be evaluated subject wise with a maximum of 100 marks for theory and 100 marks for practical subject. Summer Internships shall be evaluated for 50 marks, Full Internship & Project work in final semester shall be evaluated for 200 marks, mandatory courses with no credits shall be evaluated for 30 mid semester marks.

A student has to secure not less than 35% of marks in the end examination and a minimum of 40% of marks in the sum total of the mid semester and end examination marks taken together for the theory, practical, design, drawing subject or project etc. In case of a mandatory course, he/she should secure 40% of the total marks.

Theory Courses:

Assessment Method	Marks
Continuous Internal Assessment (CIA)	30
Semester End Examination (SEE)	70
Total	100

- i) For theory subject, the distribution shall be 30 marks for Internal Evaluation and 70 marks for the End-Examination.
- ii) For practical subject, the distribution shall be 30 marks for Internal Evaluation and 70 marks for the End- Examination.
- iii) If any course contains two different branch subjects, the syllabus shall be written in two parts with 3 units each (Part-A and Part-B) and external examination question paper shall be set with two parts each for 35 marks.

iv) If any subject is having both theory and practical components, they will be evaluated separately as theory subject and practical subject. However, they will be given same subject code with an extension of 'T' for theory subject and 'P' for practical subject.

a) Continuous Internal Evaluation

- i) For theory subjects, during the semester, there shall be two midterm examinations. Each midterm examination shall be evaluated for 30 marks of which 10 marks for objective paper (20 minutes duration), 15 marks for subjective paper (90 minutes duration) and 5 marks for assignment.
- ii) Objective paper shall contain for 05 short answer questions with 2 marks each or maximum of 20 bits for 10 marks. Subjective paper shall contain 3 either or type questions (totally six questions from 1 to 6) of which student has to answer one from each either-or type of questions. Each question carries 10 marks. The marks obtained in the subjective paper are condensed to 15 marks.

Note:

- The objective paper shall be prepared in line with the quality of competitive examinations questions.
 - The subjective paper shall contain 3 either or type questions of equal weightage of 10 marks. Any fraction shall be rounded off to the next higher mark.
 - The objective paper shall be conducted either online or offline by the respective institution on the day of subjective paper test.
 - If conducted offline, the midterm examination shall be conducted first by distribution of the Objective paper, simultaneously marking the attendance, after 20 minutes the answered objective paper shall be collected back. The student is not allowed to leave the examination hall. Then the descriptive question paper and the answer booklet shall be distributed. After 90 minutes the answered booklets are collected back.
 - Assignments shall be in the form of problems, mini projects, design problems, slip tests, quizzes etc., depending on the course content. It should be continuous assessment throughout the semester and the average marks shall be considered.
- iii) If the student is absent for the mid semester examination, no re-exam shall be conducted and mid semester marks for that examination shall be considered as zero.
 - iv) First midterm examination shall be conducted for I, II units of syllabus with one either or type question from each unit and third either or type question from both the units. The second midterm examination shall be conducted for III, IV and V units with one either or type question from each unit.

- v) Final mid semester marks shall be arrived at by considering the marks secured by the student in both the mid examinations with 80% weightage given to the better mid exam and 20% to the other.

For Example:

Marks obtained in first mid: 25 Marks
obtained in second mid: 20

Final mid semester Marks: $(25 \times 0.8) + (20 \times 0.2) = 24$

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

For Example:

Marks obtained in first mid: Absent

Marks obtained in second mid: 25

Final mid semester Marks: $(25 \times 0.8) + (0 \times 0.2) = 20$

b) End Examination Evaluation:

End examination of theory subjects shall have the following pattern:

- i) There shall be 6 questions and all questions are compulsory.
- ii) Question I shall contain 10 compulsory short answer questions for a total of 20marks such that each question carries 2 marks.
- iii) There shall be 2 short answer questions from each unit.
- iv) In each of the questions from 2 to 6, there shall be either/or type questions of 10 marks each. Student shall answer any one of them.
- v) The questions from 2 to 6 shall be set by covering one unit of the syllabus for each question.

End examination of theory subjects consisting of two parts of different subjects, for Example: Basic Electrical & Electronics Engineering and Basic Civil & Mechanical Engineering shall have the following pattern:

- i) Question paper shall be in two parts viz., Part A and Part B with equal weightage of 35 marks each.
- ii) In each part, question 1 shall contain 5 compulsory short answer questions for a total of 5 marks such that each question carries 1mark.
- iii) In each part, questions from 2 to 4, there shall be either/or type questions of 10 marks each. Student shall answer any one of them.
- iv) The questions from 2 to 4 shall be set by covering one unit of the syllabus for each question.

Practical Courses:

Assessment Method	Marks
Continuous Internal Assessment (CIA)	30
Semester End Examination (SEE)	70
Total	100

- a) For practical courses, there shall be a continuous evaluation during the semester for 30 sessional marks and end examination shall be for 70 marks.
- b) Day-to-day work in the laboratory shall be evaluated for 15 marks by the concerned laboratory teacher based on the regularity/record/viva and 15 marks for the internal test.
- c) The end examination shall be evaluated for 70 marks, conducted by the concerned laboratory teacher and a senior expert in the subject from the same department.
 - Procedure: 20 marks
 - Experimental Work & Results: 30 marks
 - Viva voce: 20 marks.

In a practical subject consisting of two parts (Eg: Basic Electrical & Electronics Engineering Lab), the end examination shall be conducted for 70 marks as a single laboratory in 3 hours.

The end examination shall be evaluated 35 marks in each part. Mid semester examination shall be evaluated as above for 30 marks (day-to-day evaluation 15 marks and internal examination 15 marks) in each part and final internal marks shall be arrived by considering the average of marks obtained in two parts.

- d) For the subject having design and/or drawing, such as Engineering Drawing, the distribution of marks shall be 30 for mid semester evaluation and 70 for end examination.

Assessment Method	Marks
Continuous Internal Assessment (CIA)	30
Semester End Examination (SEE)	70
Total	100

Day-to-day work shall be evaluated for 15 marks by the concerned subject teacher based on the reports/submissions prepared in the class.

And there shall be two midterm examinations in a semester for duration of 2 hours each for 15 marks with weightage of 80% to better mid marks and 20% for the other. The subjective paper shall contain 3 either or type questions of equal weightage of 5 marks. There shall be no objective paper in mid semester examination. The sum of day-to-day evaluation and the mid semester marks will be the final sessional marks for the subject.

The end examination pattern for Engineering Graphics, shall consists of 5 questions, either/or type, of 14 marks each. There shall be no objective type questions in the end examination. However, the end examination pattern for other subjects related to design/drawing, multiple branches, etc is mentioned along with the syllabus.

- e) There shall be no external examination for mandatory courses with zero credits. However, attendance shall be considered while calculating aggregate attendance and student shall be declared to have passed the mandatory course only when he/she secures 40% or more in the internal examinations. In case, the student fails, a re-examination shall be conducted for failed candidates for 30 marks satisfying the conditions mentioned in item 1 & 2 of the regulations.
- f) The laboratory records and mid semester test papers shall be preserved for a minimum of 3 years in the respective institutions as per the University norms and shall be produced to the Committees of the University as and when the same are asked for.

10. SKILL ORIENTED COURSES

- i) There shall be five skill-oriented courses offered during III to VII semesters.
- ii) Out of the five skill courses two shall be skill-oriented courses from the same domain. Of the remaining three skill courses, one shall be a soft skill course and the remaining two shall be skill-advanced courses from the same domain/Interdisciplinary/Job oriented.
- iii) The course shall carry 100 marks and shall be evaluated through continuous assessments during the semester for 30 sessional marks and end examination shall be for 70 marks. Day-to-day work in the class / laboratory shall be evaluated for 30 marks by the concerned teacher based on the regularity/assignments/viva/mid semester test. The end examination similar to practical examination pattern shall be conducted by the concerned teacher and an expert in the subject nominated by the principal.

- iv) The Head of the Department shall identify a faculty member as coordinator for the course. A committee consisting of the Head of the Department, coordinator and a senior Faculty member nominated by the Head of the Department shall monitor the evaluation process. The marks/grades shall be assigned to the students by the above committee based on their performance.
- v) The student shall be given an option to choose either the skill courses being offered by the college or to choose a certificate course being offered by industries/Professional bodies or any other accredited bodies. If a student chooses to take a Certificate Course offered by external agencies, the credits shall be awarded to the student upon producing the Course Completion Certificate from the agency. A committee shall be formed at the level of the college to evaluate the grades/marks given for a course by external agencies and convert to the equivalent marks/grades.
- vi) The recommended courses offered by external agencies, conversions and appropriate grades/marks are to be approved by the University at the beginning of the semester. The principal of the respective college shall forward such proposals to the University for approval.
- vii) If a student prefers to take a certificate course offered by external agency, the department shall mark attendance of the student for the remaining courses in that semester excluding the skill course in all the calculations of mandatory attendance requirements upon producing a valid certificate as approved by the University.

11. MASSIVE OPEN ONLINE COURSES (MOOCs):

A Student has to pursue and complete one course compulsorily through MOOCs approved by the Institution. A student can pursue courses other than core through MOOCs and it is mandatory to complete one course successfully through MOOCs for awarding the degree. A student is not permitted to register and pursue core courses through MOOCs.

A student shall register for the course (Minimum of either 8 weeks or 12 weeks) offered through MOOCs with the approval of Head of the Department. The Head of the Department shall appoint one mentor to monitor the student's progression. The student needs to earn a certificate by passing the exam. The student shall be awarded the credits assigned in the curriculum only by submission of the certificate. Examination fee, if any, will be borne by the student.

Students who have qualified in the proctored examinations conducted through MOOCs platform can apply for credit transfer as specified and are exempted from appearing internal as well as external examination (for the specified equivalent credit course only) conducted by the university.

Necessary amendments in rules and regulations regarding adoption of MOOC courses would be proposed from time to time.

12. CREDIT TRANSFER POLICY

Adoption of MOOCs is mandatory, to enable Blended model of teaching-learning as also envisaged in the NEP 2020. As per University Grants Commission (Credit Framework for Online Learning Courses through SWAYAM) Regulation, 2016, the University shall allow up to a maximum of 20% of the total courses being offered in a particular programme i.e., maximum of 32 credits through MOOCs platform.

- i) The Institution shall offer credit mobility for MOOCs and give the equivalent credit weightage to the students for the credits earned through online learning courses.
- ii) Student registration for the MOOCs shall be only through the respective department of the institution, it is mandatory for the student to share necessary information with the department.
- iii) Credit transfer policy will be applicable to the Professional & Open Elective courses only.
- iv) The concerned department shall identify the courses permitted for credit transfer.
- v) The University/institution shall notify at the beginning of semester the list of the online learning courses eligible for credit transfer.
- vi) The institution shall designate a faculty member as a Mentor for each course to guide the students from registration till completion of the credit course.
- vii) The university shall ensure no overlap of MOOC exams with that of the university examination schedule. In case of delay in results, the university will re-issue the marks sheet for such students.
- viii) Student pursuing courses under MOOCs shall acquire the required credits only after successful completion of the course and submitting a certificate issued by the competent authority along with the percentage of marks and grades.
- ix) The institution shall submit the following to the examination section of the university:
 - a) List of students who have passed MOOC courses in the current semester along with the certificate of completion.
 - b) Undertaking form filled by the students for credit transfer.

- x) The institutions shall resolve any issues that may arise in the implementation of this policy from time to time and shall review its credit transfer policy in the light of periodic changes brought by UGC, SWAYAM, NPTEL and state government.

Note: Students shall be permitted to register for MOOCs offered through online platforms approved by the Institution from time to time.

13. ACADEMIC BANK OF CREDITS (ABC)

The Institution has implemented Academic Bank of Credits (ABC) to promote flexibility in curriculum as per NEP 2020 to

- i) Provide option of mobility for learners across the universities of their choice
- ii) Provide option to gain the credits through MOOCs from approved digital platforms.
- iii) Facilitate award of certificate/diploma/degree in line with the accumulated credits in ABC
- iv) Execute Multiple Entry and Exit system with credit count, credit transfer and credit acceptance from students' account.

14. MANDATORY INTERNSHIPS SUMMER INTERNSHIPS

Summer Internships: Two summer internships either onsite or virtual each with a minimum of 08 weeks duration, done at the end of second and third years, respectively are mandatory. It shall be completed in collaboration with local industries, Govt. Organizations, construction agencies, Power projects, software MNCs or any industries in the areas of concerned specialization of the Undergraduate program. One of the two summer internships at the end of second year (Community Service Project) shall be society oriented and shall be completed in collaboration with government organizations/NGOs & others. The other internship at the end of third year is Industry Internship and shall be completed in collaboration with Industries. The student shall register for the internship as per course structure after commencement of academic year. The guidelines issued by the APSCHE / University shall be followed for carrying out and evaluation of Community Service Project and Industry Internship.

Evaluation of the summer internships shall be through the departmental committee. A student will be required to submit a summer internship report to the concerned department and appear for an oral presentation before the departmental committee comprising of Head of the Department, supervisor of the internship and a senior faculty member of the department.

A certificate of successful completion from industry shall be included in the report. The report and the oral presentation shall carry 50% weight age each. It shall be evaluated for 50 external marks. There shall be no internal marks for Summer Internship. A student shall secure minimum 40% of marks for successful completion. In case, if a student fails, he/she shall reappear as and when semester supplementary examinations are conducted by the Institutions.

Full Semester Internship and Project work:

In the final semester, the student should mandatorily register and undergo internship (onsite/virtual) and in parallel he/she should work on a project with well-defined objectives. At the end of the semester the candidate shall submit an internship completion certificate and a project report. A student shall also be permitted to submit project report on the work carried out during the internship.

The project report shall be evaluated with an external examiner. The total marks for project work 200 marks and distribution shall be 60 marks for internal and 140 marks for external evaluation. The supervisor assesses the student for 30 marks (Report: 15 marks, Presentation/Seminar: 15 marks). At the end of the semester, all projects shall be showcased at the department for the benefit of all students and staff and the same is to be evaluated by the departmental Project Review Committee consisting of supervisor, a senior faculty and HOD for 30 marks. The external evaluation of Project Work is a Viva-Voce Examination conducted in the presence of internal examiner and external examiner appointed by the University and is evaluated for 140 marks.

The institution shall facilitate and monitor the student internship programs. Completion of internships is mandatory, if any student fails to complete internship, he/she will not be eligible for the award of degree. In such cases, the student shall repeat and complete the internship.

15. GUIDELINES FOR OFFERING A MINOR

To promote interdisciplinary knowledge among the students, the students admitted into B.Tech. in a major stream/branch are eligible to obtain degree in Minor in another stream.

- i) The Minor program requires the completion of 12 credits in Minor stream chosen.
- ii) Two courses for 06 credits related to a Minor are to be pursued compulsorily for the minor degree, but maybe waived for students who have done similar/equivalent courses. If waived for a student, then the student must take an extra elective course in its place. It is recommended that students should complete the compulsory courses (or equivalents) before registering for the electives.

iii) Electives (minimum of 2 courses) to complete a total of 12 credits.

Note: A total of 04 Open Electives are offered in the curriculum. A student can complete the requirement for Minor within the 160 credits by opting for the courses offered through various verticals/tracks under Open Electives.

16. GUIDELINES FOR OFFERING HONORS

The objective of introducing B.Tech. (Hons.) is to facilitate the students to choose additionally the specialized courses of their choice and build their competence in a specialized area in the UG level. The programme is a best choice for academically excellent students having good academic record and interest towards higher studies and research.

- i) Honors is introduced in the curriculum of all B. Tech. programs offering a major degree and is applicable to all B. Tech (Regular and Lateral Entry) students admitted in Engineering & Technology.
- ii) A student shall earn additional 15 credits for award of B.Tech.(Honors) degree from same branch/department/discipline registered for major degree. This is in addition to the credits essential for obtaining the Undergraduate degree in Major Discipline (i.e., 160 credits).
- iii) A student is permitted to register for Honors in IV semester after the results of III Semester are declared and students may be allowed to take maximum two subjects per semester pertaining to the Honors from V Semester onwards.
- iv) The concerned Principal of the college shall arrange separate class work and timetable of the courses offered under Honors program.
- v) Courses that are used to fulfil the student's primary major may not be double counted towards the Honors. Courses with content substantially equivalent to courses in the student's primary Major may not be counted towards the Honors.
- vi) Students can complete the courses offered under Honors either in the college or in online platforms like SWAYAM with a minimum duration of 12 weeks for a 3-credit course and 8 weeks duration for a 2-credit course satisfying the criteria for credit mobility. If the courses under Honors are offered in conventional mode, then the teaching and evaluation procedure shall be similar to regular B. Tech courses.
- vii) The attendance for the registered courses under Honors and regular courses offered for Major degree in a semester are to be considered separately.
- viii) A student shall maintain an attendance of 75% in all registered courses under Honors to be eligible for attending semester end examinations.

- ix) A student registered for Honors shall pass in all subjects that constitute the requirement for the Honors degree program. No class/division (i.e., second class, first class and distinction, etc.) shall be awarded for Honors degree programme.
- x) If a student drops or is terminated from the Honors program, the additional credits so far earned cannot be converted into open or core electives; they will remain extra. However, such students will receive a separate grade sheet mentioning the additional courses completed by them.
- xi) The Honors will be mentioned in the degree certificate as Bachelor of Technology (Honors) in XYZ. For example, B.Tech. (Honors) in Mechanical Engineering

Enrolment into Honors:

- i) Students of a Department/Discipline are eligible to opt for Honors program offered by the same Department/Discipline
- ii) The enrolment of student into Honors is based on the CGPA obtained in the major degree program. CGPA shall be taken up to III semester in case of regular entry students and only III semester in case of lateral entry students. Students having 7 CGPA without any backlog subjects will be permitted to register for Honors.
- iii) If a student is detained due to lack of attendance either in Major or in Honors, registration shall be cancelled.
- iv) Transfer of credits from Honors to regular B. Tech degree and vice-versa shall not be permitted.
- v) Honors is to be completed simultaneously with a Major degree program.

Registration for Honors:

- i) The eligible and interested students shall apply through the HOD of his/her parent department. The whole process should be completed within one week before the start of every semester. Selected students shall be permitted to register the courses under Honors.
- ii) The selected students shall submit their willingness to the principal through his/her parent department offering Honors. The parent department shall maintain the record of student pursuing the Honors.
- iii) The students enrolled in the Honors courses will be monitored continuously. An advisor/mentor from parent department shall be assigned to a group of students to monitor the progress.
- iv) There is no fee for registration of subjects for Honors program offered in offline at the respective institutions.

17. ATTENDANCE REQUIREMENTS:

- i) A student shall be eligible to appear for the University external examinations if he/she acquires a minimum of 40% attendance in each subject and 75% of attendance in aggregate of all the subjects. b) Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in each semester may be granted by the College Academic Committee (CAC).
- ii) Shortage of Attendance below 65% in aggregate shall in NO CASE be condoned.
- iii) A stipulated fee shall be payable towards condonation of shortage of attendance to the Institution.
- iv) Students whose shortage of attendance is not condoned in any semester are not eligible to take their end examination of that class and their registration shall stand cancelled.
- v) A student will not be promoted to the next semester unless he satisfies the attendance requirements of the present semester. They may seek readmission for that semester from the date of commencement of class work.
- vi) If any candidate fulfils the attendance requirement in the present semester, he shall not be eligible for readmission into the same class.
- vii) If the learning is carried out in blended mode (both offline & online), then the total attendance of the student shall be calculated considering the offline and online attendance of the student.
- viii) For induction programme attendance shall be maintained as per AICTE norms.

18. PROMOTION RULES:

The following academic requirements must be satisfied in addition to the attendance requirements mentioned in section 16.

- i) A student shall be promoted from first year to second year if he/she fulfils the minimum attendance requirement as per university norms.
- ii) A student will be promoted from II to III year if he/she fulfils the academic requirement of securing 40% of the credits (any decimal fraction should be rounded off to lower digit) up to in the subjects that have been studied up to III semester.
- iii) A student shall be promoted from III year to IV year if he/she fulfils the academic requirements of securing 40% of the credits (any decimal fraction should be rounded off to lower digit) in the subjects that have been studied up to V semester.

- iv) And in case a student is detained for want of credits for a particular academic year by ii) & iii) above, the student may make up the credits through supplementary examinations and only after securing the required credits he/she shall be permitted to join in the V semester or VII semester respectively as the case may be.
- v) When a student is detained due to lack of credits/shortage of attendance he/she may be re-admitted when the semester is offered after fulfilment of academic regulations. In such case, he/she shall be in the academic regulations into which he/she is readmitted.

19. GRADING:

As a measure of the student’s performance, a 10-point Absolute Grading System using the following Letter Grades and corresponding percentage of marks shall be followed:

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

(a) Structure of Grading of Academic Performance

Range in which the marks in the subject fall	Grade	Grade points Assigned
90 & above	Superior	10
80 - 89	A (Excellent)	9
70 - 79	B (Very Good)	8
60 - 69	C (Good)	7
50 - 59	D (Average)	6
40 - 49	E (Pass)	5
< 40	F (Fail)	0
Absent	Ab (Absent)	0

- i) A student obtaining Grade 'F' or Grade 'Ab' in a subject shall be considered failed and will be required to reappear for that subject when it is offered the next supplementary examination.
- ii) For non-credit audit courses, "Satisfactory" or "Unsatisfactory" shall be indicated instead of the letter grade and this will not be counted for the computation of SGPA/CGPA/Percentage.
- iii) Computation of Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA):
- iv) The Semester Grade Point Average (SGPA) is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student, i.e.,

$$SGPA = \frac{\sum (C_i \times G_i)}{\sum C_i}$$

where, C_i is the number of credits of the i^{th} subject and G_i is the grade point scored by the student in the i^{th} course.

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

$$CGPA = \frac{\sum (C_i \times S_i)}{\sum C_i}$$

where " S_i " is the SGPA of the i^{th} semester and C_i is the total number of credits up to that semester.

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

While computing the SGPA the subjects in which the student is awarded Zero grade points will also be included.

Grade Point: It is a numerical weight allotted to each letter grade on a 10-point scale. Letter Grade: It is an index of the performance of students in a said course. Grades are denoted by the letters S, A, B, C, D and F.

(b) Award of Class:

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

Class Awarded	CGPA Secured
First Class with Distinction	≥ 7.5 (Without any Supplementary Appearance)
First Class	$\geq 6.5 < 7.5$
Second Class	$\geq 5.5 < 6.5$
Pass Class	$\geq 5.0 < 5.5$

Note: * Students who have written supplementary examinations to fulfil the credit requirement will not be awarded First Class with Distinction. For such students the highest degree that is awarded will be First Class Only.

CGPA to Percentage conversion Formula – $(CGPA - 0.5) \times 10$

20. WITH-HOLDING OF RESULTS

If the candidate has any dues not paid to the institution or if any case of indiscipline or malpractice is pending against him/her, the result of the candidate shall be withheld in such cases.

21. MULTIPLE ENTRY / EXIT OPTION

(a) Exit Policy:

The students can choose to exit the four-year programme at the end of first/second/third year.

- i) **UG Certificate in (Field of study/discipline)** - Programme duration: First year (first two semesters) of the undergraduate programme, 40 credits followed by an additional exit 10-credit bridge course(s) lasting two months, including at least 6- credit job-specific internship/ apprenticeship that would help the candidates acquire job-ready competencies required to enter the workforce.
- ii) **UG Diploma (in Field of study/discipline)** - Programme duration: First two years (first four semesters) of the undergraduate programme, 80 credits followed by an additional exit 10-credit bridge course(s) lasting two months, including at least 6- credit job-specific internship/ apprenticeship that would help the candidates acquire job-ready competencies required to enter the workforce.
- iii) **Bachelor of Science (in Field of study/discipline) i.e., B.Sc. Engineering in (Field of study/discipline)**- Programme duration: First three years (first six semesters) of the undergraduate programme, 120 credits.

(b) Entry Policy:

Modalities on multiple entry by the student into the B.Tech. programme will be provided in due course of time.

Note: The Universities / Institution shall resolve any issues that may arise in the implementation of Multiple Entry and Exit policies from time to time and shall review the policies in the light of periodic changes brought by UGC, AICTE and State government.

22. GAP YEAR CONCEPT:

Gap year concept for Student Entrepreneur in Residence is introduced and outstanding students who wish to pursue entrepreneurship / become entrepreneur are allowed to take a break of one year at any time after II year to pursue full-time entrepreneurship programme/to establish startups. This period may be extended to two years at the most and these two years would not be counted for the time for the maximum time for graduation. The principal of the respective college shall forward such proposals submitted by the students to the University.

An evaluation committee constituted by the University shall evaluate the proposal submitted by the student and the committee shall decide whether to permit the student(s) to avail the Gap Year or not.

23. TRANSITORY REGULATIONS

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

Candidates who are permitted to avail Gap Year shall be eligible for re-joining into the succeeding year of their B. Tech from the date of commencement of class work, subject to Section 2 and they will follow the academic regulations into which they are readmitted.

24. MINIMUM INSTRUCTION DAYS FOR A SEMESTER:

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

25. MEDIUM OF INSTRUCTION

The medium of instruction of the entire B. Tech undergraduate programme in Engineering & Technology (including examinations and project reports) will be in English only.

26. STUDENT TRANSFERS:

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

27. GENERAL INSTRUCTIONS:

- a) The academic regulations should be read as a whole for purpose of any interpretation.
- b) Malpractices rules-nature and punishments are appended.
- c) Where the words "he", "him", "his", occur in the regulations, they also include "she", "her", "hers", respectively.
- d) In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Head of the Institution is final.

- e) The Institution may change or amend the academic regulations or syllabi at any time and the changes or amendments shall be made applicable to all the students on rolls with effect from the dates notified by the Universities.
- f) In the case of any doubt or ambiguity in the interpretation of the guidelines given, the decision of the Head of the institution is final.

Academic Regulations (R23) for B. Tech (Lateral Entry Scheme)

(Effective for the students getting admitted into II year through Lateral Entry Scheme from the Academic Year 2024-2025 onwards)

1. AWARD OF THE DEGREE

(a) **Award of the B.Tech. Degree / B.Tech. Degree with a Minor if he/she fulfils th following:**

- (i) Pursues a course of study for not less than three academic years and not more than six academic years. However, for the students availing Gap year facility this period shall be extended by two years at the most and these two years would in addition to the maximum period permitted for graduation (Six years).
- (ii) Registers for 120 credits and secures all 120 credits.

(b) **Award of B.Tech. degree with Honors**

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

- (i) Student secures additional 15 credits fulfilling all the requisites of a B.Tech. program i.e., 120 credits.
- (ii) Registering for Honors is optional.
- (iii) Honors is to be completed simultaneously with B.Tech. programme.

2. Students, who fail to fulfil the requirement for the award of the degree within six consecutive academic years from the year of admission, shall forfeit their seat.

3. MINIMUM ACADEMIC REQUIREMENTS

The following academic requirements have to be satisfied in addition to the requirements mentioned in item no.2

- (i) A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory, practical, design, drawing subject or project if he secures not less than 35% of marks in the end examination and a minimum of 40% of marks in the sum total of the mid semester evaluation and end examination taken together.
- (ii) A student shall be promoted from III year to IV year if he/she fulfils the academic requirements of securing 40% of the credits (any decimal fraction should be rounded off to lower digit) in the subjects that have been studied up to V semester.

And in case if student is already detained for want of credits for particular academic year, the student may make up the credits through supplementary exams of the above exams before the commencement of IV year I semester class work of next year.

4. COURSE PATTERN

- (i) The entire course of study is three academic years on semester pattern.
- (ii) A student eligible to appear for the end examination in a subject but absent at it or has failed in the end examination may appear for that subject at the next supplementary examination offered.
- (iii) When a student is detained due to lack of credits/shortage of attendance the student may be re-admitted when the semester is offered after fulfilment of academic regulations, the student shall be in the academic regulations into which he/she is readmitted.

- 5.** All other regulations as applicable for B. Tech. Four-year degree course (Regular) will hold good for B. Tech. (Lateral Entry Scheme).

**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(AUTONOMOUS)
DEPARTMENT OF SCIENCE & HUMANITIES**

I B.Tech I/II sem

23HSM111

**COMMUNICATIVE ENGLISH
(Common to All Branches of Engineering)**

**L T P C
2 0 0 2**

COURSE EDUCATIONAL OBJECTIVES

The main objective of introducing this course, *communicative English*, is to facilitate effective listening, Reading, Speaking and Writing skills among the students. It enhances the same in their comprehending abilities, oral presentations, reporting useful information and providing knowledge of grammatical structures and vocabulary. This course helps the students to make them effective in speaking and writing skills and to make them industry ready.

UNIT-I: HUMAN VALUES-Gift of Magi (Short Story)

- Listening:** Identifying the topic, the context and specific pieces of information by listening to short audio texts and answering a series of questions.
- Speaking:** Asking and answering general questions on familiar topics such as home, family, work, studies and interests; introducing oneself and others.
- Reading:** Skimming to get the main idea of a text; scanning to look for specific pieces of information.
- Writing:** Mechanics of Writing-Capitalization, Spelling Punctuation – Parts of Sentences.
- Grammar:** Parts of Speech, Basic Sentence Structures - forming questions
- Vocabulary:** Synonyms, Antonyms, Affixes(Prefixes/Suffixes), Root words.

UNIT-II: NATURE-The Brook by Alfred Tennyson (Poem)

- Listening:** Answering a series of questions about main ideas and supporting ideas after listening to audio texts.
- Speaking:** Discussion in pairs/small groups on specific topics followed by short structure talks.
- Reading:** Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together.
- Writing:** Structure of a paragraph - Paragraph writing (specific topics)
- Grammar:** Cohesive devices-linkers, use of articles and zero article; prepositions.
- Vocabulary:** Homonyms, Homophones, Homographs.

UNIT-III: BIOGRAPHY-Elon Musk

- Listening:** Listening for global comprehension and summarizing what is listened to.
- Speaking:** Discussing specific topics in pairs or small groups and reporting what is discussed
- Reading:** Reading at extended detail by making basic inferences-recognizing and interpreting specific context clues; strategies to use text clues for comprehension.
- Writing:** Summarizing, Note-making, paraphrasing
- Grammar:** Verbs-tenses; subject-verb agreement; Compound words, Collocations
- Vocabulary:** Compound words, Collocations

UNIT-IV: INSPIRATION-The Toys of Peace by Saki

- Listening:** Making predictions while listening to conversations/ transactional dialogues without video; listening with video.
- Speaking:** Role plays for practice of conversational English in academic contexts (formal and informal) –asking for and giving information/directions.
- Reading:** Studying the use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communicate processes or display complicated data.
- Writing:** Letter Writing: Official Letters, Resumes
- Grammar:** Reporting verbs, Direct & Indirect speech, Active & Passive Voice
- Vocabulary:** Words often confused, Jargons

UNIT-V: MOTIVATION-The Power of Intrapersonal Communication (An Essay)

- Listening:** Identifying key terms, understanding concepts and answering a series of relevant questions that test comprehension.
- Speaking:** Formal oral presentations on topics from academic contexts
- Reading:** Reading comprehension.
- Writing:** Writing structure of an essay on specific topics.
- Grammar:** Editing short texts –identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject verb agreement)
- Vocabulary:** Technical Jargons

COURSE OUTCOMES:

On successful completion of the course the student will enable to		PO
CO1	Understand the context, topic, and pieces of specific information from social or transactional dialogues.	PO1
CO2	Apply grammatical structures to formulate sentences and correct word forms.	PO5
CO3	Analyze course materials to speak clearly on a specific topic in informal discussions	PO2
CO4	Evaluate reading/listening texts and To write summaries based on global comprehension of these texts.	PO6
CO5	Create a coherent paragraph, essay, and resume.	PO4

TEXT BOOKS:

1. Pathfinder: Communicative English for Undergraduate Students, 1st Edition, Orient Black Swan, 2023
2. Empowering with Language by Cengage Publications, 2023

REFERENCE BOOKS:

1. Dubey, Sham Ji & Co. English for Engineers, Vikas Publishers, 2020
2. Bailey, Stephen. Academic writing: A Handbook for International Students. Routledge, 2014
3. Murphy, Raymond. English Grammar in Use, Fourth Edition, Cambridge University Press, 2019.
4. Lewis, Norman. Word Power Made Easy - The Complete Handbook for Building a Superior Vocabulary. Anchor, 2014.

REFERENCE WEBSITES:

GRAMMAR:

1. www.bbc.co.uk/learningenglish
2. <https://dictionary.cambridge.org/grammar/british-grammar/>
3. www.eslpod.com/index.html
4. <https://www.learngrammar.net/>
5. <https://english4today.com/english-grammar-online-with-quizzes/>
6. <https://www.talkenglish.com/grammar/grammar.aspx>

VOCABULARY

1. <https://www.youtube.com/c/DailyVideoVocabulary/videos>
2. https://www.youtube.com/channel/UC4cmBAit8i_NJZE8qK8sfpA

CO-PO MAPPING

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C01	3	-	-	-	-	-	-	-	-	-	-	-
C02	-	-	-	-	3	-	-	-	-	-	-	-
C03	-	3	-	-	-	-	-	-	-	-	-	-
C04	-	-	-	-	-	3	-	-	-	-	-	-
C05	-	-	-	3	-	-	-	-	-	-	-	-
CO	3	3	-	3	3	3	-	-	-	-	-	-

**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(AUTONOMOUS)
DEPARTMENT OF SCIENCE & HUMANITIES**

I B.Tech I sem

23BSC114	LINEAR ALGEBRA & CALCULUS (Common to All Branches of Engineering)	L	T	P	C
		2	1	-	3

COURSE EDUCATIONAL OBJECTIVES:

1. To familiarize the concepts of matrices and mean value theorems and their applications in engineering.
2. To equip the students to solve various application problems in engineering through evaluation of multiple integrals etc.,
3. To equip the students with standard concepts and tools of mathematics to handle various real-world problems and their applications.

UNIT-I: MATRICES (9)

Rank of a matrix by echelon form, normal form. Cauchy–Binet formulae (without proof). Inverse of Non- singular matrices by Gauss-Jordan method, System of linear equations: Solving system of Homogeneous and Non-Homogeneous equations by Gauss elimination method. Iterative methods: Jacobi and Gauss Seidel Methods.

UNIT-II: EIGEN VALUES, EIGEN VECTORS AND ORTHOGONAL TRANSFORMATION (9)

Eigen values, Eigenvectors and their properties, Diagonalization of a matrix, Cayley-Hamilton Theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton Theorem, Quadratic forms and Nature of the Quadratic Forms, Reduction of Quadratic form to canonical forms by Orthogonal Transformation.

UNIT-III: CALCULUS (9)

Mean Value Theorems: Rolle’s Theorem, Lagrange’s mean value theorem with their geometrical interpretation, Cauchy’s mean value theorem, Taylor’s and Maclaurin’s theorems with remainders (without proof), Problems and applications on the above theorems.

UNIT-IV: PARTIAL DIFFERENTIATION AND APPLICATIONS (MULTI VARIABLE CALCULUS) (9)

Functions of several variables: Continuity and Differentiability, Partial derivatives, total derivatives, chain rule, Taylor’s and Maclaurin’s series expansion of functions of two variables. Jacobians, Functional dependence, maxima and minima of functions of two variables, method of Lagrange multipliers.

UNIT-V: MULTIPLE INTEGRALS (MULTIPLE VARIABLE CALCULUS) (9)

Double integrals, Triple integrals, change of order of integration, change of variables to polar, cylindrical and spherical coordinates. Finding areas (by double integrals) and volumes (by double integrals and triple integrals).



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.

(AUTONOMOUS)

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

I B.Tech- I Semester

23ESC112

BASIC ELECTRICAL & ELECTRONICS ENGINEERING

(Common to All branches of Engineering)

L	T	P	C
2	1	0	3

PART A: BASIC ELECTRICAL ENGINEERING

PRE-REQUISITES: Nil

COURSE EDUCATIONAL OBJECTIVES:

1. Apply fundamental circuit theories to both DC and AC circuits, and analyze the complex circuit configurations.
2. Gain proficiency in understanding, operating, and analyzing electrical machines and their applications in various industries and understanding the concept of measuring instruments
3. Gain knowledge about various energy resources and understand the concept of electrical energy consumption, billing mechanism, and safety measures.

UNIT-1: DC & AC Circuits:

DC Circuits: Electrical circuit elements (R, L and C), Ohm's Law and its limitations, KCL & KVL, series, parallel, series-parallel circuits, Super Position theorem, Simple numerical problems.

AC Circuits: A.C. Fundamentals: Equation of AC Voltage and current, waveform, time period, frequency, amplitude, phase and phase difference, average value, RMS value, form factor, peak factor, Voltage and current relationship with phasor diagrams in R, L, and C circuits, Concept of Impedance, Active power, reactive power and apparent power, Concept of power factor (Simple Numerical problems).

UNIT-2: Machines and Measuring Instruments:

Machines: Construction, principle and operation of (i) DC Motor, (ii) DC Generator, (iii) Single Phase Transformer, (iv) Three Phase Induction Motor (v) Alternator, Applications of electrical machines.

Measuring Instruments: Construction and working principle of Moving Coil and Moving Iron Instruments, Dynamometer Wattmeter, Energy meter and Wheat Stone bridge.

UNIT-3: Energy Resources, Electricity Bill & Safety Measures:

Energy Resources: Conventional and non-conventional energy resources; Layout and operation of various Power Generation systems: Hydel, Thermal, Nuclear, Solar & Wind power generation.

Electricity bill: Power rating of household appliances including air conditioners, PCs, Laptops, Printers, etc. Definition of "unit" used for consumption of electrical energy, two-part electricity tariff, calculation of electricity bill for domestic consumers.

Equipment Safety Measures: Working principle of Fuse and Miniature circuit breaker (MCB), merits and demerits. Personal safety measures: Electric Shock, Earthing and its types, Safety Precautions to avoid shock.



PART B: BASIC ELECTRONICS ENGINEERING

PRE-REQUISITES: Nil

COURSE EDUCATIONAL OBJECTIVES:

1. Gain the knowledge on basic semiconductor devices
2. Acquire the knowledge on electronic circuits and instrumentation.
3. Understand the principles of digital electronics, combinational circuits and sequential circuits

UNIT-1: SEMICONDUCTOR DEVICES

Introduction - Evolution of electronics – Vacuum tubes to nano electronics - Characteristics of PN Junction Diode – Zener Effect – Zener Diode and its Characteristics. Bipolar Junction Transistor – CB, CE, CC Configurations and Characteristics – Elementary Treatment of Small Signal CE Amplifier.

UNIT-2: BASIC ELECTRONIC CIRCUITS AND INSTRUMENTATION

Rectifiers and power supplies: Block diagram description of a dc power supply, working of a full wave bridge rectifier, capacitor filter (no analysis), working of simple zener voltage regulator. Amplifiers: Block diagram of Public Address system, Circuit diagram and working of common emitter (RC coupled) amplifier with its frequency response. Electronic Instrumentation: Block diagram of an electronic instrumentation system.

UNIT-3: DIGITAL ELECTRONICS

Overview of Number Systems, Logic gates including Universal Gates, BCD codes, Excess-3 code, gray code, Hamming code. Boolean Algebra, Basic Theorems and properties of Boolean Algebra, Truth Tables and Functionality of Logic Gates – NOT, OR, AND, NOR, NAND, XOR and XNOR. Simple combinational circuits–Half and Full Adder, Introduction to sequential circuits, Flip flops, Registers and counters (Elementary Treatment only)

Course Outcomes:

On successful completion of the course the student could be		POs
CO1	Understand the concept and working of diodes, transistors, and their applications.	PO1, PO2, PO3, PO12
CO2	Analyze the electronic circuits and instrumentation	PO1, PO2, PO3, PO12
CO3	Familiarize with the number systems, codes, Boolean algebra and logic gates and understand the working of different combinational & sequential circuits.	PO1, PO2, PO3, PO12

TEXTBOOKS:

1. R. L. Boylestad & Louis Nashlesky, Electronic Devices & Circuit Theory, Pearson Education, 2021.
2. R. P. Jain, Modern Digital Electronics, 4th Edition, Tata Mc Graw Hill, 2009

**SREENIVASAINSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)**

I B.Tech. – I / II Semester

23ESC113

**ENGINEERING GRAPHICS
(Common to All Branches)**

**L T P C
1 - 4 3**

PRE-REQUISITES: Nil.

COURSE EDUCATIONAL OBJECTIVES:

1. To expose them to national standards related to technical drawings and develop knowledge of basic engineering curves.
2. To develop drawing skills for communication of concepts, ideas and design of projections of points, lines and planes.
3. To develop geometrical shapes and multiple views of projections of solids.
4. To develop drawing skills for communication of concepts, ideas and design the development of surfaces of section of solids.
5. To develop geometrical shapes and multiple views of orthographic projections of isometric views.

UNIT –1: ENGINEERING CURVES AND SCALES (9)

Introduction: Introduction about lines, lettering and dimensioning – Geometrical constructions and constructing regular polygons by general methods. **Engineering Curves:** Construction of ellipse, parabola and hyperbola by general method – Construction of cycloids – Construction involutes – Drawing of tangents and normal to the above curves. **Scales:** Plain scales, and diagonal.

UNIT –2: PROJECTION OF POINTS, LINES AND PLANE SURFACES (12)

Projection of Points: Principles of orthographic projection – Reference lines and Plane – Projections of points. **Projection of Lines:** Projections of lines parallel to both reference planes, perpendicular to one reference plane and parallel to other reference plane, inclined to one reference plane and parallel to the other reference plane – Determination of true lengths, true inclinations by rotating line and trapezoidal method. **Projection of Planes:** Perpendicular to both reference planes, parallel to one reference plane and inclined to the other reference plane; plane inclined to both the reference planes.

UNIT –3: PROJECTION OF SOLIDS (12)

Projection of Solids: Types of solids – Projection of simple solids (prisms, pyramids, cylinder and cone) – Axis perpendicular to horizontal plane, axis perpendicular to vertical plane and axis parallel to both the reference planes, projection of solids with axis inclined to one reference plane and parallel to another plane.

UNIT –4: SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES (12)

Section of Solids: Sectioning of right regular solids like prisms, pyramids, cylinder and cone – Solids in simple vertical position when the cutting plane is inclined to the one of the principal planes and perpendicular to the other plane – Obtaining true shape of section. **Development of Surfaces:** Development of Surfaces: Development of lateral surfaces of simple and sectioned solids like prisms, pyramids, cylinder and cone.

**SREENIVASAINSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)**

UNIT –5: ISOMETRIC PROJECTIONS AND ORTHOGRAPHIC PROJECTIONS (9)

Isometric Projection: Principles of isometric projection – Isometric scale – Isometric views of simple solids and truncated solids like prisms, pyramids, cylinder, sphere, and cone. **Orthographic Projections:** Visualization principles – Plane of projections – Representation of three-dimensional objects – Sketching of multiple views from pictorial views – Conversion of isometric views to orthographic views – Conversion of orthographic views to isometric views.

COMPUTER GRAPHICS (Not for Examination)

(3)

Practicing of simple 2D and 3D drawings of objects using Auto CAD

Total Hours: 60

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Construct the Engineering curves and generate tangent and normal for those curves.	PO1, PO2, PO3, P10, PO12
CO2	Draw the projection of points, lines and plane surfaces.	PO1, PO2, PO3, P10, PO12
CO3	Draw the projection of solids, like prisms, pyramids, cylinder, and cone.	PO1, PO2, PO3, P10, PO12
CO4	Draw the section of solids and development of surfaces.	PO1, PO2, PO3, P10, PO12
CO5	Draw the isometric projections and orthographic views.	PO1, PO2, PO3, P10, PO12

TEXT BOOKS:

1. N.D. Bhatt and V. M. Panchal, "Engineering Drawing", Charotar Publishing House, 50th edition, 2010.
2. M.B.Shah and B.C.Rana , "Engineering Drawing", Pearson Education, 2/e, 2009.

REFERENCE BOOKS:

3. K.L.Narayana and P.Kannaiah, "Engineering Drawing", 2/e, 2012, Scitech Publishers.
4. Luzzader, Warren.J and Duff,John M, "Fundamentals of Engineering Drawing with an Introduction to Interactive Computer Graphics for Design and Production", Eastern Economy Edition, Prentice Hall of India Pvt. Ltd, New Delhi, 2005.
5. K.Venugopal and V.Prabhu Raja , "Engineering Graphics", New Age International (P) Limited, 2008.
6. Basant Agarwal and C.M.Agarwal , "Engineering Drawing", Tata McGraw Hill Publishing Company Limited, New Delhi, , 2008,
7. K.V.Natrajan , "A Text book of Engineering Graphics", Dhanalakshmi Publishers, Chennai. 2009.
8. Creating 2D&3D drawings of objects including PCB and Transformations using Auto CAD

**SREENIVASAINSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)**

REFERENCE WEBSITE:

1. <https://nptel.ac.in/courses/112/102/112102304/>
2. <https://nptel.ac.in/courses/112/105/112105294/>
3. <https://nptel.ac.in/courses/112/103/112103019/>
4. <https://nptel.ac.in/courses/112/104/112104172/>

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



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

I B.Tech - I Semester

**23ESC114
INTRODUCTION TO PROGRAMMING
(Common to all Branches)**

**L T P C
2 1 0 3**

PRE-REQUISITES: Nil

COURSE EDUCATIONAL OBJECTIVES:

1. To introduce students to the fundamentals of computer programming.
2. To provide logical thinking and problem-solving skills using control structures.
3. To familiarize students with programming concepts such as data types, arrays and strings.
4. To introduce the concepts of pointers and user-define data types.
5. To encourage the students with functions and file handling mechanisms.

UNIT- 1 Introduction to Programming and Problem Solving (10)

History of Computers, Basic organization of a computer: ALU, input-output units, memory, program counter, Introduction to Programming Languages, Basics of a Computer Program- Algorithms, flowcharts. Introduction to Compilation and Execution, Primitive Data Types, Variables, and Constants, Basic Input and Output, Operators and Expressions, Type Conversion, and Casting.

Problem solving techniques: Algorithmic approach, characteristics of algorithm, Problem solving strategies: Top-down approach, Bottom-up approach, Time and space complexities of algorithms.

UNIT- 2 Control Structures (8)

Simple sequential programs, Conditional Statements (if, if-else, switch), Loops (for, while, do-while). Break and Continue.

UNIT- 3 Arrays and Strings (9)

Arrays indexing, memory model, programs with array of integers, two dimensional arrays. Strings-Declaring and Initializing String Variables, Reading string from terminal, Writing string to the screen, String Handling Functions.

UNIT-4 Pointers & User Defined Data types (9)

Pointers, dereferencing and address operators, pointer and address arithmetic, array manipulation using pointers. User-defined data types-Structures and Unions.

UNIT-5 Functions & File Handling (9)

Introduction to Functions, Function Declaration and Definition, Function call Return Types and Arguments, modifying parameters inside functions using pointers, arrays as parameters. Scope and Lifetime of Variables. File Handling- Basic Operations on Files – File Handling Function.

TOTAL HOURS: 45

COURSE OUTCOMES:

On successful completion of the course the student will be able to,		POs related to COs
CO1	Understand basics of computers, the concept of algorithm and algorithmic thinking.	PO1, PO2
CO2	Analyze a problem and develop an algorithm and program using control structures to solve it.	PO1, PO2, PO3
CO3	Implement various programming concepts using arrays and strings.	PO1,PO2, PO3, PO4
CO4	Understand and implement more advanced features of pointers and user-defined data types.	PO1, PO2, PO5
CO5	Develop problem-solving using functions and file handling concepts.	PO1, PO3, PO4, PO5



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
(Accredited by NBA)

TEXT BOOKS:

1. "The C Programming Language", Brian W. Kernighan and Dennis M. Ritchie, Prentice-Hall, 1988
2. Schaum's Outline of Programming with C, Byron S Gottfried, McGraw-Hill Education, 1996

REFERENCE BOOKS:

1. Computing fundamentals and C Programming, Balagurusamy, E., McGraw-Hill Education, 2008.
2. Programming in C, Rema Theraja, Oxford, 2016, 2nd edition
3. C Programming, A Problem Solving Approach, Forouzan, Gilberg, Prasad, CENGAGE, 3rd edition

REFERENCE WEBSITES:

1. https://onlinecourses.swayam2.ac.in/cec22_cs11
2. https://onlinecourses.nptel.ac.in/noc22_cs40
3. <https://www.geeksforgeeks.org>

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	3	-	-	-	-	-	-	-	-
CO4	3	3	-	-	3	-	-	-	-	-	-	-
CO5	3	-	3	3	3	-	-	-	-	-	-	-
CO*	3	3	2	3	3	-	-	-	-	-	-	-

**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(AUTONOMOUS)
DEPARTMENT OF SCIENCE & HUMANITIES**

I B.Tech I/II sem

23HSM112	COMMUNICATIVE ENGLISH LAB	L	T	P	C
	(Common to all Branches of Engineering)	-	-	2	1

COURSE EDUCATIONAL OBJECTIVES:

The main objective of introducing this course, *Communicative English Laboratory*, is to expose the students to a variety of self-instructional, learner friendly modes of language learning students will get trained in the basic communication skills and make them ready to face job interviews.

LIST OF TOPICS:

1. Vowels & Consonants
2. Neutralization/Accent Rules
3. Communication Skills & JAM
4. Role Play, Conversational Practice and TED talks
5. E-mail Writing
6. Resume Writing, Cover letter, SOP
7. Group Discussions-methods & practice
8. Debates-Methods & Practice
9. PPT Presentations/Poster Presentation
10. Interviews Skills

SUGGESTED SOFTWARES:

1. Walden Info tech
2. Young India Films

REFERENCE BOOKS:

1. MeenakshiRaman,Sangeeta-Sharma.TechnicalCommunication.OxfordPress.2018.
2. GrantTaylor:EnglishConversationPractice,TataMcGraw-HillEducationIndia,2016
3. Hewing's,Martin.CambridgeAcademicEnglish(B2).CUP,2012.
4. T.Balasubramanyam,ATextbookofEnglishPhoneticsforIndianStudents,(3rdEd)TrinityPress.

WEB RESOURCES:

1. www.esl-lab.com
2. www.englishmedialab.com
3. www.englishinteractive.net
4. <https://www.britishcouncil.in/english/online>
5. <http://www.letstalkpodcast.com/>
6. https://www.youtube.com/c/mmmEnglish_Emma/featured
7. <https://www.youtube.com/c/ArnelsEverydayEnglish/featured>
8. <https://www.youtube.com/c/engvidAdam/featured>
9. <https://www.youtube.com/c/EnglishClass101/featured>
10. <https://www.youtube.com/c/SpeakEnglishWithTiffani/playlists>
11. https://www.youtube.com/channel/UCV1h_cBE0Drdx19qkTM0WNw

COURSE OUTCOMES:

On successful completion of the course the student will be able to		PO
CO1	Understand the different aspects of the English language proficiency with emphasis on LSRW skills.	PO1
CO2	Apply communication skills through various language learning activities.	PO5
CO3	Analyze the English speech sounds, stress, rhythm, into nation and syllable division for better listening and speaking comprehension.	PO6
CO4	Evaluate and exhibit professionalism in participating in debates and group discussions.	PO2
CO5	Create effective resonance and prepare themselves to face interviews in future.	PO10

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	-	-
CO	3	3	-	-	3	3	-	-	-	3	-	-



PRE-REQUISITES: Nil

COURSE EDUCATIONAL OBJECTIVES:

1. To provide knowledge on flowchart and algorithm to the given problem
2. To exercise conditional and iterative statements to write C programs
3. To develop the skill of C programs using arrays, strings and functions.
4. To understand C programs using pointers, Structures and union.
5. To familiarize with file handling techniques.

Week 1

Familiarization with programming environment

- i) Basic Linux environment and its editors like Vi, Vim & Emacs etc.
- ii) Exposure to Turbo C, gcc
- iii) Writing simple programs using printf(), scanf()

Week 2

Converting algorithms/flow charts into C Source code.

Developing the algorithms/flowcharts for the following sample programs

- i) Sum and average of 3 numbers
- ii) Conversion of Fahrenheit to Celsius and vice versa
- iii) Simple interest Calculation

Week 3

Simple computational problems using arithmetic expressions.

- i) Finding the square root of a given number
- ii) Finding compound interest
- iii) Area of a triangle using heron's formulae
- iv) Distance travelled by an object

Week 4

Simple computational problems using the operator' precedence and associativity

- i) Evaluate the following expressions.
 - a. $A+B*C+(D*E) + F*G$
 - b. $A/B*C-B+A*D/3$
 - c. $A+++B---A$
 - d. $J= (i++) + (++i)$
- ii) Find the maximum of three numbers using conditional operator
- iii) Take marks of 5 subjects in integers, and find the total, average in float

Week 5

Problems involving if-then-else structures.

- i) Write a C program to find the max and min of four numbers using if-else.
- ii) Write a C program to generate electricity bill.
- iii) Find the roots of the quadratic equation.
- iv) Write a C program to simulate a calculator using switch case.
- v) Write a C program to find the given year is a leap year or not.



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Week 6

Iterative problems e.g., the sum of series

- i) Find the factorial of given number using any loop.
- ii) Find the given number is a prime or not.
- iii) Compute sine and cos series
- iv) Checking a number palindrome
- v) Construct a pyramid of numbers

Week 7

1D Array manipulation, linear search

- i) Find the min and max of a 1-D integer array.
- ii) Perform linear search on 1D array.
- iii) The reverse of a 1D integer array
- iv) Find 2's complement of the given binary number.
- v) Eliminate duplicate elements in an array.

Week 8

Matrix problems, String operations, Bubble sort

- i) Addition of two matrices
- ii) Multiplication two matrices
- iii) Sort array elements using bubble sort
- iv) Concatenate two strings without built-in functions
- v) Reverse a string using built-in and without built-in string functions

Week 9

Pointers

- i) Write a C program to find the sum of a 1D array using pointers
- ii) Enter n students data using Pointers and display failed students list
- iii) Demonstrate the arithmetic operations using pointers.
- iv) Write a C Program using Pointers to Read in an Array of Integers and Print its Elements in Reverse Order

Week 10

Structures and Unions

- i) Demonstrate the differences between structures and unions using a C program.
- ii) Write a C program to find the total, average of n students using structures
- iii) Write a C program to copy one structure variable to another structure of the same type.
- iv) Write a C program to shift/rotate using bit fields.

Week 11

Simple functions using call by value, solving differential equations using Euler's theorem.

- i) Write a C function to calculate NCR value.
- ii) Write a C function to find the length of a string.
- iii) Write a C function to transpose of a matrix.
- iv) Write a C function to demonstrate numerical integration of differential equations using Euler's method

Week 12

Recursive functions

- i) Write a recursive function to generate Fibonacci series.
- ii) Write a recursive function to find the GCD of two numbers.
- iii) Write a recursive function to find the factorial of a number.
- iv) Write a recursive function to find the sum of series.



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Week 13

Simple functions using Call by reference.

- i) Write a C program to swap two numbers using call by reference.
- ii) Write a C program to copy one string into another using pointer.
- iii) Write a C program to find no of lowercase, uppercase, digits and other characters using pointers.

Week 14

File operations

- i) Write a C program to write and read text into a file.
- ii) Write a C program to write and read text into a binary file using fread() and fwrite()
- iii) Copy the contents of one file to another file.
- iv) Write a C program to merge two files into the third
- v) Write a C program to print last n characters of a given file.

Total Hours: 45

COURSE OUTCOMES:

After the successful completion of this course, the students able to:		POs related to COs
CO1	Read and understand the execution of programs written in C language.	PO1
CO2	Analyze the programs on control statements and arrays.	PO2
CO3	Design C programs which utilize memory efficiently using programming constructs like pointers.	PO3
CO4	Develop the programs to demonstrate the applications of arrays, functions, basic concepts of pointers in C	PO4
CO5	Analyze and implement the advanced concepts on functions and File handling techniques.	PO5
CO6	Follow the ethical principles in implementing the programs	PO8
CO7	Do experiments effectively as an individual and as a team member in a group.	PO9
CO8	Communicate verbally and in written form, the understanding about the experiments.	PO10
CO9	Continue updating their skill related to loops, pointers and files, implementing programs in future.	PO12

TEXT BOOKS:

1. Ajay Mittal, Programming in C: A practical approach, Pearson.
2. Byron Gottfried, Schaum's Outline of Programming with C, McGraw Hill

REFERENCE BOOKS:

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice-Hall of India
2. C Programming, A Problem-Solving Approach, Forouzan, Gilberg, Prasad, CENGAGE

REFERENCE WEBSITES:

1. https://onlinecourses.swayam2.ac.in/cec22_cs11
2. https://onlinecourses.nptel.ac.in/noc22_cs40
3. <https://www.geeksforgeeks.org>.



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CO-PO MAPPING:

CO-PO	PO 1	PO 2	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
CO*	3	3	3	3	3	-	-	3	3	3		3



23ESC116 ELECTRICAL & ELECTRONICS ENGINEERING WORKSHOP

L T P C
0 0 3 1.5

(Common to All branches of Engineering)

COURSE EDUCATIONAL OBJECTIVES:

- 1 Gain the knowledge on basic laws
- 2 Acquire the knowledge on theorems and Characteristics.
- 3 Analyze the Power and Power factor measurement
- 4 Analyze various characteristics of electrical circuits, electrical machines and measuring instruments
- 5 Measurement of various electrical parameters; Household and commercial wiring

Activities:

1. Familiarization of commonly used Electrical & Electronic Workshop Tools: Bread board, Solder, cables, relays, switches, connectors, fuses, Cutter, plier, screwdriver set, wire stripper, flux, knife/blade, soldering iron, de-soldering pump etc.
 - Provide some exercises so that hardware tools and instruments are learned to be used by the students.
2. Familiarization of Measuring Instruments like Voltmeters, Ammeters, multimeter, LCR-Q meter, Power Supplies, CRO, DSO, Function Generator, Frequency counter.
 - Provide some exercises so that measuring instruments are learned to be used by the students.
3. Components:
 - Familiarization/Identification of components (Resistors, Capacitors, Inductors, Diodes, transistors, IC's etc.) – Functionality, type, size, colour coding package, symbol, cost etc.
 - Testing of components like Resistor, Capacitor, Diode, Transistor, ICs etc. - Compare values of components like resistors, inductors, capacitors etc with the measured values by using instruments

PART A: ELECTRICAL ENGINEERING LAB

List of experiments:

1. Verification of Ohms law, KCL and KVL
2. Verification of Superposition theorem
3. Measurement of Resistance using Wheat stone bridge
4. Magnetization Characteristics of DC shunt Generator
5. Measurement of Power and Power factor using Single-phase wattmeter
6. Measurement of Earth Resistance using Megger
7. Calculation of Electrical Energy for Domestic Premises

Course Outcomes:

On successful completion of the course the student could be		POs
CO1	Understand the Electrical circuit design concept; measurement of resistance, power, power factor; concept of wiring and operation of Electrical Machines and Transformer.	PO1, PO2, PO3
CO2	Apply the theoretical concepts and operating principles to derive mathematical models for circuits, Electrical machines and measuring instruments; calculations for the measurement of resistance, power and power factor.	PO1, PO2, PO3
CO3	Apply the theoretical concepts to obtain calculations for the measurement of resistance, power and power factor.	PO1, PO2, PO3
CO4	Analyze various characteristics of electrical circuits, electrical machines and measuring instruments.	PO1, PO2, PO3, PO12
CO5	Design suitable circuits and methodologies for the measurement of various electrical parameters; Household and commercial wiring.	PO1, PO2, PO3, PO12



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PART B: ELECTRONICS ENGINEERING LAB

COURSE EDUCATIONAL OBJECTIVES:

- 1 Identify & testing of various electronic components.
- 2 Understand the usage of electronic measuring instruments.
- 3 Evaluate the performance of rectifiers
- 4 Study the characteristics of various electron devices
- 5 Obtain the operation of a digital circuit.

Note: Minimum Six Experiments to be performed. All the experiments shall be implemented using both Hardware and Software.

List of Experiments:

1. Plot V-I characteristics of PN Junction diode A) Forward bias B) Reverse bias.
2. Plot V – I characteristics of Zener Diode and its application as voltage Regulator.
3. Implementation of half wave and full wave rectifiers
4. Plot Input & Output characteristics of BJT in CE and CB configurations
5. Frequency response of CE amplifier.
6. Simulation of RC coupled amplifier with the design supplied
7. Verification of Truth Table of AND, OR, NOT, NAND, NOR, Ex-OR, Ex-NOR gates using ICs.
8. Verification of Truth Tables of S-R, J-K& D flip flops using respective ICs.

Tools / Equipment Required: DC Power supplies, Multi meters, DC Ammeters, DC Voltmeters, AC Voltmeters, CROs, all the required active devices.

COURSE OUTCOMES:

On successful completion of the course the student could be		POs
CO1	Identify & testing of various electronic components.	PO1, PO2, PO3,
CO2	Understand the usage of electronic measuring instruments.	PO1, PO2, PO3,
CO3	Evaluate the performance of rectifiers	PO1, PO2, PO3,
CO4	Plot and discuss the characteristics of various electron devices	PO1, PO2, PO3, PO12
CO5	Obtain the operation of a digital circuit.	PO1, PO2, PO3, PO12

REFERENCES:

1. R. L. Boylestad & Louis Nashlesky, Electronic Devices & Circuit Theory, Pearson Education, 2021.
2. R. P. Jain, Modern Digital Electronics, 4th Edition, Tata Mc Graw Hill, 2009 3. R. T. Paynter, Introductory Electronic Devices & Circuits – Conventional Flow Version, Pearson Education, 2009.



I B.Tech. – I /II Semester

23ESC118 IT WORKSHOP LAB

(Common to all branches of Engineering)

L	T	P	C
0	0	2	1

PRE-REQUISITES: Nil

COURSE OBJECTIVES:

1. To introduce the internal parts of a computer, peripherals, I/O ports, connecting cables.
2. To demonstrate configuring the system as Dual boot both Windows and other Operating Systems Viz. Linux, BOSS
3. To teach basic command line interface commands on Linux.
4. To teach the usage of Internet for productivity and self-paced life-long learning
5. To introduce Compression, Multimedia and Antivirus tools and Office Tools such as Word processors, Spread sheets and Presentation tools.

List of Experiments:

PC Hardware & Software Installation

1. Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.
2. Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video would be given as part of the course content.
3. Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.
4. Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot (VMWare) with both Windows and Linux. Lab instructors should verify the installation and follow it up with a Viva
5. Every student should install BOSS on the computer. The system should be configured as dual boot (VMWare) with both Windows and BOSS. Lab instructors should verify the installation and follow it up with a Viva

Internet & World Wide Web

6. 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.
7. Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.
8. 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 to the instructors by the student.
9. Cyber Hygiene: Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to customize their browsers to block pop ups, block active x downloads to avoid viruses and/or worms.



LaTeX and WORD

10. Word Orientation: The mentor needs to give an overview of La TeX and Microsoft (MS) office or equivalent (FOSS) tool word: Importance of La TeX and MS office or equivalent(FOSS) tool Word as word Processors, Details of the four tasks and features that would be covered in each, Using La TeXand word – Accessing, overview of toolbars, saving files, Usinghelp and resources, rulers, format painter in word.

11. Using La TeX and Word to create a 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 La TeXand Word.

12. Creating project abstract Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

13. Creating a Newsletter: Features to be covered:- Table of Content, Newspaper columns,Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

EXCEL

Excel Orientation: The mentor needs to tell the importance of MS office or 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 helpand resources.
14.Creating a Scheduler - Features to be covered: Gridlines, Format Cells, Summation, auto fill, Formatting Text

15. Calculating GPA -. Features to be covered:- Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function,

LOOKUP/VLOOKUP

16. Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting

POWER POINT

17. Students will be working on basic power point utilities and tools which help them create basic power point presentations. PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in PowerPoint.

18. Interactive presentations - Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts.

19. Master Layouts (slide, template, and notes), Types of views (basic, presentation, slideslotter, notes etc), and Inserting – Background, textures, Design Templates, Hidden slides.

AI TOOLS – ChatGPT

20. Prompt Engineering: Experiment with different types of prompts to see how the model responds. Try asking questions, starting conversations, or even providing incomplete sentences to see how the model completes them.

- Ex: Prompt: "You are a knowledgeable AI. Please answer the following question: What is the capital of France?"

21. Creative Writing: Use the model as a writing assistant. Provide the beginning of a story or a description of a scene, and let the model generate the rest of the content. This can be a fun way to brainstorm creative ideas

- Ex: Prompt: "In a world where gravity suddenly stopped working, people started floating upwards. Write a story about how society adapted to this new reality."



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22. Language Translation: Experiment with translation tasks by providing a sentence in one language and asking the model to translate it into another language. Compare the output to see how accurate and fluent the translations are.

- Ex: Prompt: "Translate the following English sentence to French: 'Hello, how are you doing today?'"

Total Hours: 45

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
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.	PO2
CO3	Demonstrate the working of the internet that include the use of protocols, domains, IP addresses, URLs, web browsers, web servers, mail-servers, etc.	PO3
CO4	Familiarize with parts of MS Office, To create and save a document, To set page settings, create headers and footers, To use various formatting features such as bold face, italicize, underline, subscript, superscript, line spacing, etc.	PO4
CO5	Prompt the different types of questions using CHATBOT	PO5
CO6	Follow the ethical principles in implementing the programs	PO8
CO7	Do experiments effectively as an individual and as a team member in a group.	PO9
CO8	Communicate verbally and in written form, the understanding about the experiments	PO10
CO9	Continue updating their skill related to MS Office, Internet and Computer in future.	PO12

Text Books:

1. Comdex Information Technology course tool kit, Vikas Gupta, WILEY Dream tech, 2003
2. The Complete Computer upgrade and repair book, Cheryl A Schmidt, WILEY Dream tech, 2013, 3rd edition

Reference Books:

1. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education, 2012, 2nd edition
2. PC Hardware - A Handbook, Kate J. Chase, PHI (Microsoft)
3. LaTeX Companion, Leslie Lamport, PHI/Pearson.
4. IT Essentials PC Hardware and Software Companion Guide, David Anfins on and Ken Quamme. – CISCO Press, Pearson Education, 3rd edition
5. IT Essentials PC Hardware and Software Labs and Study Guide, Patrick Regan– CISCO Press, Pearson Education, 3rd edition



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CO-PO Mapping

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C01	3	-	-	-	-	-	-	-	-	-	-	-
C02	-	3	-	-	-	-	-	-	-	-	-	-
C03	-	-	3	-	-	-	-	-	-	-	-	-
C04	-	-	-	3	-	-	-	-	-	-	-	-
C05	-	-	-	-	3	-	-	-	-	-	-	-
C06	-	-	-	-	-	-	-	3	-	-	-	-
C07	-	-	-	-	-	-	-	-	3	-	-	-
C08	-	-	-	-	-	-	-	-	-	3	-	-
C09	-	-	-	-	-	-	-	-	-	-	-	3
CO*	3	3	3	3	3	-	-	3	3	3	-	3

**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(AUTONOMOUS)**

DEPARTMENT OF SCIENCE & HUMANITIES

I B.Tech I/II sem

23HSM114 NSS/NCC/SCOUTS & GUIDES/COMMUNITY SERVICE L T P C
(Common to All branches of Engineering) 0 0 1 0.5

COURSE EDUCATIONAL OBJECTIVES:

1. To impart discipline, character, and fraternity amongst young citizens
2. To train them to work in teams/groups to enhance their team spirit.
3. To enable the students to acquire leadership qualities.
4. To induce social consciousness among students through various activities.
5. To instill self-confidence and the ideals of selfless service
6. To engage students in responsible and challenging actions for the common good.

COURSE OUTCOMES:

After the completion of the course the student will be able to

1. Understand the importance of discipline, character and service motto.
2. Outline the needs and problems of the community
3. Solve some societal issues by applying acquired knowledge, facts, and techniques
4. Explore human relationships by analyzing social problems
5. Determine to extend their help for the fellow beings and downtrodden people
6. Develop leadership skills and civic responsibilities

UNIT-I: ORIENTATION

General Orientation on NSS/NCC/ Scouts & Guides/Community Service activities, career guidance.

Activities:

1. Conducting –ice breaking sessions-expectations from the course-knowing personal talents and skills
2. Conducting orientations programs for the students –future plans-activities-releasing road map etc.
3. Displaying success stories-motivational biopics- award winning movies on societal issues etc.
4. Conducting talent show in singing patriotic songs-paintings- any other contribution.

UNIT-II: NATURE & CARE

Activities:

1. Best out of waste competition.
2. Poster and signs making competition to spread environmental awareness.
3. Recycling and environmental pollution article writing competition.
4. Organising Zero-waste day.
5. Digital Environmental awareness activity via various social media platforms.
6. Virtual demonstration of different eco-friendly approaches for sustainable living.
7. Write a summary on any book related to environmental issues.

UNIT-III:COMMUNITY SERVICE

Activities:

1. Conducting One Day Special Camp in a village contacting village-area leaders- Survey in the village, identification of problems- helping them to solve via media-authorities-experts-etc.
2. Conducting awareness programs on Health-related issues such as General Health, Mental health, Spiritual Health, HIV/AIDS,
3. Conducting consumer Awareness. Explaining various legal provisions etc.
4. Women Empowerment Programmes - Sexual Abuse, Adolescent Health and Population Education.
5. Any other programmes in collaboration with local charities, NGOs etc.

REFERENCE BOOKS:

1. Nirmalya Kumar Sinha & Surajit Majumder, A Text Book of National Service Scheme Vol;.I, Vidya Kutir Publication, 2021 (ISBN 978-81-952368-8-6)
2. Red Book - National Cadet Corps – Standing Instructions Vol I & II, Directorate General of NCC, Ministry of Defence, New Delhi
3. Davis M. L. and Cornwell D. A., "Introduction to Environmental Engineering", McGraw Hill, New York 4/e 2008
4. Masters G. M., Joseph K. and Nagendran R. "Introduction to Environmental Engineering and Science", Pearson Education, New Delhi. 2/e 2007
5. Ram Ahuja. Social Problems in India, Rawat Publications, New Delhi.

GENERAL GUIDELINES:

1. Institutes must assign slots in the Timetable for the activities.
2. Institutes are required to provide instructor to mentor the students

EVALUATION GUIDELINES:

1. Evaluated for a total of 100 marks.
2. A student can select 6 activities of his/her choice with a minimum of 01 activity per unit. Each activity shall be evaluated by the concerned teacher for 15 marks, totalling to 90 marks.
3. A student shall be evaluated by the concerned teacher for 10 marks by conducting viva• voce on the subject.

**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(AUTONOMOUS)**

DEPARTMENT OF SCIENCE & HUMANITIES

I B.Tech II sem

23BSC121	DIFFERENTIAL EQUATIONS AND VECTOR (Common to All Branches of Engineering)	L	T	P	C
		2	1	-	3

COURSE EDUCATIONAL OBJECTIVES:

1. To enlighten the learners in the concept of differential equations and multivariable calculus.
2. To furnish the learners with basic concepts and techniques at plus two level to lead them into advanced level by handling various real-world applications

UNIT-I: DIFFERENTIAL EQUATIONS OF FIRST ORDER AND FIRST DEGREE (9)

Linear differential equations – Bernoulli's equations - Exact equations and equations reducible to exact form. Applications: Newton's Law of cooling – Law of natural growth and decay, Electrical circuits.

UNIT-II: LINEAR DIFFERENTIAL EQUATIONS OF HIGHER ORDER (CONSTANT COEFFICIENTS) (9)

Definitions, homogenous and non-homogenous, complimentary function, general solution, particular integral, Wronskian, Method of variation of parameters. Simultaneous linear equations, Applications to L-C-R Circuit problems and Simple Harmonic motion.

UNIT-III: PARTIAL DIFFERENTIAL EQUATIONS (9)

Introduction and formation of Partial Differential Equations by elimination of arbitrary constants and arbitrary functions, solutions of first order linear equations using Lagrange's method and Non-Linear (Standard forms) equations. Homogeneous Linear Partial differential equations with constant coefficients (Method of Separation of variables).

UNIT-IV: VECTOR DIFFERENTIATION (9)

Scalar and vector point functions, vector operator Del, Del applies to scalar point functions Gradient, Directional derivative, del applied to vector point functions-Divergence and Curl, vector identities.

UNIT-V: VECTOR INTEGRATION (9)

Line Integral-circulation-work done, surface integral-flux, Green's theorem in the plane (without proof), Stoke's theorem (without proof), volume integral, Divergence theorem (without proof) and related problems.

**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(AUTONOMOUS)
DEPARTMENT OF SCIENCE & HUMANITIES**

I B. Tech I/II sem

23BSC111

APPLIED CHEMISTRY

L T P C

**(Common to EEE, ECE, CSE,
CSE (AI&ML), CSE (AI) and CSE (DS))**

3 0 0 3

COURSE EDUCATIONAL OBJECTIVES:

1. To train the students about the concept of Quantum Mechanics and Molecular Orbital theory.
2. To familiarize Knowledge and applications of modern engineering materials
3. To understand the concept of Electro Chemistry with its applications such as battery, fuel cells and sensors
4. To develop knowledge on the concept and applications of polymers
5. To introduce instrumental methods such as UV, IR and Chromatography with applications

UNIT-I:STRUCTURE AND BONDING MODELS

(9)

Fundamentals of Quantum mechanics, Schrodinger Wave equation, significance of Ψ and Ψ^2 , particle in one dimensional box, molecular orbital theory – bonding in homo- and heteronuclear diatomic molecules – energy level diagrams of O₂ and CO, etc. n- molecular orbitals of butadiene and benzene, calculation of bond order.

UNIT-II:MODERN ENGINEERING MATERIALS

(9)

Semiconductors, band diagram in solids, Semiconductor devices (p-n junction diode as rectifier and transistors)

Super conductors-Introduction basic concept, applications.

Supercapacitors: Introduction, Basic Concept-Classification – Applications.

Nano materials: Introduction, classification, properties and applications of Fullerenes, carbon nano tubes and Graphines nanoparticles.

UNIT-III:ELECTROCHEMISTRY AND APPLICATIONS

(9)

Electrochemical cell, Nernst equation, cell potential calculations and numerical problems, potentiometry- potentiometric titrations (redox titrations), concept of conductivity, conductivity cell, conductometric titrations (acid-base titrations).

Electrochemical sensors – potentiometric sensors with examples, amperometric sensors with examples.

Primary cells – Zinc-air battery, Secondary cells –lithium-ion batteries- working of the batteries including cell reactions; Fuel cells, hydrogen-oxygen fuel cell– working of the cells. Polymer Electrolyte Membrane Fuel cells (PEMFC).

UNIT-IV:POLYMER CHEMISTRY

(9)

Introduction to polymers, functionality of monomers, chain growth and step growth polymerization, coordination polymerization, with specific examples and mechanisms of polymer formation.

Plastics –Thermo and Thermosetting plastics, Preparation, properties and applications of – PVC, Teflon, Bakelite, Nylon-6,6, carbon fibres.

Elastomers–Buna-S, Buna-N–preparation, properties and applications.

Conducting polymers – polyacetylene, polyaniline, – mechanism of conduction and applications. Bio-Degradable polymers - Poly Glycolic Acid (PGA), Poly Lactic Acid (PLA).

UNIT-V:INSTRUMENTAL METHODS AND APPLICATIONS

(9)

Electromagnetic spectrum. Absorption of radiation: Beer-Lambert's law. UV-Visible Spectroscopy, electronic transition, Instrumentation, IR spectroscopies, fundamental modes and selection rules, Instrumentation. Chromatography-Basic Principle, Classification-HPLC: Principle, Instrumentation and Applications.

**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(AUTONOMOUS)
DEPARTMENT OF SCIENCE & HUMANITIES**

On successful completion of the course the students will be able to		POs
CO1	Demonstrate knowledge based on quantum mechanics and molecular orbital theory	PO1, PO2
CO2	Demonstrate knowledge on engineering materials with applications	PO1, PO2, PO6
CO3	Demonstrate knowledge on electrochemistry with analytical skills and applications such as battery, fuel cells and sensors	PO1, PO2, PO6
CO4	Demonstrate knowledge on polymers with applications related to society and sustainability	PO1, PO2, PO6, PO7
CO5	Demonstrate knowledge on principles and instrumentations of spectroscopy and chromatography	PO1, PO2

TEXT BOOKS:

1. Jain and Jain, Engineering Chemistry, 16/e, Dhanpat Rai, 2013.
2. Peter Atkins, Julio de Paula and James Keeler, Atkins' Physical Chemistry, 10/e, Oxford University Press, 2010.

REFERENCE BOOKS:

1. Skoog and West, Principles of Instrumental Analysis, 6/e, Thomson, 2007.
2. J.M. Lehn, Supra Molecular Chemistry, VCH Publications

CO/POs	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	-	-	-	2	2	-	-	-	-	-
CO5	3	2	-	-	-	-	-	-	-	-	-	-
CO*	3	2	-	-	-	2	2	-	-	-	-	-

**SREENIVASAINSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)**

I B.Tech I/II sem

23BSC113

ENGINEERING PHYSICS

L T P C

(Common to All Engineering Branches)

3 0 0 3

COURSE EDUCATIONAL OBJECTIVES:

1. To study the intensity variation of light due to interference, diffraction and polarization
2. To understand the fundamental of crystals and their structures.
3. To recognize various types of polarization of dielectrics and classification of the magnetic materials.
4. To study the principles of quantum mechanics and implementing it the one-dimensional motion of particles and the band theory of solids.
5. To provide an overview of semiconductor and identification of type of semiconductor using Hall effect.

UNIT-I : Wave Optics

Interference: Introduction - Principle of superposition - Interference of light - Interference in thin films (Reflection Geometry) & applications - Colors in thin films - Newton's Rings - Determination of wavelength and refractive index.

Diffraction: Introduction - Fresnel and Fraunhofer diffractions - Fraunhofer diffraction due to single slit, double slit - Diffraction Grating - Applications

Polarization: Introduction - Types of polarization - Polarization by reflection, refraction and Double refraction - Nicol's Prism - Half wave and Quarter wave plates. - Applications

UNIT-II : Crystallography and X-ray diffraction

Crystallography: Space lattice, Basis, Unit Cell and lattice parameters - Bravais Lattices - crystal systems (3D) - coordination number - packing fraction of SC, BCC & FCC - Miller indices - separation between successive (hkl) planes.

X-ray diffraction: Bragg's law - X-ray Diffractometer - crystal structure determination by Laue's and powder methods.

UNIT-III: Dielectric and Magnetic Materials

Dielectric Materials: Introduction - Dielectric polarization - Dielectric polarizability, Susceptibility, Dielectric constant and Displacement Vector - Relation between the electric vectors - Types of polarizations - Electronic (Quantitative), Ionic (Quantitative) and Orientation polarizations (Qualitative) - Lorentz internal field - Clausius-Mossotti equation - complex dielectric constant - Frequency dependence of polarization - dielectric loss

Magnetic Materials: Introduction - Magnetic dipole moment - Magnetization - Magnetic susceptibility and permeability - Atomic origin of magnetism - Classification of magnetic materials: Dia, para, Ferro, anti-ferro & Ferri magnetic materials - Domain concept for Ferromagnetism & Domain walls (Qualitative) - Hysteresis - soft and hard magnetic materials.

UNIT-IV: Quantum Mechanics and Free electron theory

Quantum Mechanics: Dual nature of matter - Heisenberg's Uncertainty Principle - Significance and properties of wave function - Schrodinger's time independent and dependent wave equations - Particle in a one-dimensional infinite potential well.

Free Electron Theory: Classical free electron theory (Qualitative with discussion of merits and demerits) - Quantum free electron theory - electrical conductivity based on quantum free electron theory - Fermi-Dirac distribution - Density of states - Fermi energy.

**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)**

I B.Tech. - I Semester

23ESC111	BASIC CIVIL AND MECHANICAL ENGINEERING (Part-B) (Common to All Branches)	L T P C 3 - - 3
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**BASIC CIVIL ENGINEERING
(Part-A)**

PRE-REQUISITES: Nil

COURSE EDUCATIONAL OBJECTIVES:

1. To study the Overview of civil engineering and basic concepts on construction materials.
2. To study the basic concepts in the field of surveying & Foundation Engineering
3. To study the basic transportation, water resources and environmental engineering.

UNIT –1: INTRODUCTION TO CIVIL ENGINEERING (8)

BASICS OF CIVIL ENGINEERING: Overview of civil engineering – Civil engineering contributions to the welfare of society – Various disciplines of civil engineering – Basic concepts and scope of structural engineering, geo-technical engineering, transportation engineering, hydraulics , water resources engineering, and environmental engineering

CONSTRUCTION TECHNOLOGY: Fundamental concepts of building planning for residential buildings and Sequences of Work in Building Construction – Introduction to Prefabricated construction Techniques & Green buildings concept **Construction Materials:** Cement – Aggregate – Bricks – Cement – Concrete – Steel – Timber – Modern materials. (Brief discussion only)

UNIT –2: SURVEYING & FOUNDATION ENGINEERING (8)

SURVEYING: Objectives of surveying – Horizontal measurements – Angular measurements – Introduction to bearings levelling instruments used for levelling – Simple problems on levelling and bearings– Contour mapping. (Brief discussion only)

FOUNDATIONS ENGINEERING: Bearing capacity of soil, functions of foundations, types – shallow and deep- Load bearing and framed structures (Brief discussion only)

UNIT –3: TRANSPORTATION AND WATER RESOURCES AND ENVIRONMENTAL ENGINEERING (8)

TRANSPORTATION ENGINEERING: Importance of transportation in Nation's economic development – Types of highway pavements – Flexible pavements and rigid pavements – Simple differences– Basics concepts on harbor, tunnel, airport, and railway engineering. (Brief discussion only)

WATER RESOURCES AND ENVIRONMENTAL ENGINEERING: Introduction on water resources and environmental engineering – Sources of water – Quality of water and Specifications – Introduction to hydrology – Rainwater harvesting – Water storage and conveyance structures – Fundamental concepts on dams and reservoirs. (Brief discussion only)

Total Hours: 24

(Note: The subject covers only the basic principles of Civil Engineering. The evaluation shall be intended to test only the fundamentals of the subject)

**SREENIVASAINSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)**

I B.Tech. - I Semester

23ESC111	BASIC CIVIL AND MECHANICAL ENGINEERING (Part-B) (Common to All Branches)	L T P C 3 - - 3
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**BASIC MECHANICAL ENGINEERING
(Part-B)**

PRE-REQUISITES: Nil.

COURSE EDUCATIONAL OBJECTIVES:

1. To study the basic concepts materials, machining, and scope of mechanical engineering.
2. To study the basic concepts in the field of thermal engineering.
3. To study the basic principles of power plants, mechanical transmission system and fundamentals of robotics.

UNIT –1: INTRODUCTION TO MATERIALS & MANUFACTURING ENGINEERING (8)

Introduction to Mechanical Engineering: Role of mechanical engineering in industries and society – Technologies and scope in different sectors such as energy, manufacturing, design, automotive, aerospace, and marine. **Engineering Materials:** Introduction on metals-ferrous and non-ferrous, ceramics, composites, smart materials. **Manufacturing Processes:** Basic principles and applications of casting, forming, joining processes, and machining – Introduction to CNC machines, 3D printing, and smart manufacturing.

UNIT –2: INTRODUCTION TO THERMAL ENGINEERING (8)

Thermal Engineering: Working principle of boilers. **Refrigeration:** Refrigeration and air-conditioning cycles – Units of refrigeration – Refrigerants – Vapour-compression and absorption system. **Air Conditioning:** Terminology in air conditioning – Working principle of window, split, and central air conditioning system. **IC Engines:** Basic concepts on Otto cycle and Diesel cycle – Components of IC engines – SI/CI Engines – Working principle of two/four stroke petrol and diesel engines – Differences between petrol and diesel engines – Basic concepts on electric and hybrid vehicles.

UNIT –3: POWER PLANTS, MECHANICAL TRANSMISSION AND ROBOTICS (8)

Power Plants: Working principle of steam, diesel, hydro, gas turbine, and nuclear power plants. **Mechanical Power Transmission:** Belt drives, chain, rope drives, gear drives and their applications. **Introduction to Robotics:** Joints & links, configurations, and applications of robotics.

(**Note:** The subject covers only the basic principles of Mechanical Engineering systems. The evaluation shall be intended to test only the fundamentals of the subject)

Total Hours: 24

**SREENIVASAINSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)**

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Understand the concepts of engineering materials and basic manufacturing process.	PO1, PO2, PO3
CO2	Describe the basic concepts of thermal engineering, refrigeration, air conditioning and IC engines.	PO1, PO2, PO3
CO3	Describe the working of different mechanical power transmission systems, power plants, and fundamentals of robotics.	PO1, PO2, PO3

TEXT BOOKS:

1. G.Shanmugam and M.S.Palanichamy, "Basic Civil and Mechanical Engineering", Tata McGraw Hill Publishing Co., New Delhi , 1996.
2. Venugopal K,Prahu Raja V, "Basic Mechanical Engineering", Anuradha Publishers, Chennai, 2000.

REFERENCE BOOKS:

1. Materials Science and Engineering: An Introduction, William D. Callister, 9/e, 2014,Wiley India Pvt. Ltd.
2. Serope Kalpakjian and Steven R. Schmid, "Manufacturing Engineering and Technology (SI Edition)", Pearson Education, New Delhi, 7/e, 2018.
3. Ian Gibson, David W.Rosen and Brent Stucker, "Additive Manufacturing Technologies: 3D Printing, Rapid Prototyping and Direct Digital Manufacturing", Springer, 2/e, 2015.
3. V. Ganesan, "Internal Combustion Engines", Tata McGraw-Hill Education Pvt. Ltd., 4/e, 2012.
4. C P Arora, "Refrigeration and Air Conditioning", Tata McGraw-Hill Education Pvt. Ltd., Noida, 3/e, 2008.
5. M.Ehsani, Y.Gao,S.Gayand AliEmadi, Modern Electric, Hybrid Electric and Fuel Cell Vehicles" Fundamentals, Theory and Design", CRC Press, 2005
6. P.K.Nag, "Power Plant Engineering", McGraw-Hill Education Pvt. Ltd., New Delhi,4/e, 2014.
7. S.S.Rattan, "Theory of Machines and Mechanisms", Tata McGraw-Hill Education Pvt.Ltd, Noida, 5/e, 2019.
8. Industrial Robotics: Technology, Programming and Applications, Mikell P Groover, Mitchell Weiss, Roger N. Nagel, Nicholas G Odrey and Ashish Dutta 2/e, 2012, Tata McGraw-Hill Education Pvt. Ltd.,

REFERENCE WEBSITE:

1. <https://nptel.ac.in/courses/112103316>
2. <https://nptel.ac.in/courses/112106293>
3. <https://nptel.ac.in/courses/112104290>

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



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
(Accredited by NBA)

I B.Tech. – II Semester

DATA STRUCTURES	L	T	P	C
(Common to CSE, CSE (AI&ML), CSE (AI) and CSE (DS))	2	1	0	3

PRE-REQUISITES: Computer Programming

COURSE OBJECTIVES:

1. To provide the knowledge of basic data structures and their implementations.
2. To understand importance of data structures in context of linked list concept.
3. To develop skills to apply appropriate data structures in problem solving using stacks.
4. To understand and implement the data structures using queue concept.
5. To provide knowledge about trees and hashing concepts.

UNIT-1 **(9)**

Introduction to Linear Data Structures: Definition and importance of Linear data structures, Abstract data types (ADTs) and their implementation, Overview of time and space complexity analysis for linear data structures. Searching Techniques: Linear & Binary Search, Sorting Techniques: Bubble sort, Selection sort, Insertion Sort

UNIT- 2 **(9)**

Linked Lists: Singly linked lists: representation and operations, doubly linked lists and circular linked lists, Comparing arrays and linked lists, Applications of linked lists.

UNIT- 3 **(9)**

Stacks: Introduction to stacks: properties and operations, implementing stacks using arrays and linked lists, Applications of stacks in expression evaluation, backtracking, reversing list etc.

UNIT- 4 **(9)**

Queues: Introduction to queues: properties and operations, implementing queues using arrays and linked lists, Applications of queues in breadth-first search, scheduling, etc.

Deque: Introduction to deque (double-ended queues), Operations on deque and their applications.

UNIT-5 **(9)**

Trees: Introduction to Trees, Binary Search Tree – Insertion, Deletion & Traversal

Hashing: Brief introduction to hashing and hash functions, Collision resolution techniques: chaining and open addressing, Hash tables: basic implementation and operations, Applications of hashing in unique identifier generation, caching, etc.

Total Hours: 45

Course Outcomes

	On the successful completion of this course, the student should be able to,	POs related to COs
CO1	Explain the role of linear data structures in organizing and accessing data efficiently in algorithms.	PO1, PO2
CO2	Design, implement, and apply linked lists for dynamic data storage, demonstrating understanding of memory allocation.	PO1,PO2
CO3	Develop programs using stacks to handle recursive algorithms, manage program states, and solve related problems	PO1,PO2,P O3,



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES

(Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

(Accredited by NBA)

CO4	Apply queue-based algorithms for efficient task scheduling and breadth-first traversal in graphs and distinguish between deques and priority queues, and apply them appropriately to solve data management challenges.	PO1, PO3,PO4
CO5	Devise novel solutions to small scale programming challenges involving data structures such as stacks, queues, Trees.	PO1,PO3,PO4,PO5

Text books:

1. Data Structures and algorithm analysis in C, Mark Allen Weiss, Pearson, 2nd Edition.
2. Fundamentals of data structures in C, Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed, Silicon Press, 2008

Reference Books:

1. Algorithms and Data Structures: The Basic Toolbox by Kurt Mehlhorn and Peter Sanders
2. C Data Structures and Algorithms by Alfred V. Aho, Jeffrey D. Ullman, and John E. Hopcroft
3. Problem Solving with Algorithms and Data Structures" by Brad Miller and David Ranum
4. Introduction to Algorithms by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein
5. Algorithms in C, Parts 1-5 (Bundle): Fundamentals, Data Structures, Sorting, Searching, and Graph Algorithms" by Robert Sedgewick

Reference Websites

1. <https://nptel.ac.in/courses/106/102/106102064/>
2. <https://nptel.ac.in/courses/106/106/106106127/>

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	3	-	-	-	-	-	-	-	-
CO5	3	-	2	2	2	-	-	-	-	-	-	-
CO*	3	3	3	2	2	-						

**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(AUTONOMOUS)
DEPARTMENT OF SCIENCE & HUMANITIES**

I B.Tech I/II sem

23BSC115

**APPLIED CHEMISTRY LAB
(Common to EEE, ECE, CSE,
CSE (AI&ML), CSE (AI) and CSE (DS))**

L	T	P	C
-	-	2	1

COURSE EDUCATIONAL OBJECTIVES:

1. Verify the fundamental concepts with experiments.
2. To provide solid foundation in chemistry laboratory to solve engineering problems
3. To apply theoretical principles in preparing polymers and nonmaterial's
4. To apply theoretical principles in estimating strength of acid, ferrous ion
5. To apply theoretical concept and principles in determining cell constant and conductance of solution, strength of acids by conduct metric titrations and PH metric titrations, redox potential, emf and viscosity
6. To experience the importance of theory by utilizing analytical tools such as pb-acid battery, colorimeter, ostwalds viscometer, potentiometer, conductivity meter and PH meter
7. To experience the importance of theory by performing spectroscopic investigations, using modern instrumental tools such as UV-spectrophotometer and IR spectrometer

LIST OF EXPERIMENTS

1. Measurement of 10Dq by spectrophotometric method.
2. Conduct metric titration of strong acid (HCl) vs. strong base (NaOH)
3. Conduct metric titration of weak acid (CH₃COOH) vs. strong base (NaOH)
4. Determination of cell constant and conductance of potassium chloride solutions
5. Potentiometry-determination of redox potentials and emfs (emf titration of Fe²⁺ with cr₂O₇²⁻)
6. Determination of Strength of an acid in Pb-Acid battery
7. Preparation of a polymer (Bakelite).
8. Verification Lambert-Beer's law for KMnO₄ by colorimetry.
9. Wavelength measurement of sample through UV-Visible Spectroscopy
10. Identification of simple organic compounds by IR
11. Preparation of ZnO nanomaterials by precipitation method
12. Estimation of Ferrous Iron by Dichrometry
13. Determination of molecular weight of a polymer using Ostwald viscometer
14. pH metric titration of strong acid (HCl) vs strong base (NaOH)

Note: Any **TEN** of the listed experiments are to be conducted, out of which any **TWO** experiments may be conducted in virtual mode.

REFERENCE BOOK:

1. "Vogel's Quantitative Chemical Analysis, 6th Edition" Pearson Publications by J. Mendham, R.C. Denney, J.D. Barnes and B. Sivasankar

COURSE OUTCOMES:

On the successful completion of the course students will be able to		POs
CO1	Demonstrate knowledge on preparation of bakerite and nanomaterial	PO1
CO2	Analyse ferrous iron colorimetry and ferrous iron by dichrometry, analyse acid in lead acid battery	PO2
CO3	Conduct investigations of lead in lead acid battery, wave length determination in spectrophotometer, conductometric titrations of acids and bases	PO4
CO4	Analyse using tools such as UV and IR spectrophotometers	PO5
CO5	Follow the ethical principles in implementing the programmes	PO8

**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(AUTONOMOUS)
DEPARTMENT OF SCIENCE & HUMANITIES**

C06	Conduct experiments effectively as an individual and as a team member in a group	PO9
C07	Communicate verbally and in written form the understanding about the experiments	PO10
C08	Continue updating their skill related to nanomaterials and battery and implementing programmes in future	PO12

CO/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C01	3	-	-	-	-	-	-	-	-	-	-	-
C02	-	3	-	-	-	-	-	-	-	-	-	-
C03	-	-	-	3	-	-	-	-	-	-	-	-
C04	-	-	-	-	3	-	-	-	-	-	-	-
C05	-	-	-	-	-	-	-	3	-	-	-	-
C06	-	-	-	-	-	-	-	-	3	-	-	-
C07	-	-	-	-	-	-	-	-	-	3	-	-
C08	-	-	-	-	-	-	-	-	-	-	-	3
CO	3	3	-	3	3	-	-	3	3	3	-	3

I B.Tech I/II sem

23BSC117

**ENGINEERING PHYSICS LAB
(Common to All Engineering Branches)**

**L T P C
- - 2 1**

PRE-REQUISITES: Nil.

COURSE EDUCATIONAL OBJECTIVES:

1. **To** Operate optical instruments like travelling microscope and spectrometer.
2. To Estimate the wavelengths of different colors using diffraction grating.
3. To Plot the intensity of the magnetic field of circular coil carrying current with distance.
4. To Calculate the band gap of a given semiconductor.
5. To verify the laws of stretched strings

LIST OF EXPERIMENTS

1. Determination of radius of curvature of a given Plano convex lens by Newton's rings.
2. Determination of thickness of a thin wire using wedge method
3. Study the variation of B versus H by magnetizing the magnetic material (B-H curve).
4. Determination of wavelength of Laser light using diffraction grating.
5. Determination of energy gap of a semiconductor using p-n junction diode.
6. Determination of particle size using laser source
7. Magnetic field along the axis of a current carrying circular coil by Stewart Gee's Method.
8. Determination of rigidity modulus of the material of the given wire using Torsional pendulum.
9. Sonometer: Verification of laws of stretched string.
10. Determination of wavelengths of different spectral lines in mercury spectrum using diffraction grating in normal incidence configuration
11. Determination of temperature coefficients of a thermistor.
12. Determination of Frequency of electrically maintained tuning fork by Melde's experiment.

Note: Any **TEN** of the listed experiments are to be conducted. Out of which any **TWO** experiments may be conducted in virtual mode.

REFERENCE BOOK:

1. A Textbook of Practical Physics - S. Balasubramanian, M.N. Srinivasan, S. Chand Publishers, 2017.

WEB RESOURCE:

1. **URL:** www.vlab.co.in

**SREENIVASAINSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)**

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Demonstrate Knowledge on measurement of various physical quantities using optical methods and fundamentals of magnetic fields	PO1
CO2	Identify different physical properties of materials like band gap, magnetic field intensity etc, for engineering and technological applications	PO2
CO3	Provide valid conclusions on phenomena Interference and Diffraction	PO4
CO4	Follow the ethical principles in implementing the programs	PO8
CO5	Do experiments effectively as an individual and as a team member in a group.	PO9
CO6	Communicate verbally and in written form, the understanding about the experiments.	PO10
CO7	Continue updating their skill related to loops, pointers and files implementing programs in future.	PO12

CO/POs	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
CO	3	3	-	3	-	-	-	3	3	3	-	3

**SREENIVASAINSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)**

I B.Tech. - I Semester

23ESC117

**ENGINEERING WORKSHOP
(Common to All Branches)**

**L T P C
- - 3 1.5**

PRE-REQUISITES: Nil.

COURSE EDUCATIONAL OBJECTIVES:

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

Trade for Exercises:

1. **Demonstration:** Safety practices and precautions to be observed in workshop.
2. **Carpentry:** Familiarity with different types of woods and tools used in wood working and make following joints.
 - a. Middle T lap joint or Half lap joint
 - b. Mortise and tenon joint
 - c. Dove tail joint or bridle joint
3. **Sheet Metal:** Familiarity with different types of tools used in sheet metal working, Developments of following sheet metal job from GI sheets.
 - a. Tapered tray
 - b. Conical funnel
 - c. Elbow pipe
 - d. Brazing
4. **Fitting:** Familiarity with different types of tools used in fitting and do the following fitting exercises.
 - a. V fit
 - b. Dove tail joint
 - c. Semi-circular fit / Square fit
 - d. Bicycle tire puncture
5. **House Wiring:** Familiarity with different types of basic electrical circuits and make the following connections.
 - a. Parallel and series
 - b. Two-way switch
 - c. Godown lighting
 - d. Tube light
 - e. Three phase motor
 - f. Soldering of wires
6. **Basic Machining:** Familiarity with different types of tools used in metal parts and practicing basic machining operation.
 - a. Simple plain turning / simple step turning.
 - b. Drilling and tapping
7. **Plumbing:** Familiarity with plumbing tools, Preparation of pipe joints with coupling for same diameter and with reducer for different diameters and make the following tap connections
 - a. Single tap connections
 - b. Multi tap connections.

**SREENIVASAINSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)**

Trade for Demonstration:

- 1. Foundry Trade:** Demonstration and practice on moulding tools and processes, preparation of green sand moulds for single and split patterns.
- 2. Welding:** Demonstration and practice on Arc Welding and Gas welding
Preparation of Lap joint and Butt joint.

TEXT BOOKS:

1. Serope Kalpak Jain and Steven R. Schmid, "Manufacturing Processing for Engineering Materials (SI Edition)", Pearson Education, New Delhi, 6/e, 2018.
2. P.N. Rao, "Manufacturing Technology - Foundry, Farming and Welding, Volume-I", Tata McGraw-Hill Education Pvt. Ltd., Noida, 5/e, 2018.

REFERENCE BOOKS:

1. Hajra Choudhury S.K and Nirjhar Roy, "Elements of Workshop Technology, Volume-I", Media Promoters and Publishers Pvt.Ltd, 15/e, 2010.
2. Roy A Lindberg, "Process and Materials of Manufacturing", Pearson Education, New Delhi, 4/e, 2015.
3. R.K. Jain, "Production Technology", Khanna publishers, New Delhi, 17/e, 2011.
4. R.K. Rajput, "A Textbook of Manufacturing Technology: Manufacturing Processes", Laxmi Publications (P) Ltd., New Delhi, 2/e, 2017.
5. "A Text book of Manufacturing Technology-I", P.C.Sharma, S.Chand & Company Pvt. Ltd., New Delhi, 1/e, 2011.

REFERENCE WEBSITE:

1. <https://nptel.ac.in/courses/112/104/112104301/>
2. <https://nptel.ac.in/courses/112/107/112107219/>

COURSE OUTCOMES:

On successful completion of the course, students will be able to		POs
C01	Demonstrate the knowledge on different tools used in carpentry, fitting, sheet metal, house wiring and plumbing sections and also basic machining process	PO1
C02	Analyze the basic pipeline connection using different joints	PO2
C03	Design and develop simple components by using different materials includes wood, GI sheet and MS plates	PO3
C04	Apply basic electrical engineering tools on the house wiring practice	PO5
C05	Follow the ethical principles in while doing the exercises.	PO8
C06	Do the exercises effectively as an individual and as a team member in a group	PO9
C07	Communicate verbally among team members and in written form, the understanding about the trade exercises.	PO10
C08	Continue updating their skill related to trades.	PO12

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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
CO	3	3	3	-	3	-	-	3	3	3	-	3



I B.Tech. – II Semester

23CSE121 DATA STRUCTURES LAB	L	T	P	C
(Common to CSE, CSE (AI&ML), CSE (AI) and CSE (DS))	0	0	3	1.5

PRE-REQUISITES: Computer Programming

COURSE OBJECTIVES:

1. To strengthen the ability of the students to identify the problem.
2. To apply the suitable datastructure for the given real-world problem.
3. To understand the knowledge about linear data structure.
4. To understand and analyze the data structure concepts using non-linear data structures.
5. To gain knowledge in practical applications of data structures.

List of Experiments:

1: Array Manipulation

- i) Write a program to reverse an array.
- ii) C Programs to implement the Searching Techniques – Linear & Binary Search
- iii) C Programs to implement Sorting Techniques – Bubble, Selection and Insertion Sort

2: Linked List Implementation

- i) Implement a singly linked list and perform insertion and deletion operations.
- ii) Develop a program to reverse a linked list iteratively and recursively.
- iii) Solve problems involving linked list traversal and manipulation.

3: Linked List Applications

- i) Create a program to detect and remove duplicates from a linked list.
- ii) Implement a linked list to represent polynomials and perform addition.
- iii) Implement a double-ended queue (deque) with essential operations.

4: Double Linked List Implementation

- i) Implement a doubly linked list and perform various operations to understand its properties and applications.
- ii) Implement a circular linked list and perform insertion, deletion, and traversal.

5: Stack Operations

- i) Implement a stack using arrays and linked lists.
- ii) Write a program to evaluate a postfix expression using a stack.
- iii) Implement a program to check for balanced parentheses using a stack.

6: Queue Operations

- i) Implement a queue using arrays and linked lists.
- ii) Develop a program to simulate a simple printer queue system.
- iii) Solve problems involving circular queues.

7: Stack and Queue Applications

- i) Use a stack to evaluate an infix expression and convert it to postfix.
- ii) Create a program to determine whether a given string is a palindrome or not.
- iii) Implement a stack or queue to perform comparison and check for symmetry.



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8: Binary Search Tree

- i) Implementing a BST using Linked List.
- ii) Traversing of BST.

9: Hashing

- i) Implement a hash table with collision resolution techniques.
- ii) Write a program to implement a simple cache using hashing.

Total Hours: 45

COURSE OUTCOMES

On the successful completion of this course, the student should be able to,		POs related to COs
CO1	Explain the role of linear data structures in organizing and accessing data efficiently in algorithms	PO1
CO2	Design, implement, and apply linked lists for dynamic data storage, demonstrating understanding of memory allocation.	PO2
CO3	Develop programs using stacks to handle recursive algorithms, manage program states, and solve related problems	PO3
CO4	Apply queue-based algorithms for efficient task scheduling and breadth-first traversal in graphs and distinguish between queues and priority queues and apply them appropriately to solve data management challenges.	PO4
CO5	Recognize scenarios where hashing is advantageous, and design hash-based solutions for specific problems.	PO5
CO6	Follow the ethical principles in implementing the programs	PO8
CO7	Do experiments effectively as an individual and as a team member in a group.	PO9
CO8	Communicate verbally and in written form, the understanding about the experiments.	PO10
CO9	Continue updating their skill related to loops, pointers and files, implementing programs in future.	PO12

Textbooks:

1. Data Structures and algorithm analysis in C, Mark Allen Weiss, Pearson, 2nd Edition.
2. Fundamentals of data structures in C, Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed, Silicon Press, 2008

Reference Books:

1. Algorithms and Data Structures: The Basic Toolbox by Kurt Mehlhorn and Peter Sanders
2. C Data Structures and Algorithms by Alfred V. Aho, Jeffrey D. Ullman, and John E. Hopcroft
3. Problem Solving with Algorithms and Data Structures" by Brad Miller and David Ranum
4. Introduction to Algorithms by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein
Algorithms in C, Parts 1-5 (Bundle): Fundamentals, Data Structures, Sorting, Searching, and Graph Algorithms by Robert Sedgewick.



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Reference Websites:

1. <https://nptel.ac.in/courses/106/102/106102064/>
2. <https://nptel.ac.in/courses/106/106/106106127/>

CO-PO MAPPING

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C01	3	-	-	-	-	-	-	-	-	-	-	-
C02	-	3	-	-	-	-	-	-	-	-	-	-
C03	-	-	3	-	-	-	-	-	-	-	-	-
C04	-	-	-	3	-	-	-	-	-	-	-	-
C05	-	-	-	-	3	-	-	-	-	-	-	-
C06	-	-	-	-	-	-	-	3	-	-	-	-
C07	-	-	-	-	-	-	-	-	3	-	-	-
C08	-	-	-	-	-	-	-	-	-	3	-	-
C09	-	-	-	-	-	-	-	-	-	-	-	3
CO*	3	3	3	-	3	-	-	3	3	3	-	3

**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(AUTONOMOUS)**

DEPARTMENT OF SCIENCE & HUMANITIES

I B.Tech I/II sem

23HSM113	Health And Wellness, Yoga and Sports (Common to All branches of Engineering)	L	T	P	C
		0	0	1	0.5

COURSE EDUCATIONAL OBJECTIVES:

1. To maintain their mental and physical wellness upright and develop ability in them to cope up with the stress arising in the life.
2. To create space in the curriculum to nurture the potential of the students in sports/games/yoga etc.
3. To introduce a practice oriented introductory course on the subject.

COURSE OUTCOMES:

After completion of the course the student will be able to

1. Be Physical fit to perform daily routine without undue fatigue.
2. Be Mentally alert and Socially Cohesive
3. Consider success and failure equally.
4. Develop Positive Personality
5. Improve Leadership qualities

UNIT-I:

Concept of health and fitness, Nutrition and Balanced diet, basic concept of immunity Relationship between diet and fitness, Globalization and its impact on health, Body Mass Index (BMI) of all age groups.

Activities:

1. Organizing health awareness programmes in community
2. Preparation of health profile
3. Preparation of chart for balance diet for all age groups

UNIT- II:

Concept of yoga, need for and importance of yoga, origin and history of yoga in Indian context, classification of yoga, Physiological effects of Asanas- Pranayama and meditation, stress management and yoga, Mental health and yoga practice.

Activities:

Yoga practices – Asana, Kriya, Mudra, Bandha, Dhyana, Surya Namaskar



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II B.Tech –III semester

23MBA24xa	MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS	L	T	P	C
	(Common to All branches of Engineering)	2			2

PRE - REQUISITES: Nil

COURSE EDUCATIONAL OBJECTIVES:

1. To make students understand the basic perspectives of managerial economics
2. To inculcate knowledge of analyzing production operations and cost structure.
3. To provide knowledge on forms of business and market structure.
4. To give an overview on investment appraisal methods to promote the students to learn how to plan long-term investment decisions.
5. To provide fundamental skills on accounting and to explain the process of preparing financial statements

UNIT – I: MANAGERIAL ECONOMICS: (9)

Introduction – Nature, meaning, significance, functions, and advantages of Managerial Economics. **Demand-Concept**, Function, Law of Demand - Demand Elasticity- Types – Measurement. Demand Forecasting- Factors governing Forecasting, Methods.

UNIT – II: PRODUCTION AND COST ANALYSIS: (9)

Production Analysis: Introduction – Functions and significance of Production. Production Function– Least cost combination– Short run and Long run Production Function- Isoquants and Isocosts

Cost & Break-Even Analysis: Cost concepts and cost behaviour - Break-Even Analysis (BEA) - Determination of Break-Even Point (Simple Problems)

UNIT – III: BUSINESS ORGANIZATIONS AND MARKETS: (9)

Introduction Forms of Business Organizations- Sole Proprietary - Partnership - Joint Stock Companies - Public Sector Enterprises. **Types of Markets** - Perfect and Imperfect Competition - Features of Perfect Competition Monopoly-Monopolistic Competition– Oligopoly-Price-Output Determination - Pricing Methods and Strategies

UNIT – IV: CAPITAL BUDGETING: (9)

Introduction – Nature, meaning, significance. Types of Working Capital, Components, Sources of Short-term and Long-term Capital, Estimating Working capital requirements. Capital Budgeting– Features, Proposals, Methods and Evaluation.

Projects – Pay Back Method, Accounting Rate of Return (ARR) Net Present Value (NPV) Internal Rate Return (IRR) Method (simple problems)



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UNIT – V: FINANCIAL ACCOUNTING AND ANALYSIS: (9)

Introduction – Concepts and Conventions- Double-Entry Bookkeeping, Journal, Ledger, Trial Balance- **Final Accounts** (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments). **Introduction to Financial Analysis** - Analysis and Interpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course , student will be able to		Pos
CO1	Demonstrate the basic knowledge of Managerial Economics and demand analysis.	PO1,PO11
CO2	Apply the Concept of Production and cost analysis in business decision making	PO1,PO2,PO4,PO10,PO11
CO3	Classify the forms of business organization and forms of market.	PO1,PO2,PO11,
CO4	Analyze the investment alternatives using capital budgeting techniques.	PO1,PO2,PO4,PO10,PO11
CO5	Prepare the accounting statements and analyze the financial performance of business entity	PO1,PO2,PO4,PO10,PO11

Text Books:

1. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2016.
2. Aryasri: Business Economics and Financial Analysis, 4/e, MGH, 2019.

Reference Books:

1. Ahuja HI Managerial economics Schand,3/e,2013
2. S.A. Siddiqui and A.S. Siddiqui: Managerial Economics and Financial Analysis, NewAge International, 2013.
3. Joseph G. Nellis and David Parker: Principles of Business Economics, Pearson, 2/e,New Delhi.
4. Domnick Salvatore: Managerial Economics in a Global Economy, Cengage, 2013.

Reference website :

1. <https://www.nutshell.com/blog/sales-forecasting-methods>
2. <https://corporatfinanceinstitute.com/resources/accounting/break-even-analysis/>
3. <https://archive.nptel.ac.in/courses/110/101/110101149/>
4. <https://archive.nptel.ac.in/courses/110/107/110107144/>
5. <https://www.copperberg.com/how-to-price-your-digital-products-and-services/>



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



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II B.Tech –III semester

23MBA24xb	BUSINESS ENVIRONMENT	L	T	P	C
	(Common to All branches of Engineering)	2			2

PRE - REQUISITES: Nil

COURSE EDUCATIONAL OBJECTIVES:

1. To make students understand about Business Environment
2. To enable student's in knowing the importance of fiscal and monetary policy
3. To facilitate the students in understanding the export policy of the country
4. To Impart knowledge on the functioning and role of WTO
5. To encourage the student in knowing the structure of stock markets

UNIT – I: OVERVIEW OF BUSINESS ENVIRONMENT: (9)

Introduction – meaning Nature, Scope, significance, functions and advantages.

Types- Internal & External, Micro and Macro. Competitive structure of industries -

Environmental Analysis- advantages & limitations of environmental analysis

UNIT – II: FISCAL & MONETARY POLICY: (9)

Introduction – Nature, meaning, significance, functions and advantages. **Public**

Revenues - Public Expenditure - Evaluation of recent fiscal policy of GOI.

Highlights of Budget- Monetary Policy - Demand and Supply of Money –**RBI** - Objectives of monetary and credit policy - Recent trends- Role of Finance Commission

UNIT – III: INDIA'S TRADE POLICY: (9)

Introduction – Nature, meaning, significance, functions and advantages. Magnitude and

direction of Indian International Trade - Bilateral and Multilateral Trade Agreements -

EXIM policy and role of EXIM bank -**Balance of Payments**- Structure & Major components

-Causes for Disequilibrium in Balance of Payments - Correction measures

UNIT – IV: WORLD TRADE ORGANIZATION: (9)

Introduction – Nature, significance, functions and advantages. **Organization and**

Structure - Role and functions of WTO in promoting world trade - **GATT** -Agreements in the Uruguay Round –TRIPS, TRIMS - Disputes Settlement Mechanism - Dumping and Anti- dumping



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UNIT – V: MONEY MARKETS AND CAPITAL MARKETS: (9)

Introduction – Nature, meaning, significance, functions and advantages. Features and components of Indian financial systems - Objectives, features and structure of money markets and capital markets - Reforms and recent development – **SEBI** – Stock Exchanges -Investor protection and role of SEBI, Introduction to international finance

Total Hours:

45

COURSE OUTCOMES:

On successful completion of the course , student will be able to		Pos
	Understand types of Business Environments and its Importance	PO1,PO6,
CO1		
CO2	Evaluate fiscal and monetary policy	PO1,PO11
CO3	Understand India's Trade Policy	PO1, PO11
	Develop a personal synthesis and approach for identifying business opportunities	PO1,PO9,PO10
CO4		
	Apply the knowledge of Money markets in future investment	PO1, PO11
CO5		

Text Books:

1. Francis Cherunilam, International Business: Text and Cases, Prentice Hall of India.
2. K. Aswathappa, Essentials of Business Environment: Texts and Cases & Exercises 13th Revised Edition. HPH

Reference Books:

1. K. V. Sivayya V. B. M Das, Indian Industrial Economy, Sultan Chand Publishers, New Delhi, India.
2. Sundaram Black, International Business Environment Text and Cases, Prentice Hall of India, New Delhi, India.
3. Chari. S. N, International Business, Wiley India.
4. E. Bhattacharya, International Business, Excel Publications, New Delhi.

Reference website :

1. <https://www.slideshare.net/ShompaDhali/business-environment-53111245>
2. <https://www.slideshare.net/rbalsells/fiscal-policy-ppt>
3. <https://www.slideshare.net/aguness/monetary-policy-presentationppt>



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4. <https://www.slideshare.net/DaudRizwan/monetary-policy-of-india-69561982>
5. <https://www.slideshare.net/ShikhaGupta31/indias-trade-policyppt>
6. <https://www.slideshare.net/viking2690/wto-ppt-60260883>
7. <https://www.slideshare.net/prateeknepal3/ppt-mo>

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



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II B.Tech –III semester

23MBA24xc	ORGANISATIONAL BEHAVIOUR	L	T	P	C
	(Common to All branches of Engineering)	2			2

PRE - REQUISITES: Nil

COURSE EDUCATIONAL OBJECTIVES:

1. To enable student's comprehension of organizational behavior
2. To offer knowledge to students on self-motivation and management
3. To facilitate the students to become powerful leaders
4. To impart knowledge about group dynamics
5. To make them understand the importance of change and development

UNIT – I: INTRODUCTION TO ORGANIZATIONAL BEHAVIOR: (8)

Meaning, definition, nature, scope and functions - Organizing Process – Making organizing effective - **Understanding Individual Behaviour** –Attitude -Perception - Learning – Personality

UNIT – II: MOTIVATION: (9)

Theories of Motivation- Maslow's Hierarchy of Needs - Herzberg's Two Factor Theory -Vroom's theory of expectancy – Mc Clelland's theory of needs–Mc Gregor's theory X andtheory Y– Adam's equity theory.

UNIT – III: ORGANIZATIONAL CLIMATE AND LEADERSHIP: (9)

Introduction – Meaning, scope, definition, Nature - **Organizational Climate - Leadership**

- Traits Theory–Managerial Grid - Transactional Vs Transformational Leadership – Qualities of good Leader - Conflict Management -Evaluating Leader.

UNIT – IV: GROUP DYNAMICS: (10)

Introduction – Meaning, scope, definition, Nature- Types of groups - **Determinants of group behaviour** - Group process – Group Development - Group norms - Group cohesiveness - Small Groups - Group decision making - **Team building** - Conflict in the organization– Conflict resolution.



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UNIT – V: ORGANIZATIONAL CHANGE AND DEVELOPMENT: (9)

Introduction –Nature, Meaning, scope, definition and functions- **Organizational Culture** - Changing the Culture – Change Management – Work Stress Management – Organizational management – Managerial implications of organization’s change and development.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course , student will be able to		Pos
CO1	Understand the nature and concept of Organizational behaviour	PO1,PO8,PO9, PO10,PO11,PO12
CO2	Apply theories of motivation to analyse the performance problems	PO1, PO8,PO9, PO10
CO3	Analyse the different theories of leadership	PO1,PO9,PO11,
CO4	Evaluate group dynamics	PO1,PO9,PO10, PO11
CO5	Analyse organizational dynamics and readiness	PO1,PO9, PO12

Text Books:

1. Essentials of Management, 10/e., 2008, Koontz, H and,Weihrich, H, McGraw-Hill,New York.
2. Organizational Behavior, 15/e, 2013, Stephen P. Robbins, Pearson Education, SanDiego

Reference Books:

1. Organizational Behaviour, 12 /e, 2010, Fred Luthans, Tata McGrawHill, NewDelhi.
2. Organizational Behaviour, 15/e, 2012, Robbins, SP, Prentice Hall of India, New Delhi.
3. Management and Organisational Behaviour, 4/e, 2010, Subbarao P, HimalayaPublishing House, New Delhi.

Refference website :

1. <https://www.geeksforgeeks.org/introduction-to-business-management/>
2. <http://www.mim.ac.mw/books/Management%20&%20Organizational%20Behaviour,%207th%20edition.pdf>
3. <https://ccsuniversity.ac.in/bridge-library/pdf/Main-principles%20of%20Management%20and%20Organisational%20Behaviour.pdf>



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CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	-	-	-	-	-	-	3	2	3	3	3
CO.2	3	-	-	-	-	-	-	2	3	3	-	-
CO.3	3	-	-	-	-	-	-	-	3	3	-	-
CO.4	3	-	-	-	-	-	-	-	3	3	3	-
CO.5	3	-	-	-	-	-	-	-	2	-	-	3
CO*	3	-	-	-	-	-	-	2.5	2.6	3	3	3



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II B Tech- III Semester

23BSC232	DISCRETE MATHEMATICS & GRAPH THEORY	L	T	P	C
	Common to CSE/CSD/CSM/CAI	3	1	-	4

PRE-REQUISITES: Set Theory, Permutations and Combinations, Calculus, Linear Algebra
COURSE EDUCATIONAL OBJECTIVES:

1. To gain the knowledge on connectives and relate the laws of logic to find the disjunctive normal form and conjunctive normal form of compound proposition and various concepts related to predicate logic.
2. To perform the operations associated with sets, functions, and relations and study the basic Properties of lattices and the concept of groups, Abelian groups and group homomorphism and isomorphism.
3. To develop skill to analyze the concepts of Permutations, Combinations, Binomial and Multinomial Theorems
4. To develop skill to apply the concept of Recurrence relations and Generating Functions in various computer programming languages.
5. To study the fundamentals of graphs, sub graphs, planar graphs, Hamiltonian graphs, Euler graphs, Spanning trees and graph traversals.

UNIT I:Mathematical Logic

09

Introduction, Statements and Notation, Connectives, Well-formed formulas, Tautology, Duality law, Equivalence, Implication, Normal Forms, Functionally complete set of connectives, Inference Theory of Statement Calculus, Predicate Calculus, Inference theory of Predicate Calculus.

UNIT II:Set theory

09

The Principle of Inclusion- Exclusion, Pigeon hole principle and its application, Functions-composition of functions, Inverse Functions, Recursive Functions, Lattices and its properties. Algebraic structures: Algebraic systems-Examples and General Properties, Semi groups and Monoids, groups, sub groups, homomorphism, Isomorphism.

UNIT III:Elementary Combinatorics

09

Combinations and Permutations, Enumeration of Combinations and Permutations, Enumerating Combinations and Permutations with Repetitions, Enumerating Permutations with Constrained Repetitions, Binomial Coefficients, The Binomial and Multinomial Theorems.

UNIT IV:Recurrence Relations

09

Generating Functions of Sequences, Calculating Coefficients of Generating Functions, Recurrence relations, Solving Recurrence Relations by Substitution and Generating functions, The Method of Characteristic roots, Solutions of Inhomogeneous Recurrence Relations.

UNIT V:Graphs

09

Basic Concepts, Isomorphism and Subgraphs, Trees and their Properties, Spanning Trees, Directed Trees, Binary Trees, Planar Graphs, Euler's Formula, Multigraphs and Euler Circuits, Hamiltonian Graphs.



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23ESC232	II B.TECH - III SEMESTER DIGITAL LOGIC AND COMPUTER ORGANIZATION	L 3	T -	P -	C 3
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COURSE OBJECTIVES:

1. Provide students with a comprehensive understanding of digital logic design principles and computer organization fundamentals.
2. Describe basic structure of computer.
3. To understand the computer arithmetic and processor organization.
4. To classify the memory, and peripheral devices.
5. To gain the knowledge on input/output (I/O) systems and their interaction with the CPU

UNIT – I:

9

DATA REPRESENTATION: Binary Numbers, Fixed Point Representation. Floating Point Representation. Number base conversions, Octal and Hexadecimal Numbers, components, Signed binary numbers, Binary codes

DIGITAL LOGIC CIRCUITS-I: Basic Logic Functions, Logic gates, universal logic gates, Minimization of Logic expressions. K-Map Simplification, Combinational Circuits, Decoders, Multiplexers

UNIT – II:

9

DIGITAL LOGIC CIRCUITS-II: Sequential Circuits, Flip-Flops, Binary counters, Registers, Shift Registers, Ripple counters

BASIC STRUCTURE OF COMPUTERS: Computer Types, Functional units, Basic operational concepts, Bus structures, Software, Performance, multiprocessors and multi computers, Computer Generations, Von- Neumann Architecture

UNIT – III:

9

COMPUTER ARITHMETIC: Addition and Subtraction of Signed Numbers, Design of Fast Adders, Multiplication of Positive Numbers, Signed-operand Multiplication, Fast Multiplication, Integer Division, Floating-Point Numbers and Operations

PROCESSOR ORGANIZATION: Fundamental Concepts, Execution of a Complete Instruction, Multiple-Bus Organization, Hardwired Control and Multi programmed Control

UNIT – IV:

9

THE MEMORY ORGANIZATION: Basic concepts, Semiconductor RAM Memories, Read-Only Memories, Speed, Size and Cost, Cache Memories, Performance Considerations, Virtual Memories, Memory Management Requirements, Secondary Storage, Solid state drives- Flash, PCI Express flash, Hybrid DRAM-flash storage.

UNIT – V:

9

INPUT/OUTPUT ORGANIZATION: Accessing I/O Devices, Interrupts, Processor Examples, Direct Memory Access, Buses, Interface Circuits, Standard I/O Interfaces, PCI Express, types of USB.

Total Hours: 45



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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
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II B.TECH - III SEMESTER**

**23CSE231 ADVANCED DATA STRUCTURES & ALGORITHM LTP C
ANALYSIS
(Common to CSE, CSM, CAI and CSD) 3 0 0 3**

PRE-REQUISITES: A course on Data Structures

COURSE EDUCATIONAL OBJECTIVES:

1. Provide knowledge about algorithm analysis using time complexity and space complexity, and to introduce the concept of AVL trees and B trees.
2. To understand the concepts of Heap trees, Basics of Graphs and Divide and Conquer algorithm design strategy.
3. To gain knowledge of Greedy and Dynamic programming approach to problem solving.
4. To Understand back tracking and branch and bound strategies for solving the complex problems
5. To Develop skills of deciding a problem is solvable or not using NP hard and NP complete class problem.

UNIT 1: (9)

Introduction to Algorithm Analysis, Space and Time Complexity analysis, Asymptotic Notations. AVL Trees – Creation, Insertion, Deletion operations and Applications B-Trees – Creation, Insertion, Deletion operations and Applications

UNIT 2: (9)

Heap Trees (Priority Queues) – Min and Max Heaps, Operations and Applications Graphs – Terminology, Representations, Basic Search and Traversals, Connected Components and Biconnected Components, applications. Divide and Conquer: The General Method, Quick Sort, Merge Sort, Strassen’s matrix multiplication, Convex Hull

UNIT 3: (9)

Greedy Method: General Method, Job Sequencing with deadlines, Knapsack Problem, Minimum cost spanning trees, Single Source Shortest Paths. Dynamic Programming: General Method, All pairs shortest paths, Single Source Shortest Paths– General Weights (Bellman Ford Algorithm), Optimal Binary Search Trees, 0/1 Knapsack, String Editing, Travelling Salesperson problem

UNIT 4: (9)

Backtracking: General Method, 8-Queens Problem, Sum of Subsets problem, Graph Coloring, 0/1 Knapsack Problem
Branch and Bound: The General Method, 0/1 Knapsack Problem, Travelling Salesperson problem

UNIT 5: (9)

NP Hard and NP Complete Problems: Basic Concepts, Cook’s theorem NP Hard Graph Problems: Clique Decision Problem (CDP), Chromatic Number Decision Problem (CNDP), Traveling Salesperson Decision Problem (TSP) NP Hard Scheduling Problems: Scheduling Identical Processors, Job Shop Scheduling

Total Hours: 45



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II B.TECH - III SEMESTER

23CSE232 OBJECT ORIENTED PROGRAMMING THROUGH JAVA L T P C
(Common to CSE, CSM, CAI, CSD) 3 0 0 3

PRE-REQUISITES: A course on Introduction to Programming

COURSE EDUCATIONAL OBJECTIVES:

1. Identify Java language components and how they work together in applications
2. Learn the fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries.
3. learn how to extend Java classes with inheritance and dynamic binding and how to use exception handling in Java applications
4. understand how to design applications with threads in Java
5. understand how to use Java APIs for program development

UNIT 1: (9)

Object Oriented Programming: Basic concepts, Principles,

Program Structure in Java: Introduction, Writing Simple Java Programs, Elements or Tokens in Java Programs, Java Statements, Command Line Arguments, User Input to Programs, Escape Sequences Comments, Programming Style.

Data Types, Variables, and Operators : Introduction, Data Types in Java, Declaration of Variables, Data Types, Type Casting, Scope of Variable Identifier, Literal Constants, Symbolic Constants, Formatted Output with printf() Method, Static Variables and Methods, Attribute Final,

Introduction to Operators, Precedence and Associativity of Operators, Assignment Operator (=), Basic Arithmetic Operators, Increment (++) and Decrement (- -) Operators, Ternary Operator, Relational Operators, Boolean Logical Operators, Bitwise Logical Operators.

Control Statements: Introduction, if Expression, Nested if Expressions, if-else Expressions, Ternary Operator (? :), Switch Statement, Iteration Statements, while Expression, do-while Loop, for Loop, Nested for Loop, For-Each for Loop, Break Statement, Continue Statement.

UNIT 2: (9)

Classes and Objects: Introduction, Class Declaration and Modifiers, Class Members, Declaration of Class Objects, Assigning One Object to Another, Access Control for Class Members, Accessing Private Members of Class, Constructor Methods for Class, Overloaded Constructor Methods, Nested Classes, Final Class and Methods, Passing Arguments by Value and by Reference, Keyword this.

Methods: Introduction, Defining Methods, Overloaded Methods, Overloaded Constructor Methods, Class Objects as Parameters in Methods, Access Control, Recursive Methods, Nesting of Methods, Overriding Methods, Attributes Final and Static.

UNIT 3: (9)

Arrays: Introduction, Declaration and Initialization of Arrays, Storage of Array in Computer Memory, Accessing Elements of Arrays, Operations on Array Elements, Assigning Array to Another Array, Dynamic Change of Array Size, Sorting of Arrays, Search for Values in Arrays, Class Arrays, Two-dimensional Arrays, Arrays of Varying Lengths, Three-dimensional Arrays, Arrays as Vectors.



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Inheritance: Introduction, Process of Inheritance, Types of Inheritances, Universal Super Class-Object Class, Inhibiting Inheritance of Class Using Final, Access Control and Inheritance, Multilevel Inheritance, Application of Keyword Super, Constructor Method and Inheritance, Method Overriding, Dynamic Method Dispatch, Abstract Classes, Interfaces and Inheritance.

Interfaces: Introduction, Declaration of Interface, Implementation of Interface, Multiple Interfaces, Nested Interfaces, Inheritance of Interfaces, Default Methods in Interfaces, Static Methods in Interface, Functional Interfaces, Annotations.

UNIT 4: (9)

Packages and Java Library: Introduction, Defining Package, Importing Packages and Classes into Programs, Path and Class Path, Access Control, Packages in Java SE, Java.lang Package and its Classes, Class Object, Enumeration, class Math, Wrapper Classes, Auto-boxing and Auto-unboxing, Java util Classes and Interfaces, Formatter Class, Random Class, Time Package, Class Instant (java.time.Instant), Formatting for Date/Time in Java, Temporal Adjusters Class, Temporal Adjusters Class.

Exception Handling: Introduction, Hierarchy of Standard Exception Classes, Keywords throws and throw, try, catch, and finally Blocks, Multiple Catch Clauses, Class Throwable, Unchecked Exceptions, Checked Exceptions.

Java I/O and File: Java I/O API, standard I/O streams, types, Byte streams, Character streams, Scanner class, Files in Java(Text Book 2)

UNIT 5: (9)

String Handling in Java: Introduction, Interface Char Sequence, Class String, Methods for Extracting Characters from Strings, Comparison, Modifying, Searching; Class String Buffer.

Multithreaded Programming: Introduction, Need for Multiple Threads Multithreaded Programming for Multi-core Processor, Thread Class, Main Thread-Creation of New Threads, Thread States, Thread Priority-Synchronization, Deadlock and Race Situations, Inter-thread Communication - Suspending, Resuming, and Stopping of Threads.

Java Database Connectivity: Introduction, JDBC Architecture, Installing MySQL and MySQL Connector/J, JDBC Environment Setup, Establishing JDBC Database Connections, ResultSet Interface

Java FX GUI: Java FX Scene Builder, Java FX App Window Structure, displaying text and image, event handling, laying out nodes in scene graph, mouse events (Text Book 3)

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course the student will be		POs related to Cos
CO1	Analyse problems, design solutions using OOP principles, and implement them efficiently in Java. (L4)	PO1, PO2, PO5
CO2	Design and implement classes to model real-world entities, with a focus on attributes, behaviours, and relationships between objects (L4)	PO1, PO4,PO5
CO3	Demonstrate an understanding of inheritance hierarchies and polymorphic behaviour, including method overriding and dynamic method dispatch. (L3)	PO1,PO3,PO4, PO5



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CO4	Apply Competence in handling exceptions and errors to write robust and fault-tolerant code. (L3)	PO1,PO4, PO5
CO5	Perform file input/output operations, including reading from and writing to files using Java I/O classes, graphical user interface (GUI) programming using JavaFX.(L3)	PO1, PO2, PO4, PO5

TEXT BOOKS:

- 1) JAVA one step ahead, Anitha Seth, B.L.Juneja, Oxford.
- 2) Joy with JAVA, Fundamentals of Object Oriented Programming, DebasisSamanta, MonalisaSarma, Cambridge, 2023.
- 3) JAVA for Programmers, Paul Deitel, Harvey Deitel, 4th Edition, Pearson.

REFERENCES:

- 1) The complete Reference Java, 11thedition, Herbert Schildt,TMH
- 2) Introduction to Java programming, 7th Edition, Y Daniel Liang, Pearson

REFERENCE WEBSITE:

- 1) <https://nptel.ac.in/courses/106/105/106105191/>
- 2) https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_012880464547618816347_shared/overview

CO-PO MAPPING:

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



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23CSE233 II B.TECH - III SEMESTER L T P C
ADVANCED DATA STRUCTURES & ALGORITHM 0 0 0 1.5
ANALYSIS LAB
(Common to CSE, CSM and CAI)

PRE-REQUISITES: A course on Data Structures

COURSE EDUCATIONAL OBJECTIVES:

- Acquire practical skills in constructing and managing Data structures
- Apply the popular algorithm design methods in problem-solving scenarios

List of Demo/ Experiments (Only for Skill Enhancement, Not for Exams) (15)

Experiments covering the Topics:

- Operations on AVL trees, B-Trees, Heap Trees
- Graph Traversals
- Sorting techniques
- Finding Biconnected components in a graph
- Shortest path algorithms using greedy Method
- 0/1 Knapsack Problem using Dynamic Programming and Backtracking
- Travelling Salesperson problem using Branch and Bound
- N-Queens Problem using Backtracking
- Job Sequencing using Branch and Bound

Sample Programs:

1. Construct an AVL tree for a given set of elements which are stored in a file. And implement insert and delete operation on the constructed tree. Write contents of tree into a new file using in-order.
2. Construct B-Tree an order of 5 with a set of 100 random elements stored in array. Implement searching, insertion and deletion operations.
3. Construct Min and Max Heap using arrays, delete any element and display the content of the Heap.
4. Implement BFT and DFT for given graph, when graph is represented by
 - a) Adjacency Matrix
 - b) Adjacency Lists
5. Write a program for finding the biconnected components in a given graph.
6. Implement Quick sort and Merge sort and observe the execution time for various input sizes (Average, Worst and Best cases).
7. Compare the performance of Single Source Shortest Paths using Greedy method when the graph is represented by adjacency matrix and adjacency lists.
8. Implement Job Sequencing with deadlines using Greedy strategy.
9. Write a program to solve 0/1 Knapsack problem Using Dynamic Programming.
10. Implement N-Queens Problem Using Backtracking.
11. Use Backtracking strategy to solve 0/1 Knapsack problem.
12. Implement Travelling Sales Person problem using Branch and Bound approach.



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COURSE OUTCOMES:

On successful completion of the course the student will be		POs related to COs
CO1	Acquire the Knowledge on structure and model of the sorting techniques.	PO1
CO2	Analyze the Time and space complexity.	PO2
CO3	Design solutions for user requirements using software functionality.	PO3
CO4	Investigate on different dynamic programming in developing TSP	PO4
CO5	Develop the the N-queens problem using backtracking algorithm	PO5, PO6
CO6	Follow the ethical principles in implementing the programs	PO8
CO7	Do experiments effectively as an individual and as a team member in a group.	PO9
CO8	Communicate verbally and in written form, the understanding about the experiments.	PO10
CO9	Continue updating their skill related to object oriented concepts and implementing programs in future.	PO12

REFERENCE BOOKS:

1. Fundamentals of Data Structures in C++, Horowitz Ellis, SahniSartaj, Mehta, Dinesh, 2ndEdition, Universities Press
2. Computer Algorithms/C++ Ellis Horowitz, SartajSahni, SanguthevarRajasekaran, 2ndEdition, University Press
3. Data Structures and program design in C, Robert Kruse, Pearson Education Asia
4. An introduction to Data Structures with applications, Trembley& Sorenson, McGraw Hill

REFERENCE WEBSITE:

1. <http://cse01-iiith.vlabs.ac.in/>
2. <http://peterindia.net/Algorithms.html>

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	1	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	3	-	-	-
CO8	-	-	-	-	-	-	-	-	-	3	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO*	3	3	3	3	3	1	-	3	3	3	-	3



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II B.TECH - III SEMESTER

**23CE234 OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB
(Common to CSE, CSM, CAI, CSD)**

**L T P C
0 0 3 1.5**

PRE-REQUISITES: A course on Introduction to Programming

COURSE EDUCATIONAL OBJECTIVES:

1. Practice object-oriented programming in the Java programming language
2. Implement Classes, Objects, Methods, Inheritance, Exception, Runtime Polymorphism, User defined Exception handling mechanism
3. Illustrate inheritance, Exception handling mechanism, JDBC connectivity
4. Construct Threads, Event Handling, implement packages, Java FX GUI

EXPERIMENTS COVERING THE TOPICS:

- Object Oriented Programming fundamentals- data types, control structures
- Classes, methods, objects, Inheritance, polymorphism,
- Exception handling, Threads, Packages, Interfaces
- Files, I/O streams, JavaFX GUI

LIST OF EXPERIMENTS:

EXERCISE - 1:

- a) Write a JAVA program to display default value of all primitive data type of JAVA
- b) Write a java program that display the roots of a quadratic equation $ax^2+bx=0$. Calculate the discriminate D and basing on value of D, describe the nature of root.

EXERCISE - 2

- a) Write a JAVA program to search for an element in a given list of elements using binary search mechanism.
- b) Write a JAVA program to sort for an element in a given list of elements using bubble sort
- c) Write a JAVA program using String Buffer to delete, remove character.

EXERCISE - 3

- a) Write a JAVA program to implement class mechanism. Create a class, methods and invoke them inside main method.
- b) Write a JAVA program implement method overloading.
- c) Write a JAVA program to implement constructor.
- d) Write a JAVA program to implement constructor overloading.

EXERCISE - 4

- a) Write a JAVA program to implement Single Inheritance
- b) Write a JAVA program to implement multilevel Inheritance
- c) Write a JAVA program for abstract class to find areas of different shapes

EXERCISE - 5

- a) Write a JAVA program give example for "super" keyword.
- b) Write a JAVA program to implement Interface. What kind of Inheritance can be achieved?
- c) Write a JAVA program that implements Runtime polymorphism

EXERCISE - 6

- a) Write a JAVA program that describes exception handling mechanism
- b) Write a JAVA program Illustrating Multiple catch clauses
- c) Write a JAVA program for creation of Java Built-in Exceptions
- d) Write a JAVA program for creation of User Defined Exception

EXERCISE - 7

- a) Write a JAVA program that creates threads by extending Thread class. First thread display "Good Morning "every 1 sec, the second thread displays "Hello "every 2 seconds and



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the third display "Welcome" every 3 seconds,(Repeat the same by implementing Runnable)

- b) Write a program illustrating **is Alive** and **join ()**
- c) Write a Program illustrating Daemon Threads.
- d) Write a JAVA program Producer Consumer Problem

EXERCISE – 8

- a) Write a JAVA program that import and use the user defined packages
- b) Without writing any code, build a GUI that display text in label and image in an ImageView (use JavaFX)
- c) Build a Tip Calculator app using several JavaFX components and learn how to respond to user interactions with the GUI

COURSE OUTCOMES:

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

REFERENCE BOOKS:

1. P. J. Deitel, H. M. Deitel, "Java for Programmers", Pearson Education, PHI, 4th Edition, 2007.
2. P. Radha Krishna, "Object Oriented Programming through Java", Universities Press, 2nd Edition, 2007
3. Bruce Eckel, "Thinking in Java", Pearson Education, 4th Edition, 2006.
4. Sachin Malhotra, Saurabh Chaudhary, "Programming in Java", Oxford University Press, 5th Edition, 2010.

REFERENCE WEBSITE:

- <https://java-iitd.vlabs.ac.in/>
- <http://peterindia.net/javaFiles.html>

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
CO*	3	3	3	3	3	-	-	3	3	3	-	3



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II B.TECH - III SEMESTER

23CSE235

**PYTHON PROGRAMMING
(SKILL ENHANCEMENT COURSE)
(Common to ALL)**

L T P C

0 1 2 2

PRE-REQUISITES: A course on Introduction to Programming

COURSE EDUCATIONAL OBJECTIVES:

1. Introduce core programming concepts of Python programming language.
2. Demonstrate about Python data structures like Lists, Tuples, Sets and dictionaries
3. Implement Functions, Modules and Regular Expressions in Python Programming and to create practical and contemporary applications using these

UNIT-I:

History of Python Programming Language, Thrust Areas of Python, Installing Anaconda Python Distribution, Installing and Using Jupyter Notebook.

Parts of Python Programming Language: Identifiers, Keywords, Statements and Expressions, Variables, Operators, Precedence and Associativity, Data Types, Indentation, Comments, Reading Input, Print Output, Type Conversions, the type () Function and Is Operator, Dynamic and Strongly Typed Language.

Control Flow Statements: if statement, if-else statement, if...elif...else, Nested if statement, while Loop, for Loop, continue and break Statements, Catching Exceptions Using try and except Statement.

SAMPLE EXPERIMENTS:

1. Write a program to find the largest element among three Numbers.
2. Write a Program to display all prime numbers within an interval
3. Write a program to swap two numbers without using a temporary variable.
4. Demonstrate the following Operators in Python with suitable examples.
 - i) Arithmetic Operators
 - ii) Relational Operators
 - iii) Assignment Operators
 - iv) Logical Operators
 - v) Bit wise Operators
 - vi) Ternary Operator
 - vii) Membership Operators
 - viii) Identity Operators
5. Write a program to add and multiply complex numbers
6. Write a program to print multiplication table of a given number.

UNIT-II:

Functions: Built-In Functions, Commonly Used Modules, Function Definition and Calling the function, return Statement and void Function, Scope and Lifetime of Variables, Default Parameters, Keyword Arguments, *args and **kwargs, Command Line Arguments.

Strings: Creating and Storing Strings, Basic String Operations, Accessing Characters in String by Index Number, String Slicing and Joining, String Methods, Formatting Strings.

Lists: Creating Lists, Basic List Operations, Indexing and Slicing in Lists, Built-In Functions Used on Lists, List Methods, del Statement.

SAMPLE EXPERIMENTS:

7. Write a program to define a function with multiple return values.
8. Write a program to define a function using default arguments.
9. Write a program to find the length of the string without using any library functions.
10. Write a program to check if the substring is present in a given string or not.
11. Write a program to perform the given operations on a list:
 - i. addition
 - ii. insertion
 - iii. slicing
12. Write a program to perform any 5 built-in functions by taking any list.

UNIT-III:

Dictionaries: Creating Dictionary, Accessing and Modifying key:value Pairs in Dictionaries, Built-In Functions Used on Dictionaries, Dictionary Methods, del Statement.



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Tuples and Sets: Creating Tuples, Basic Tuple Operations, tuple() Function, Indexing and Slicing in Tuples, Built-In Functions Used on Tuples, Relation between Tuples and Lists, Relation between Tuples and Dictionaries, Using zip() Function, Sets, Set Methods, Frozenset.

Sample Experiments:

13. Write a program to create tuples (name, age, address, college) for at least two members and concatenate the tuples and print the concatenated tuples.
14. Write a program to count the number of vowels in a string (No control flow allowed).
15. Write a program to check if a given key exists in a dictionary or not.
16. Write a program to add a new key-value pair to an existing dictionary.
17. Write a program to sum all the items in a given dictionary.

UNIT-IV:

Files: Types of Files, Creating and Reading Text Data, File Methods to Read and Write Data, Reading and Writing Binary Files, Pickle Module, Reading and Writing CSV Files, Python os and os.path Modules.

Object-Oriented Programming: Classes and Objects, Creating Classes in Python, Creating Objects in Python, Constructor Method, Classes with Multiple Objects, Class Attributes Vs Data Attributes, Encapsulation, Inheritance, Polymorphism.

SAMPLE EXPERIMENTS:

18. Write a program to sort words in a file and put them in another file. The output file should have only lower-case words, so any upper-case words from source must be lowered.
19. Python program to print each line of a file in reverse order.
20. Python program to compute the number of characters, words and lines in a file.
21. Write a program to create, display, append, insert and reverse the order of the items in the array.
22. Write a program to add, transpose and multiply two matrices.
23. Write a Python program to create a class that represents a shape. Include methods to calculate its area and perimeter. Implement subclasses for different shapes like circle, triangle, and square.

UNIT-V:

Introduction to Data Science: Functional Programming, JSON and XML in Python, NumPy with Python, Pandas.

SAMPLE EXPERIMENTS:

24. Python program to check whether a JSON string contains complex object or not.
25. Python Program to demonstrate NumPy arrays creation using array () function.
26. Python program to demonstrate use of ndim, shape, size, dtype.
27. Python program to demonstrate basic slicing, integer and Boolean indexing.
28. Python program to find min, max, sum, cumulative sum of array
29. Create a dictionary with at least five keys and each key represent value as a list where this list contains at least ten values and convert this dictionary as a pandas data frame and explore the data through the data frame as follows:
 - a) Apply head () function to the pandas data frame
 - b) Perform various data selection operations on Data Frame
30. Select any two columns from the above data frame, and observe the change in one attribute with respect to other attribute with scatter and plot operations in matplotlib



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COURSE OUTCOMES:

On successful completion of this course the students should be able to:		POs related to COs
CO1	Learn various problem solving approaches and ability to identify an appropriate approach to solve the problem	PO1, PO2, PO3, PO5
CO2	Implement conditionals and loops to design the python programming	PO1, PO2, PO3, PO5
CO3	Implement lists, set, tuples and dictionaries to develop python program.	PO1, PO2, PO3, PO5
CO4	Able to modulate the given problem using structural approach of programming	PO1, PO2, PO3, PO5
CO5	Build Python Programs using packages to solve real-time problems.	PO1, PO2, PO3, PO4, PO5
CO6	Follow the ethical principles in implementing the programs	PO8
CO7	Do experiments effectively as an individual and as a team member in a group.	PO9
CO8	Communicate verbally and in written form, the understanding about the experiments.	PO10
CO9	Continue updating their skill related to lists, tuples and dictionaries implementing programs in future.	PO12

REFERENCE BOOKS:

1. Gowrishankar S, Veena A., Introduction to Python Programming, CRC Press.
2. Python Programming, S Sridhar, J Indumathi, V M Hariharan, 2nd Edition, Pearson, 2024
3. Introduction to Programming Using Python, Y. Daniel Liang, Pearson.

REFERENCE WEBSITE:

1. <https://www.coursera.org/learn/python-for-applied-data-science-ai>
2. <https://www.coursera.org/learn/python?specialization=python#syllabus>

CO-PO MAPPING:

CO-PO	PO 1	PO 2	PO 3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	-	2	-	-	-	-	-	-	-
CO2	3	3	3	-	2	-	-	-	-	-	-	-
CO3	3	3	3	-	2	-	-	-	-	-	-	-
CO4	3	3	3	-	2	-	-	-	-	-	-	-
CO5	3	3	3	3	2	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	3	-	-	-
CO8	-	-	-	-	-	-	-	-	-	3	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO*	3	3	3	3	2	-	-	3	3	3		3



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II B.TECH - III SEMESTER

23MAC231	Environmental Studies	L	T	P	C
	Common to all Branches	2	-	-	-

PRE-REQUISITES: NIL

COURSE EDUCATIONAL OBJECTIVES:

1. To recognize nature of environment, atmosphere and natural resources including renewable and nonrenewable resources.
2. To understand flow and bio-geo-chemical cycles, ecological pyramids and bio-diversity with its conservation.
3. To identify various causes of pollution and solid waste management and related preventive measures.
4. To evaluate and interpret the rainwater harvesting, watershed management and environmental issues such as ozone layer depletion, greenhouse effect etc.
5. To understand the causes of population explosion, value education and welfare programs.

UNIT - I: INTRODUCTION TO ENVIRONMENTAL STUDIES AND NATURAL RESOURCES (6)

Multidisciplinary nature of environmental studies: (a) Definition, scope and importance. Need for public awareness

Natural Resources: Renewable and non-renewable resources: Natural resources and associated problems. a) Forest resources: Use and over-exploitation, deforestation, case studies, mining, dams and their effects on forest and tribal people. b)

Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. e) Energy resources: Growing energy needs, renewable and nonrenewable energy resources.

UNIT - II: CONCEPT OF ECOSYSTEM AND BIODIVERSITY (6)

Structure and function of an ecosystem: Producers, consumers and decomposers- Energy flow in the ecosystem- Ecological succession- Food chains, food webs and ecological pyramids- Introduction, types, characteristic features, structure and function of the following ecosystem: a. Forest ecosystem b. Grassland ecosystem c. Desert ecosystem d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Biodiversity and its conservation: Introduction – Definition: genetic, species and ecosystem diversity-Biogeographical classification of India-Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values - Biodiversity at global, National and local levels- India as a mega-diversity nation-Hotspots 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 - III: ENVIRONMENTAL POLLUTION AND WASTE MANAGEMENT (6)



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Environmental Pollution: Definition - Cause, effects and control measures of: - a. Air pollution b. Water pollution c. Soil pollution d. Marine pollution e. Noise pollution f. Thermal pollution g. nuclear hazards

Solid waste Management: Causes, effects and control measures of urban and industrial wastes-Role of an individual in prevention of pollution. Pollution case studies-Disaster management: floods, earthquake, cyclone and landslides.

UNIT – IV: SOCIAL ISSUES AND THE ENVIRONMENT (6)

From Unsustainable to Sustainable development: Urban problems related to energy- Water conservation, rain water harvesting, watershed management-Resettlement and rehabilitation of people; its problems and concerns

UNIT – V: HUMAN POPULATION AND THE ENVIRONMENT (6)

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.

COURSE OUTCOMES:

On successful completion of the course, students will be able to		POs
CO1	Grasp multidisciplinary nature of environmental studies, atmosphere and various renewable and nonrenewable resources.	PO1, PO7, PO8
CO2	Understand flow and bio-geo- chemical cycles, ecological pyramids and biodiversity and with its conservation.	PO1, PO7, PO8
CO3	Understand various causes of pollution and solid waste management and related preventive measures.	PO1, PO7, PO8
CO4	Gain knowledge on rainwater harvesting, watershed management, environmental issues and waste land reclamation.	PO1, PO7, PO8
CO5	Understand population explosion, value education and welfare programmes.	PO1, PO7, PO8

TEXT BOOKS:

1. Ferdinand P. Beer, E. Russell Johnston, "Vector Mechanics for Engineers", TataMcGraw-HillEducationPvt., Ltd, 12/e, 2019.
2. ErachBharucha, "Textbook of Environmental Studies for Undergraduate Courses", University Grants Commission, 2/e, 2013, University Press.
3. Palaniswamy, "Environmental Studies", Pearson Educations.
4. S. AzeemUnisa, "Environmental Studies", Academic Publishing Company.
5. K. RaghavanNambiar, "Text book of Environmental Studies for UndergraduateCourses as per UGC model syllabus", SciTech Publications (India) Pvt. Ltd.

REFERENCE BOOKS:

1. DeekshaDave, and E. Sai Baba Reddy, "Textbook of Environmental Science" CengagePublications.
2. C.P.Kaushik and AnubhaKaushik "Text book of EnvironmentalStudies", New AgeInternational publishers, 4/e, 2006.



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3. M. Anji Reddy, "Text Book of Environmental Sciences and Technology", BSPublications.
4. J.P. Sharma, "Comprehensive Environmental Studies", Laxmi Publications.
5. J. Glynne Henry and Gary W. Heinke, "Environmental Sciences and Engineering", Printice Hall of India Pvt Ltd.
6. G.R. Chatwal, "A Text book of Environmental Studies", Himalaya Publishing House
7. Gilbert M. Masters, and Wendell P. Ela, "Introduction to EnvironmentalEngineeringand Science", Printice Hall of India Pvt Ltd.

REFERENCE WEBSITE:

<https://nptel.ac.in/courses/127/105/127105018/>

<https://nptel.ac.in/courses/113/104/113104061/>

<https://nptel.ac.in/courses/120/108/120108005/>

<https://nptel.ac.in/courses/120/108/120108002/>



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II B.Tech. - IV Semester

23HSM234	UNIVERSAL HUMAN VALUES –UNDERSTANDING HARMONY AND ETHICAL HUMAN CONDUCT	L	T	P	C
	(Common to All Branches)	2	1		3

Course Objectives:

1. To help the students appreciate the essential complementary between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
2. To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of existence. Such holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way.
3. To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behaviour and mutually enriching interaction with Nature.

Course Topics

The course has 28 lectures and 14 tutorials in 5 modules. The lectures and tutorials are of 1- hour duration. Tutorial sessions are to be used to explore and practice what has been proposed during the lecture sessions.

The Teacher's Manual provides the outline for lectures as well as practice sessions. The teacher is expected to present the issues to be discussed as propositions and encourage the students to have a dialogue.

UNIT I

Introduction to Value Education (6 lectures and 3 tutorials for practice session)

Lecture 1: Right Understanding, Relationship and Physical Facility (Holistic Development and the Role of Education)

Lecture 2: Understanding Value Education

Tutorial 1: Practice Session PS1 Sharing about Oneself

Lecture 3: self-exploration as the Process for Value Education

Lecture 4: Continuous Happiness and Prosperity – the Basic Human Aspirations

Tutorial 2: Practice Session PS2 Exploring Human

Consciousness
Lecture 5: Happiness and Prosperity – Current Scenario.

Lecture 6: Method to Fulfill the Basic Human Aspirations

Tutorial 3: Practice Session PS3 Exploring Natural Acceptance

UNIT II

Harmony in the Human Being (6 lectures and 3 tutorials for practice session)
Lecture 7: Understanding Human being as the Co-existence of the self and the body.

Lecture 8: Distinguishing between the Needs of the self and the body

Tutorial 4: Practice Session PS4 Exploring the difference of Needs of self and body.

Lecture 9: The body as an Instrument of the self



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Lecture 10: Understanding Harmony in the self
Tutorial 5: Practice Session PS5 Exploring Sources of Imagination in the self
Lecture 11: Harmony of the self with the body
Lecture 12: Programme to ensure self-regulation and Health
Tutorial 6: Practice Session PS6 Exploring Harmony of self with the body

UNIT III Harmony in the Family and Society (6 lectures and 3 tutorials for practice session)
Lecture 13: Harmony in the Family – the Basic Unit of Human Interaction
Lecture 14: 'Trust' – the Foundational Value in Relationship
Tutorial 7: Practice Session PS7 Exploring the Feeling of Trust
Lecture 15: 'Respect' – as the Right Evaluation
Tutorial 8: Practice Session PS8 Exploring the Feeling of Respect
Lecture 16: Other Feelings, Justice in Human-to-Human Relationship
Lecture 17: Understanding Harmony in the Society
Lecture 18: Vision for the Universal Human Order
Tutorial 9: Practice Session PS9 Exploring Systems to fulfil Human Goal

UNIT IV Harmony in the Nature/Existence (4 lectures and 2 tutorials for practice session)
Lecture 19: Understanding Harmony in the Nature
Lecture 20: Interconnectedness, self-regulation and Mutual Fulfilment among the Four Orders of Nature
Tutorial 10: Practice Session PS10 Exploring the Four Orders of Nature
Lecture 21: Realizing Existence as Co-existence at All Levels
Lecture 22: The Holistic Perception of Harmony in Existence
Tutorial 11: Practice Session PS11 Exploring Co-existence in Existence.

UNIT V Implications of the Holistic Understanding – a Look at Professional Ethics (6 lectures and 3 tutorials for practice session)
Lecture 23: Natural Acceptance of Human Values
Lecture 24: Definitiveness of (Ethical) Human Conduct
Tutorial 12: Practice Session PS12 Exploring Ethical Human Conduct
Lecture 25: A Basis for Humanistic Education, Humanistic Constitution and Universal Human Order
Lecture 26: Competence in Professional Ethics
Tutorial 13: Practice Session PS13 Exploring Humanistic Models in Education
Lecture 27: Holistic Technologies, Production Systems and Management Models-Typical Case Studies
Lecture 28: Strategies for Transition towards Value-based Life and Profession
Tutorial 14: Practice Session PS14 Exploring Steps of Transition towards Universal Human Order



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Practice Sessions for UNIT I – Introduction to Value Education
PS1 Sharing about Oneself
PS2 Exploring Human Consciousness
PS3 Exploring Natural Acceptance

Practice Sessions for UNIT II – Harmony in the Human Being
PS4 Exploring the difference of Needs of self and body
PS5 Exploring Sources of Imagination in the self
PS6 Exploring Harmony of self with the body

Practice Sessions for UNIT III – Harmony in the Family and Society
PS7 Exploring the Feeling of Trust
PS8 Exploring the Feeling of Respect
PS9 Exploring Systems to fulfil Human Goal

Practice Sessions for UNIT IV – Harmony in the Nature (Existence)
PS10 Exploring the Four Orders of Nature
PS11 Exploring Co-existence in Existence

Practice Sessions for UNIT V – Implications of the Holistic Understanding – a Look at Professional Ethics
PS12 Exploring Ethical Human Conduct
PS13 Exploring Humanistic Models in Education
PS14 Exploring Steps of Transition towards Universal Human Order

READINGS:

Textbook and Teachers Manual

a. The Textbook

R R Gaur, R Asthana, G P Bagaria, A Foundation Course in Human Values and Professional Ethics, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1

b. The Teacher's Manual

R R Gaur, R Asthana, G P Bagaria, Teachers' Manual for A Foundation Course in Human Values and Professional Ethics, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-53-2

Reference Books

1. Jeevan Vidya: Ek Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.
2. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
3. The Story of Stuff (Book).
4. The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi
5. Small is Beautiful - E. F Schumacher.
6. Slow is Beautiful - Cecile Andrews
7. Economy of Permanence - J C Kumarappa
8. Bharat Mein Angreji Raj – Pandit Sunderlal
9. Rediscovering India - by Dharampal
10. Hind Swaraj or Indian Home Rule - by Mohandas K. Gandhi
11. India Wins Freedom - Maulana Abdul Kalam Azad
12. Vivekananda - Romain Rolland (English)
13. Gandhi - Romain Rolland (English)



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COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Define the terms like natural acceptance ,Happiness and Prosperity. (L1,L2)	PO7
CO2	Identify One's self and one's surroundings family society nature. (L1, L2)	PO7
CO3	Apply what they have learnt to their own self in different day to day settings in real life. (L3)	PO8
CO4	Relate human values with human relationship and human society. (L4)	PO8
CO5	Justify the need for universal human values and harmonious existence. (L5) Develop as socially and ecologically responsible engineers. (L3,L6)	PO8

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

Mode of Conduct:

Lecture hours are to be used for interactive discussion, placing the proposals about the topics at hand and motivating students to reflect, explore and verify them.

Tutorial hours are to be used for practice sessions.

While analyzing and discussing the topic, the faculty mentor's role is in pointing to essential elements to help in sorting them out from the surface elements. In other words, help the students explore the important or critical elements.

In the discussions, particularly during practice sessions (tutorials), the mentor encourages the student to connect with one's own self and do self-observation, self-reflection and self-exploration.

Scenarios may be used to initiate discussion. The student is encouraged to take up "ordinary" situations rather than "extra-ordinary" situations. Such observations and their analyses are shared and discussed with other students and faculty mentor, in a group sitting.

Tutorials (experiments or practical) are important for the course. The difference is that the laboratory is everyday life, and practical are how you behave and work in real life. Depending on the nature of topics, worksheets, home assignment and/or activity are included. The practice sessions (tutorials) would also provide support to a student in performing actions commensurate to his/her beliefs. It is intended that this would lead to development of commitment, namely behaving and working based on basic human values.

It is recommended that this content be placed before the student as it is, in the form of a basic foundation course, without including anything else or excluding any part of this content. Additional content may be offered in separate, higher courses. This course is to be taught by faculty from every teaching department, not exclusively by any one department.

Teacher preparation with a minimum exposure to at least one 8-day Faculty Development Program on Universal Human Values is deemed essential.



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Online Resources:

1. <https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%201-Introduction%20to%20Value%20Education.pdf>
2. <https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%202-Harmony%20in%20the%20Human%20Being.pdf>
3. <https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%203-Harmony%20in%20the%20Family.pdf>
4. <https://fdp-si.aicte-india.org/UHV%201%20Teaching%20Material/D3-S2%20Respect%20July%202023.pdf>
5. <https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%205-Harmony%20in%20the%20Nature%20and%20Existence.pdf>
6. <https://fdp-si.aicte-india.org/download/FDPTeachingMaterial/3-days%20FDP-SI%20UHV%20Teaching%20Material/Day%203%20Handouts/UHV%203D%20D3-S2A%20Und%20Nature-Existence.pdf>
7. <https://fdp-si.aicte-india.org/UHV%20II%20Teaching%20Material/UHV%20II%20Lecture%2023-25%20Ethics%20v1.pdf>
8. <https://www.studocu.com/in/document/kiet-group-of-institutions/universal-human-values/chapter-5-holistic-understanding-of-harmony-on-professional-ethics/62490385>
9. https://onlinecourses.swayam2.ac.in/aic22_ge23/preview



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B.TECH. - IV SEMESTER

23CSE241

OPERATING SYSTEMS

**L T P C
3 0 0 3**

PRE-REQUISITES: A course on Introduction to Programming

COURSE EDUCATIONAL OBJECTIVES:

1. Understand the basic concepts and principles of operating systems, including process management, memory management, file systems, and Protection.
2. Make use of process scheduling algorithms and synchronization techniques to achieve better performance of a computer system.
3. Illustrate different conditions for deadlock and their possible solutions.

UNIT –1: OPERATING SYSTEMS OVERVIEW & SYSTEM STRUCTURES

(9)

Operating Systems Overview: Introduction, Operating system functions, Operating systems operations, Computing environments, Free and Open-Source Operating Systems.

System Structures: Operating System Services, User and Operating-System Interface, system calls, Types of System Calls, system programs, Operating system Design and Implementation, Operating system structure, Building and Booting an Operating System, Operating system debugging.

UNIT –2: PROCESSES, THREADS AND CONCURRENCY & CPU SCHEDULING (9)

Processes: Process Concept, Process scheduling, Operations on processes, Inter-process communication.

Threads and Concurrency: Multithreading models, Thread libraries, Threading issues.

CPU Scheduling: Basic concepts, Scheduling criteria, Scheduling algorithms, Multiple processor scheduling.

UNIT III: SYNCHRONIZATION TOOLS & DEADLOCKS

(9)

Synchronization Tools: The Critical Section Problem, Peterson’s Solution, Mutex Locks, Semaphores, Monitors, Classic problems of Synchronization.

Deadlocks: system Model, Deadlock characterization, Methods for handling Deadlocks, Deadlock prevention, Deadlock avoidance, Deadlock detection, Recovery from Deadlock.

UNIT –IV: MEMORY-MANAGEMENT STRATEGIES & STORAGE MANAGEMENT

(9)

Memory-Management Strategies: Introduction, Contiguous memory allocation, Paging, Structure of the Page Table, Swapping.

Virtual Memory Management: Introduction, Demand paging, Copy-on-write, Page replacement, Allocation of frames, Thrashing.

Storage Management: Overview of Mass Storage Structure, HDD Scheduling.

UNIT V: FILE SYSTEM & PROTECTION

(9)

File System: File System Interface, File concept, Access methods, Directory Structure, File system Implementation, File-system structure, File-system Operations, Directory implementation, Allocation method, Free space management, File-System Internals: File System Mounting, Partitions and Mounting, File Sharing.

Protection: Goals of protection, Principles of protection, Protection Rings, Domain of protection, Access matrix.

Total Hours: 45



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COURSE OUTCOMES:

On successful completion of the course the student will be		POs related to COs
CO1	Describe the basics of the operating systems, mechanisms of OS to handle processes, threads, and their communication. (L1)	PO1, PO2
CO2	Understand the basic concepts and principles of operating systems, including process management, memory management, file systems, and Protection. (L2)	PO1, PO3, PO4
CO3	Make use of process scheduling algorithms and synchronization techniques to achieve better performance of a computer system. (L3)	PO1,PO2, PO3,PO4,PO5
CO4	Illustrate different conditions for deadlock and their possible solutions. (L2)	PO1, PO2, PO4
CO5	Analyze the memory management and its allocation policies. (L4)	PO1, PO4

TEXT BOOKS:

1. Operating System Concepts, Silberschatz A, Galvin P B, Gagne G, 10th Edition, Wiley, 2018.
2. Modern Operating Systems, Tanenbaum A S, 4th Edition, Pearson , 2016

REFERENCE BOOKS:

1. Operating Systems -Internals and Design Principles, Stallings W, 9th edition, Pearson, 2018
2. Operating Systems: A Concept Based Approach, D.M Dhamdhere, 3rd Edition, McGraw- Hill, 2013

REFERENCE WEBSITE:

1. <https://nptel.ac.in/courses/106/106/106106144/>
2. <http://peterindia.net/OperatingSystems.html>

CO-PO MAPPING:

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



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II B.Tech. - IV Semester

23CSE242

**DATABASE MANGEMENT SYSTEM
(Common to CSE, CSM, CAI and CSD)**

**L T P C
3 0 0 3**

PRE-REQUISITES: A course on Introduction to Programming

COURSE EDUCATIONAL OBJECTIVES:

1. Discuss the basic Database concepts and the applications, data models and ER Model.
2. Understand the Relational database design principles
3. Master the basics of SQL and construct queries using SQL.
4. Understand the Normalization process in Database Management System.
5. Familiar with the basic issues of transaction processing and concurrency control.

UNIT -1: INTRODUCTION TO DATABASE MANAGEMENT SYSTEM AND ENTITY RELATIONSHIP MODEL (9)

Database system - Characteristics (Database Vs File System) - Database Users - Advantages of Database systems - Database applications - Brief introduction of different Data Models - Concepts of Schema - Instance and data independence -Three tier schema architecture for data independence

- Database system structure environment - Centralized and Client Server architecture for the database - Introduction to Entity Relationship Model - Representation of entities - Attributes - Entity set - Relationship - Relationship set - Constraints - Sub classes - super class - Inheritance- Specialization -Generalization using ER Diagrams.

UNIT -2: RELATIONAL MODEL (9)

Introduction to Relational model - Concepts of domain - Attribute - Tuple - Relation importance of null values - Constraints (Domain, Key constraints, integrity constraints) and their importance - Relational Algebra, Relational Calculus - BASIC SQL: Simple Database schema - Data Base Language - types- Table definitions (create, alter), different DML operations (insert, delete, update).

UNIT -3: INTRODUCTION TO STRUCTURED QUERY LANGUAGE (9)

Basic SQL querying (select and project) using where clause arithmetic & logical operations - SQL functions(Date and Time, Numeric, String conversion) - Creating tables with relationship, Implementation of key and integrity constraints - Nested queries, sub queries, grouping, aggregation, ordering - Implementation of different types of Joins, view (updatable and non-updatable) - Relational set operations.

UNIT -4: NORMALIZATION (9)

Purpose of Normalization and schema refinement - Concept of functional dependency - normal forms based on functional dependency - Lossless join and dependency preserving decomposition (1NF, 2NF and 3 NF), concept of surrogate key - Boyce-Codd normal form(BCNF) - MVD - Fourth normal form(4NF) - Fifth Normal Form (5NF).

UNIT -5: TRANSACTION CONCEPT AND INDEXING CONCEPTS (9)

Transaction State - ACID properties - Concurrent Executions - Serializability - Recoverability, Implementation of Isolation - Testing for Serializability - Lock based - Time stamp based optimistic
- Concurrency protocols - Deadlocks - Failure Classification - Storage, Recovery and



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Atomicity - Recovery algorithm - Introduction to Indexing Techniques - B+ Trees, operations on B+ Trees - Hash Based Indexing

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Demonstrate knowledge on Data models and Database Languages and Design Entity Relationship model for a database	PO1, PO3
CO2	Analyze the relational database theory, and be able to write relational algebra and relational calculus expressions for queries	PO1, PO2
CO3	Analyze and evaluate the database using SQL DML/DDDL	PO1, PO2, PO3, PO5
CO4	Analyze databases using normal forms to provide solutions for real time applications	PO1, PO2
CO5	Understand the properties of transactions in a database system, analyze serializability and indexing techniques.	PO1, PO3, PO4

TEXT BOOKS:

1. Database Management Systems, 3rd edition, Raghurama Krishnan, Johannes Gehrke, TMH (For Chapters 2, 3, 4)
2. Database System Concepts, 5th edition, Silberschatz, Korth, Sudarsan, TMH (For Chapter 1 and Chapter 5)

REFERENCE BOOKS:

1. Introduction to Database Systems, 8th edition, C J Date, Pearson.
2. Database Management System, 6th edition, Ramez Elmasri, Shamkant B. Navathe, Pearson
3. Database Principles Fundamentals of Design Implementation and Management, Carlos Coronel, Steven Morris, Peter Robb, Cengage Learning.

REFERENCE WEBSITE:

1. <https://www.w3schools.in/sql/database-concepts>
2. <https://www.javatpoint.com/dbms-tutorial>
3. <https://www.geeksforgeeks.org/introduction-of-dbms-database-management-system-set-1/>
4. <https://nptel.ac.in/courses/106/105/106105175/>
5. https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_01275806667282022456_shared/overview

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	-	-	-	-	-	-	-	-	-	-
CO.3	3	3	3	-	3	-	-	-	-	-	-	-
CO.4	3	3	-	-	-	-	-	-	-	-	-	-
CO.5	3	-	2	3	-	-	-	-	-	-	-	-
CO*	3	3	2.6	3	3	-	-	-	-	-	-	-



**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES -
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II B.Tech. - IV Semester**

23CSE243

SOFTWARE ENGINEERING

**L T P C
3 0 0 3**

PRE-REQUISITES: A course on Introduction to Programming

COURSE EDUCATIONAL OBJECTIVES:

1. To provide knowledge of basic software engineering methods, practices and their appropriate application.
2. To understand software requirements and the SRS documents.
3. To design components based on different software architectural styles and to Study the notations of Unified Modeling Language to identify, analyze, and model structural and behavioral concepts of the system.
4. To understanding of approaches to verification and validation including static analysis, and Reviews.
5. To describe software measurement and software risks.

UNIT -1: INTRODUCTION

(9)

Introduction: Evolution, Software development projects, Exploratory style of software developments, Emergence of software engineering, Notable changes in software development practices, Computer system engineering.

Software Life Cycle Models: Basic concepts, Waterfall model and its extensions, Rapid application development, Agile development model, Spiral model.

UNIT -2: SOFTWARE PROJECT MANAGEMENT & REQUIREMENTS ANALYSIS AND SPECIFICATION

(9)

Software Project Management: Software project management complexities, Responsibilities of a software project manager, Metrics for project size estimation, Project estimation techniques, Empirical Estimation techniques, COCOMO, Halstead's software science, risk management.

Requirements Analysis And Specification: Requirements gathering and analysis, Software Requirements Specification (SRS), Formal system specification, Axiomatic specification, Algebraic specification, Executable specification and 4GL.

UNIT III: SOFTWARE DESIGN & AGILITY & FUNCTION-ORIENTED SOFTWARE DESIGN & USER INTERFACE DESIGN

(9)

Software Design: Overview of the design process, How to characterize a good software design?

Layered arrangement of modules, Cohesion and Coupling. approaches to software design.

Agility: Agility and the Cost of Change, Agile Process, Extreme Programming (XP), Other Agile Process Models, Tool Set for the Agile Process (Text Book 2)

Function-Oriented Software Design: Overview of SA/SD methodology, Structured analysis, Developing the DFD model of a system, Structured design, Detailed design, and Design Review.

User Interface Design: Characteristics of a good user interface, Basic concepts, Types of user interfaces, Fundamentals of component-based GUI development, and user interface design methodology.

UNIT -IV: CODING AND TESTING & SOFTWARE RELIABILITY AND QUALITY MANAGEMENT

(9)

Coding And Testing: Coding, Code review, Software documentation, Testing, Black-box testing, White-Box testing, Debugging, Program analysis tools, Integration testing, Testing object-oriented programs, Smoke testing, and Some general issues associated with testing.

Software Reliability And Quality Management: Software reliability. Statistical testing,



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Software quality, Software quality management system, ISO 9000. SEI Capability maturity model. Few other important quality standards, and Six Sigma.

UNIT V: COMPUTER-AIDED SOFTWARE ENGINEERING & SOFTWARE MAINTENANCE & SOFTWARE REUSE (9)

Computer-Aided Software Engineering (Case): CASE and its scope, CASE environment, CASE support in the software life cycle, other characteristics of CASE tools, Towards second generation CASE Tool, and Architecture of a CASE Environment.

Software Maintenance: Characteristics of software maintenance, Software reverse engineering, Software maintenance process models and Estimation of maintenance cost.

Software Reuse: reuse- definition, introduction, reason behind no reuse so far, Basic issues in any reuse program, A reuse approach, and Reuse at organization level.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course the student will be		POs related to COs
CO1	Identify the key activities in managing a software project and can compare different process models.	PO1, PO2
CO2	Identify software requirements and design SRS document by analyzing the data flows.	PO1, PO3, PO4
CO3	Design class based components and conduct component level design based on architectural styles and patterns. Represent classes, responsibilities and states using UML notation and model structural concepts of the system. Model behavioral concepts of the system and analyze and document the requirements through use case driven approach	PO1,PO2, PO3,PO4,PO5
CO4	Identify various types of testing and development metrics for various phases of software development.	PO1, PO2, PO4
CO5	Identify the software risks and analyze the quality assurance activities, Represent classes, responsibilities and states using UML notation and model structural concepts of the system	PO1, PO4

TEXT BOOKS:

1. Fundamentals of Software Engineering, Rajib Mall, 5th Edition, PHI.
2. Software Engineering A practitioner's Approach, Roger S. Pressman, 9th Edition, Mc- Graw Hill International Edition.

REFERENCE BOOKS:

1. Software Engineering, Ian Sommerville, 10th Edition, Pearson.
2. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.

E-RESOURCES:

- 1) <https://nptel.ac.in/courses/106/105/106105182/>
- 2) https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_01260589506387148827_shared/overview
- 3) https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_013382690411003904735_shared/overview



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CO-PO MAPPING:

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



II B.TECH - IV SEMESTER

23CSE244

OPERATING SYSTEMS LAB

**L T P C
3 0 0 3**

PRE-REQUISITES: A course on Introduction to Programming

COURSE EDUCATIONAL OBJECTIVES:

1. Provide insights into system calls, file systems, semaphores,
2. Develop and debug CPU Scheduling algorithms, page replacement algorithms, thread implementation
3. Implement Bankers Algorithms to Avoid the Dead Lock

EXPERIMENTS COVERING THE TOPICS:

- UNIX fundamentals, commands & system calls
- CPU Scheduling algorithms, thread processing
- IPC, semaphores, monitors, deadlocks
- Page replacement algorithms, file allocation strategies
- Memory allocation strategies

SAMPLE EXPERIMENTS:

1. Practicing of Basic UNIX Commands.
2. Write programs using the following UNIX operating system calls
fork, exec, getpid, exit, wait, close, stat, opendir and readdir
3. Simulate UNIX commands like cp, ls, grep, etc.,
4. Simulate the following CPU scheduling algorithms
 - a) FCFS
 - b) SJF
 - c) Priority
 - d) Round Robin
5. Control the number of ports opened by the operating system with
 - a) Semaphore
 - b) Monitors.
6. Write a program to illustrate concurrent execution of threads using pthreads library.
7. Write a program to solve producer-consumer problem using Semaphores.
8. Implement the following memory allocation methods for fixed partition
 - a) First fit
 - b) Worst fit
 - c) Best fit
9. Simulate the following page replacement algorithms
 - a) FIFO
 - b) LRU
 - c) LFU
10. Simulate Paging Technique of memory management.
11. Implement Bankers Algorithm for Dead Lock avoidance and prevention
12. Simulate the following file allocation strategies
 - a) Sequential
 - b) Indexed
 - c) Linked



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COURSE OUTCOMES:

On successful completion of the course the student will be		POs related to COs
CO1	Trace different CPU Scheduling algorithms (L2).	PO1, PO2
CO2	Implement Bankers Algorithms to Avoid the Dead Lock (L3).	PO1, PO3, PO4
CO3	Evaluate Page replacement algorithms (L5).	PO1,PO2, PO3,PO4,PO5
CO4	Illustrate the file organization techniques (L4).	PO1, PO2, PO4
CO5	Illustrate Inter process Communication and concurrent execution of threads (L4)	PO1, PO4

REFERENCES:

1. Operating System Concepts, Silberschatz A, Galvin P B, Gagne G, 10th Edition, Wiley, 2018.
2. Modern Operating Systems, Tanenbaum A S, 4th Edition, Pearson, 2016
3. Operating Systems -Internals and Design Principles, Stallings W, 9th edition, Pearson, 2018
4. Operating Systems: A Concept Based Approach, D.M Dhamdhere, 3rd Edition, McGraw-Hill, 2013

REFERENCE WEBSITE:

1. <https://www.cse.iitb.ac.in/~mythili/os/>
2. <http://peterindia.net/OperatingSystems.html>

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
CO*	3	3	3	3	3	-	-	3	3	3	-	3



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II B.Tech. - IV Semester

23CSE245

DATABASE MANAGEMENT SYSTEMS LAB

(Common to CSE, CSM, CAI, CSD)

L T P C

3 0 0 3

PRE-REQUISITES: A course on Introduction to Programming

COURSE EDUCATIONAL OBJECTIVES:

This Course will enable students to

1. Populate and query a database using SQL DDL/DML Commands
2. Declare and enforce integrity constraints on a database
3. Writing Queries using advanced concepts of SQL
4. Programming PL/SQL including procedures, functions, cursors and triggers

EXPERIMENTS COVERING THE TOPICS:

1. DDL, DML, DCL commands
2. Queries, nested queries, built-in functions,
3. PL/SQL programming- control structures
4. Procedures, Functions, Cursors, Triggers,
5. Database connectivity- ODBC/JDBC

EXPERIMENTS :

1. Creation, altering and dropping of tables and inserting rows into a table (use constraints while creating tables) examples using SELECT command.
2. Queries (along with sub Queries) using ANY, ALL, IN, EXISTS, NOT EXISTS, UNION, INTERSECT, Constraints. Example:- Select the roll number and name of the student who secured fourth rank in the class.
3. Queries using Aggregate functions (COUNT, SUM, AVG, MAX and MIN), GROUP BY, HAVING and Creation and dropping of Views.
4. Queries using Conversion functions (to_char, to_number and to_date), string functions (Concatenation, lpad, rpad, ltrim, rtrim, lower, upper, initcap, length, substr and instr), date functions (Sysdate, next_day, add_months, last_day, months_between, least, greatest, trunc, round, to_char, to_date)
5. i. Create a simple PL/SQL program which includes declaration section, executable section and exception –Handling section (Ex. Student marks can be selected from the table and printed for those who secured first class and an exception can be raised if no records were found)
ii. Insert data into student table and use COMMIT, ROLLBACK and SAVEPOINT in PL/SQL block.
6. Develop a program that includes the features NESTED IF, CASE and CASE expression. The program can be extended using the NULLIF and COALESCE functions.
7. Program development using WHILE LOOPS, numeric FOR LOOPS, nested loops using ERROR Handling, BUILT –IN Exceptions, USE defined Exceptions, RAISE 1 APPLICATION ERROR.
8. Programs development using creation of procedures, passing parameters IN and OUT of PROCEDURES.
9. Program development using creation of stored functions, invoke functions in SQL Statements and write complex functions.
10. Develop programs using features parameters in a CURSOR, FOR UPDATE CURSOR, WHERE CURRENT of clause and CURSOR variables.



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11. Develop Programs using BEFORE and AFTER Triggers, Row and Statement Triggers and INSTEAD OF Triggers
12. Create a table and perform the search operation on table using indexing and non1indexing techniques.
13. Write a Java program that connects to a database using JDBC
14. Write a Java program to connect to a database using JDBC and insert values into it
15. Write a Java program to connect to a database using JDBC and delete values from it

REFERENCE BOOKS:

1. Oracle: The Complete Reference by Oracle Press
2. Nilesh Shah, "Database Systems Using Oracle", PHI, 2007
3. Rick F Vander Lans, "Introduction to SQL", Fourth Edition, Pearson Education, 2007
4. Ramez Elmasri, Shamkant, B. Navathe, " Database Systems, ", Pearson Education, 6th Edition, 2013.
5. Database Principles Fundamentals of Design Implementation and Management, 10 th edition, Corlos Coronel, Steven Morris, Peter Robb, Cengage Learning, 2022

REFERENCE WEBSITE:

1. <https://www.scoopworld.in>
2. <https://vlabs.iitb.ac.in/vlabs-dev/labs/dblab/index.php>

COURSE OUTCOMES:

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



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CO PO MAPPING:

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C01	3	-	-	-	-	-	-	-	-	-	-	-
C02	-	3	-	-	-	-	-	-	-	-	-	-
C03	-	-	3	-	-	-	-	-	-	-	-	-
C04	-	-	-	3	-	-	-	-	-	-	-	-
C05	-	-	-	-	3	-	-	-	-	-	-	-
C06	-	-	-	-	-	-	-	3	-	-	-	-
C07	-	-	-	-	-	-	-	-	3	-	-	-
C08	-	-	-	-	-	-	-	-	-	3	-	-
C09	-	-	-	-	-	-	-	-	-	-	-	3
CO*	3	3	3	3	3	-	-	3	3	3	-	3



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II B.Tech. - IV Semester

23CSE246

**FULL STACK DEVELOPMENT – 1
(Skill Enhancement Course)
(Common to CSE, CSM and CAI)**

**L T P C
0 1 2 2**

PRE-REQUISITES: A course on Introduction to Programming

COURSE EDUCATIONAL OBJECTIVES:

- CO1: Design Websites.
- CO2: Apply Styling to web pages.
- CO3: Make Web pages interactive.
- CO4: Design Forms for applications.
- CO5: Choose Control Structure based on the logic to be implemented.
- CO6: Understand HTML tags, Attributes and CSS properties

TRADE FOR EXERCISES:

1. LISTS, LINKS AND IMAGES

- a. Write a HTML program, to explain the working of lists.
Note: It should have an ordered list, unordered list, nested lists and ordered list in an unorderedlist and definition lists.
- b. Write a HTML program, to explain the working of hyperlinks using <a> tag and href, target Attributes.
- c. Create a HTML document that has your image and your friend's image with a specific height andwidth. Also when clicked on the images it should navigate to their respective profiles.
- d. Write a HTML program, in such a way that, rather than placing large images on a page, the preferred technique is to use thumbnails by setting the height and width parameters to somethinglike to 100*100 pixels. Each thumbnail image is also a link to a full sized version of the image. Create an image gallery using this technique

2. HTML TABLES, FORMS AND FRAMES

- Write a HTML program, to explain the working of tables. (use tags: <table>, <tr>, <th>, <td> and attributes: border, rowspan, colspan)
- Write a HTML program, to explain the working of tables by preparing a timetable. (Note: Use <caption> tag to set the caption to the table & also use cell spacing, cell padding, border, rowspan, colspan etc.).
- Write a HTML program, to explain the working of forms by designing Registration form. (Note: Include text field, password field, number field, date of birth field, checkboxes, radio buttons, list boxes using <select>&<option> tags, <text area> and two buttons ie: submit and reset. Use tables to provide a better view).
- Write a HTML program, to explain the working of frames, such that page is to be divided into 3 parts on either direction. (Note: first frame image, second frame paragraph, third frame hyperlink. And also make sure of using "no frame" attribute such that frames tobe fixed).

3. HTML 5 AND CASCADING STYLE SHEETS, TYPES OF CSS

- a. Write a HTML program, that makes use of <article>, <aside>, <figure>, <figcaption>, <footer>, <header>, <main>, <nav>, <section>, <div>, tags.
- b. Write a HTML program, to embed audio and video into HTML web page.
- c. Write a program to apply different types (or levels of styles or style specification formats) - inline, internal, external styles to HTML elements. (identify selector, property andvalue).



4. SELECTOR FORMS

- a. Write a program to apply different types of selector forms
 - Simple selector (element, id, class, group, universal)
 - Combinator selector (descendant, child, adjacent sibling, general sibling)
 - Pseudo-class selector
 - Pseudo-element selector
 - Attribute selector

5. CSS WITH COLOR, BACKGROUND, FONT, TEXT AND CSS BOX MODEL

- a. Write a program to demonstrate the various ways you can reference a color in CSS.
- b. Write a CSS rule that places a background image halfway down the page, tilting it horizontally. The image should remain in place when the user scrolls up or down.
- c. Write a program using the following terms related to CSS font and text:
 - i. font-size
 - ii. font-weight
 - iii. font-style
 - iv. text-decoration
 - v. text-transformation
 - vi. text-alignment
- d. Write a program, to explain the importance of CSS Box model using
 - i. Content
 - ii. Border
 - iii. Margin
 - iv. Padding

6. APPLYING JAVASCRIPT - INTERNAL AND EXTERNAL, I/O, TYPE CONVERSION

- a. Write a program to embed internal and external JavaScript in a web page.
- b. Write a program to explain the different ways for displaying output.
- c. Write a program to explain the different ways for taking input.
- d. Create a webpage which uses prompt dialogue box to ask a voter for his name and age. Display the information in table format along with either the voter can vote or not

7. JAVASCRIPT PRE-DEFINED AND USER-DEFINED OBJECTS

- a. Write a program using document object properties and methods.
- b. Write a program using window object properties and methods.
- c. Write a program using array object properties and methods.
- d. Write a program using math object properties and methods.
- e. Write a program using string object properties and methods.
- f. Write a program using regex object properties and methods.
- g. Write a program using date object properties and methods.
- h. Write a program to explain user-defined object by using properties, methods, accessors, constructors and display.

8. JAVASCRIPT CONDITIONAL STATEMENTS AND LOOPS

- a. Write a program which asks the user to enter three integers, obtains the numbers from the user and outputs HTML text that displays the larger number followed by the words "LARGER NUMBER" in an information message dialog. If the numbers are equal, output HTML text as "EQUAL NUMBERS".
- b. Write a program to display week days using switch case.
- c. Write a program to print 1 to 10 numbers using for, while and do-while loops.
- d. Write a program to print data in object using for-in, for-each and for-of loops
- e. Develop a program to determine whether a given number is an 'ARMSTRONG NUMBER' or not. [Eg: 153 is an Armstrong number, since sum of the cube of the digits is equal to the number i.e., $1^3 + 5^3 + 3^3 = 153$]



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- f. Write a program to display the denomination of the amount deposited in the bank in terms of 100's, 50's, 20's, 10's, 5's, 2's & 1's. (Eg: If deposited amount is Rs.163, the output should be 1-100's, 1-50's, 1- 10's, 1-2's & 1-1's)

9. JAVASCRIPT FUNCTIONS AND EVENTS

- a. Design a appropriate function should be called to display
- Factorial of that number
 - Fibonacci series up to that number
 - Prime numbers up to that number
 - Is it palindrome or not
- b. Design a HTML having a text box and four buttons named Factorial, Fibonacci, Prime, and Palindrome. When a button is pressed an appropriate function should be called to display
11. Factorial of that number
 12. Fibonacci series up to that number
 13. Prime numbers up to that number
 14. Is it palindrome or not
- c. Write a program to validate the following fields in a registration page
- i. Name (start with alphabet and followed by alphanumeric and the length should not be less than 6 characters)
 - ii. Mobile (only numbers and length 10 digits)
 - iii. E-mail (should contain format like xxxxxxx@xxxxxx.xxx)

TEXT BOOKS:

1. Programming the World Wide Web, 7th Edition, Robert W Sebesta, Pearson, 2013.
2. Web Programming with HTML5, CSS and JavaScript, John Dean, Jones & Bartlett Learning, 2019 (Chapters 1-11).
3. Pro MERN Stack: Full Stack Web App Development with Mongo, Express, React, and Node, Vasanth Subramanian, 2nd edition, APress, O'Reilly.

REFERENCE BOOKS:

-Nil-

REFERENCE WEBSITE:

1. <https://www.w3schools.com/html>
2. <https://www.w3schools.com/css>
3. <https://www.w3schools.com/js/>
4. <https://www.w3schools.com/nodejs>
5. <https://www.w3schools.com/typescript>



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COURSE OUTCOMES:

On successful completion of the course the student will be		POs related to COs
CO1	Demonstrate knowledge on web page design elements	PO1
CO2	Analyze user requirements to develop web applications.	PO2
CO3	Design client-server applications using web technologies.	PO3
CO4	Manually Test the functionality of the web application	PO4
CO5	select appropriate design tools and procedure to implement web applications	PO5
CO6	Follow ethical principles in designing, and implementing various Technologies.	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 various web technologies for implementation of various web 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
CO	3	3	3	3	3	-	-	3	3	3	-	3



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II B.Tech. - II Semester

23ESC241	DESIGN THINKING AND INNOVATION	L	T	P	C
	(Common to All Branches)	2	-	2	3

PRE-REQUISITES: DESIGN THINKING OF INNOVATION

COURSE OBJECTIVES:

The objective of this course is to familiarize students with design thinking process as a tool for breakthrough innovation. It aims to equip students with design thinking skills and ignite the minds to create innovative ideas, develop solutions for real-time problems.

Course Outcomes:

1. Define the concepts related to design thinking. (L1, L2)
2. Explain the fundamentals of Design Thinking and innovation (L1, L2)
3. Apply the design thinking techniques for solving problems in various sectors. (L3)
4. Analyse to work in a multidisciplinary environment (L4)
5. Evaluate the value of creativity (L5)
6. Formulate specific problem statements of real time issues (L3, L6)

UNIT I Introduction to Design Thinking

Introduction to elements and principles of Design, basics of design-dot, line, shape, form as fundamental design components. Principles of design. Introduction to design thinking, history of Design Thinking, New materials in Industry.

UNIT II Design Thinking Process

Design thinking process (empathize, analyze, idea & prototype), implementing the process in driving inventions, design thinking in social innovations. Tools of design thinking - person, customer, journey map, brainstorming, product development

Activity: Every student presents their idea in three minutes, Every student can present design process in the form of flow diagram or flow chart etc. Every student should explain about product development.

UNIT III Innovation

Art of innovation, Difference between innovation and creativity, role of creativity and innovation in organizations- Creativity to Innovation- Teams for innovation- Measuring the impact and value of creativity.

Activity: Debate on innovation and creativity, Flow and planning from idea to innovation, Debate on value-based innovation.

UNIT IV Product Design

Problem formation, introduction to product design, Product strategies, Product value, Product planning, product specifications- Innovation towards product design- Case studies

Activity: Importance of modelling, how to set specifications, Explaining their own product design.



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UNIT V — Design Thinking in Business Processes

Design Thinking applied in Business & Strategic Innovation, Design Thinking principles that redefine business – Business challenges: Growth, Predictability, Change, Maintaining Relevance, Extreme competition, Standardization. Design thinking to meet corporate needs- Design thinking for Startups- Defining and testing Business Models and Business Cases- Developing & testing prototypes.

Activity: How to market our own product, About maintenance, Reliability and plan for startup.

Textbooks:

1. Tim Brown, Change by design, Harper Bollins (2009)
2. Idris Mootee, Design Thinking for Strategic Innovation, 2013, John Wiley & Sons.

Reference Books:

1. David Lee, Design Thinking in the Classroom, Ulysses press
2. Shruti N Shetty, Design the Future, Norton Press
3. William Lidwell, Universal Principles of Design- Kritinaholden, Jill Butter.
4. Chesbrough.H, The Era of Open Innovation – 2013

Online Learning Resources:

<https://nptel.ac.in/courses/110/106/110106124/>
<https://nptel.ac.in/courses/109/104/109104109/>
https://swayam.gov.in/nd1_noc19_mg60/preview



**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

23CAI354T	III B. Tech – V SEMESTER ARTIFICIAL INTELLIGENCE: PRINCIPLES AND TECHNIQUES	L T P C 3 0 0 3
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COURSE EDUCATIONAL OBJECTIVES

THIS COURSE IS DESIGNED TO:

1. Introduce Artificial Intelligence.
2. Teach about the machine learning environment.
3. Present the searching Technique for Problem Solving.
4. Introduce Natural Language Processing and Robotics.

Course Outcomes:

After completion of the course, students will be able to

1. Apply searching techniques for solving a problem
2. Design Intelligent Agents
3. Develop Natural Language Interface for Machines
4. Design mini robots
5. Summarize past, present and future of Artificial Intelligence.

UNIT –1: Introduction (9)

Introduction: What is AI, Foundations of AI, History of AI, The State of Art. Intelligent Agents: Agents and Environments, Good Behaviour: The Concept of Rationality, The Nature of Environments, The Structure of Agents.

UNIT –2: SOLVING PROBLEMS BY SEARCHING (9)

Problem Solving Agents, Example problems, Searching for Solutions, Uninformed Search Strategies, Informed search strategies, Heuristic Functions, Beyond Classical Search: Local Search Algorithms and Optimization Problems, Local Search in Continuous Spaces, Searching with Nondeterministic Actions, Searching with partial observations, online search agents and unknown environments.

UNIT–3: REINFORCEMENT LEARNING&NATURAL LANGUAGE PROCESSING(9)

Reinforcement Learning: Introduction, Passive Reinforcement Learning, Active Reinforcement Learning, Generalization in Reinforcement Learning, Policy Search, applications of RL Natural Language Processing: Language Models, Text Classification, Information Retrieval, Information Extraction.

UNIT –4: NATURAL LANGUAGE FOR COMMUNICATION (9)

Natural Language for Communication: Phrase structure grammars, Syntactic Analysis, Augmented Grammars and semantic Interpretation, Machine Translation, Speech Recognition Perception: Image Formation, Early Image Processing Operations, Object Recognition by appearance, Reconstructing the 3D World, Object Recognition from Structural information, Using Vision.



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III B. Tech – V SEMESTER

23CSE351T	AUTOMATA THEORY AND COMPILER DESIGN	L	T	P	C
		3	0	0	3

PRE-REQUISITES: A course on Software Engineering

COURSE OBJECTIVES:

1. Able to understand the concept of abstract machines, construct FA, Regular Expressions for the regular languages and equivalent FSMs.
2. Able to construct pushdown automata equivalent to Context free Grammars, construct Turing Machines and understand undecidability.
3. Emphasize the concepts learnt in phases of compiler, lexical analyser and Top-down parser.
4. Able to understand the concepts of Bottom-up parser, Intermediate Code Generation.
5. Able to understand the concepts of Code optimizer and Code Generation.

UNIT-1:INTRODUCTION TO AUTOMATA AND REGULAR EXPRESSIONS

Introduction, Alphabets, Strings and Languages, Chomsky Hierarchy, Automata and Grammars, Regular Grammar and Language, Finite Automata, Deterministic finite Automata (DFA), Nondeterministic finite Automata (NFA), Equivalence of NFA and DFA, Minimization of Finite Automata, Regular Expressions, Converting Regular Grammar and Expression into Finite Automata, Pumping lemma for regular sets, Closure properties of regular sets (Without proof).

UNIT -2: CONTEXT FREE GRAMMARS AND PUSHDOWN AUTOMATA

Context Free Language, Context Free Grammar, Derivation and Parse tree, Ambiguity, Simplification of CFG's, Chomsky Normal Form, Greibach Normal Form, Push Down Automata (PDA), Design of PDA, Equivalence of PDA and CFL/CFG

UNIT -3: TURING MACHINES AND INTRODUCTION TO COMPILERS

Turing Machine, TM Model, Language acceptance, Design of Turing Machine, Compilers, Phases of Compiler, The role of Lexical Analyzer, Input Buffering

UNIT -4: THE PARSERS AND INTERMEDIATE CODE GENERATION

Parser, Top-Down parsers: Recursive Descent Parsers, Predictive Parsers Bottom-up Parsers: Shift Reduce Parsing, LR parsers, Intermediate Code Generation: Three address codes.

UNIT -5: THE CODE OPTIMIZATION AND CODE GENERATION

Code Optimization: Peephole optimization, Basic blocks and flow graphs, DAG, Principles of Source Code Optimization, Code Generation: Issues in Design of Code Generation, Simple Code Generator.

Total Hours: 45



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III B. Tech – V SEMESTER

**23CSE352T COMPUTER NETWORKS & INTERNET PROTOCOL L T P C
3 0 0 3**

PRE-REQUISITES:

COURSE OBJECTIVES:

The main objectives of the course is to

- To understand the different types of networks
- To discuss the software and hardware components of a network
- To develop an understanding the principles of computer networks.
- To familiarize with OSI model and the functions of layered structure.
- To explain networking protocols, algorithms and design perspectives

COURSE OUTCOMES:

After completion of the course, students will be able to

- Identify the software and hardware components of a Computer network. (L1)
- Explain the functionality of each layer of a computer network. (L2)
- Identify and analyze flow control, congestion control, and routing issues.(L3)
- Analyze and interpret the functionality and effectiveness of the routing protocols. (L4)

UNIT –1: INTRODUCTION

Types of Computer Networks, Broadband Access Networks, Mobile and Wireless Access Networks, Content Provider Networks, Transit networks, Enterprise Networks, Network technology from local to global, Personal Area Networks, Local Area Networks, Home Networks, Metropolitan Area Networks, Wide Area Networks, Internetworks, Network Protocols, Design Goals, Protocol Layering, Connections and Reliability, Service Primitives, The Relationship of Services to Protocols ,Reference Models, The OSI Reference Model, The TCP/IP Reference Model, A Critique of the OSI Model and Protocols, A Critique of the TCP/IP Reference Model and Protocols.

UNIT –2: THE DATA LINK LAYER (10)

Guided Transmission Media, Persistent Storage, Twisted Pairs, Coaxial Cable, Power Lines, Fiber Optics, Data Link Layer Design Issues, Services Provided To The Network Layer, Framing Error Control, Flow Control, Error Detection And Correction, Error- Correcting Codes, Error-Detecting Codes, Elementary Data Link Protocols, Initial Simplifying Assumptions Basic Transmission And Receipt, Simplex Link-Layer Protocols, Improving Efficiency, Bidirectional Transmission, Multiple Frames In Flight, Examples Of Full-Duplex, Sliding Window Protocols, The Channel Allocation Problem, Static Channel Allocation, Assumptions For Dynamic Channel Allocation, Multiple Access Protocols, Aloha, Carrier Sense Multiple Access Protocols, Collision-Free Protocols, Limited- Contention Protocols, Wireless LAN Protocols, Ethernet, Classic Ethernet Physical Layer, Classic Ethernet Mac Sublayer Protocol, Ethernet Performance, Switched Ethernet, Fast Ethernet, Gigabit Ethernet, 10-Gigabit Ethernet,40- And 100-Gigabit Ethernet, Retrospective On Ethernet.

UNIT –3: THE NETWORK LAYER (10)

Network Layer Design Issues, Store-And-Forward Packet Switching, Services Provided To The Transport Layer, Implementation Of Connectionless Service, Implementation Of Connection-Oriented Service, Comparison Of Virtual-Circuit And Datagram Networks, Routing Algorithms In A Single Network, The Optimality Principle, Shortest Path Algorithm, Flooding, Distance Vector Routing, Link State Routing, Hierarchical Routing Within a Network, Broadcast Routing, Multicast Routing, Anycast Routing, Traffic Management at The Network Layer, The Need for Traffic Management: Congestion, Approaches To Traffic Management, Internetworking, Internetworks: An Overview, How Networks differ, Connecting Heterogeneous Networks, Connecting Endpoints Across Heterogeneous Networks, Internetwork Routing: Routing Across Multiple Networks



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Supporting Different Packet Sizes: Packet Fragmentation, The Network Layer In The Internet, The IP Version 4 Protocol, IP Addresses, IP Version 6, Internet Control Protocols, Label Switching and MPLS, OSPF—An Interior Gateway Routing Protocol, BGP—The Exterior Gateway Routing Protocol, Internet Multicasting.

UNIT –4: THE TRANSPORT LAYER (10)

The Transport Service, Services Provided To The Upper Layers, Transport Service Primitives, Berkeley Sockets, An Example Of Socket Programming: An Internet File Server, Elements Of Transport Protocols, Addressing, Connection Establishment, Connection Release, Error Control And Flow Control, Multiplexing, Crash Recovery, Congestion Control, Desirable Bandwidth Allocation, Regulating The Sending Rate, Wireless Issues, The Internet Transport Protocols: UDP, Introduction To UDP, Remote Procedure Call, Real-Time Transport Protocols, The Internet Transport Protocols: TCP, Introduction To TCP, The TCP Service Model, The TCP Protocol, The TCP Segment Header, TCP Connection Establishment, TCP Connection Release..

UNIT –5: THE APPLICATION LAYER (10)

Electronic Mail, Architecture and Services, The User Agent, Message Formats, Message Transfer, Final Delivery, The World Wide Web, Architectural Overview, Static Web Objects, Dynamic Web Pages and Web Applications, HTTP and HTTPS, Web Privacy, Content Delivery, Content and Internet Traffic, Server Farms and Web Proxies, Content Delivery Networks, Peer-To-Peer Networks, Evolution of The Internet

Total Hours: 50

On successful completion of the course, students will be able to		POS
CO1	Identify the various bugs and correcting them after knowing the consequences of the bug.	PO1, PO2, P03,
CO2	Perform functional testing using control flow and transaction flow graphs.	PO1, PO2, P03,
CO3	Design the path expression and reduce them very well when needed.	PO1, PO2, P03,
CO4	Test logic or an application and identifying the nice and ugly domains.	PO1, PO2, P03,
CO5	Use appropriate software testing tools, techniques and methods for even more effective systems during both the test planning and test execution phases of a software development project.	PO1, PO2, P03,

TEXT BOOKS:

Andrew Tanenbaum, Feamster Wetherall, Computer Networks, 6th Edition, Global Edition

REFERENCE BOOKS:

1. Behrouz A. Forouzan, Data Communications and Networking, 5th Edition, McGraw Hill Publication, 2017.
2. James F. Kurose, Keith W. Ross, "Computer Networking: A Top-Down Approach", 6th edition, Pearson, 2019.



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**III B. Tech – V SEMESTER
23ECE354T MICROPROCESSORS & MICROCONTROLLERS L T P C
PROFESSIONAL ELECTIVE-I**

PRE-REQUISITES:

COURSE OBJECTIVES:

The main objectives of the course is to

- To understand the different types of networks
- To discuss the software and hardware components of a network
- To develop an understanding the principles of computer networks.
- To familiarize with OSI model and the functions of layered structure.
- To explain networking protocols, algorithms and design perspectives

UNIT I 8086 Architecture:

Main features, pin diagram/description, 8086 microprocessor family, internal architecture, bus interfacing unit, execution unit, interrupts and interrupt response, 8086 system timing, minimum mode and maximum mode configuration.

UNIT II - 8086 PROGRAMMING` (9)

8086 Programming: Program development steps, instructions, addressing modes, assembler directives, writing simple programs with an assembler, assembly language program development tools.

UNIT III-8086 INTERFACING (9)

8086 Interfacing: Semiconductor memories interfacing (RAM, ROM), Intel 8255 programmable peripheral interface, Interfacing switches and LEDs, Interfacing seven segment displays, software and hardware interrupt applications, Intel 8251 USART architecture and interfacing, Intel 8237a DMA controller, stepper motor, A/D and D/A converters, Need for 8259 programmable interrupt controllers.

UNIT IV – MICROCONTROLLER (9)

Microcontroller: Architecture of 8051 Special Function Registers (SFRs) I/O Pins Ports and Circuits - Instruction set - Addressing modes - Assembly language programming.

UNIT V - INTERFACING MICROCONTROLLER (9)

Interfacing Microcontroller: Programming 8051 Timers Serial Port Programming Interrupts Programming LCD & Keyboard Interfacing - ADC, DAC & Sensor Interfacing - External Memory Interface- Stepper Motor and Waveform generation - Comparison of Microprocessor, Microcontroller, PIC and ARM processors

Total Hours:45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		POS
CO1	Gain knowledge on the architecture, operation, and CO1 configurations of the 8086 microprocessors.	PO1, PO2, P03,
CO2	Gain knowledge on the architecture, operation, and CO1 configurations of the 8086 microprocessors.	PO1, PO2, P03,
CO3	Know the interfacing of 8086 with memory, peripherals, and CO3 controllers for various applications.	PO1, PO2, P03,
CO4	Learn the architecture, instruction set, and programming of the 8051 microcontrollers.	PO1, PO2, P03,
CO5	Understand microcontroller interfacing techniques, peripheral CO5 programming, and processor comparisons.	PO1, PO2, P03,



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III B. Tech – V SEMESTER

23CSE354A	DATA WAREHOUSING & DATA MINING PROFESSIONAL ELECTIVE-I	L	T	P	C
		3	0	0	3

COURSE OBJECTIVE:

- Familiarize with mathematical foundations of data mining tools.
- Introduce classical models and algorithms in data warehouses and data mining.
- Investigate the kinds of patterns that can be discovered by association rule mining, classification and clustering.
- Explore data mining techniques in various applications like social, scientific and environmental context.

COURSE OUTCOMES:

Upon completion of the course, the students should be able to:

- Design a Data warehouse system and perform business analysis with OLAP tools (L6).
- Apply suitable pre-processing and visualization techniques for data analysis (L3)
- Apply frequent pattern and association rule mining techniques for data analysis (L3)
- Design appropriate classification and clustering techniques for data analysis (L6)
- Infer knowledge from raw data (L4)

UNIT - I

Basic Concepts – Data Warehousing Components – Building a Data Warehouse – Database Architectures for Parallel Processing – Parallel DBMS Vendors – Multidimensional Data Model – Data Warehouse Schemas for Decision Support, Concept Hierarchies -Characteristics of OLAP Systems – Typical OLAP Operations, OLAP and OLTP.

UNIT- II

Introduction to Data Mining Systems – Knowledge Discovery Process – Data Mining Techniques – Issues – applications- Data Objects and attribute types, Statistical description of data, Data Preprocessing – Cleaning, Integration, Reduction, Transformation and discretization, Data Visualization, Data similarity and dissimilarity measures.

UNIT- III

Mining Frequent Patterns, Associations and Correlations – Mining Methods- Pattern Evaluation Method – Pattern Mining in Multilevel, Multi-Dimensional Space – Constraint Based Frequent Pattern Mining, Classification using Frequent Patterns.

UNIT- IV

Decision Tree Induction – Bayesian Classification – Rule Based Classification – Classification by Back Propagation – Support Vector Machines -- Lazy Learners – Model Evaluation and Selection- Techniques to improve Classification Accuracy. Clustering Techniques – Cluster Analysis- Partitioning Methods – Hierarchical Methods – Density Based Methods – Grid Based Methods – Evaluation of clustering – Clustering high dimensional data- Clustering with constraints, Outlier analysis-outlier detection methods.

UNIT- V

WEKA TOOL Datasets – Introduction, Iris plants database, Breast cancer database, Auto imports
UNIT- V WEKA TOOL Datasets – Introduction, Iris plants database, Breast cancer database, Auto imports]



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23CSE354D

III B. Tech – V SEMESTER
SOFT COMPUTING
PROFESSIONAL ELECTIVE-I

L T P C
3 0 0 3

COURSE OBJECTIVES:

- Familiarize with soft computing concepts
- Introduce and use the idea of fuzzy logic and use of heuristics based on human experience
- Familiarize the Neuro-Fuzzy modelling using Classification and Clustering techniques
- Learn the concepts of Genetic algorithm and its applications
- Acquire the knowledge of Rough Sets.

Course Outcomes:

- Identify the difference between Conventional Artificial Intelligence to Computational Intelligence.
- Understand fuzzy logic and reasoning to handle and solve engineering problems □ Apply the Classification techniques on various applications.
- Perform various operations of genetic algorithms and Rough Sets.

UNIT - I

Introduction to Soft Computing: Evolutionary Computing, "Soft" computing versus "Hard" computing, Soft Computing Methods, Recent Trends in Soft Computing, Characteristics of Soft computing, Applications of Soft Computing Techniques.

UNIT- II

Fuzzy Systems: Fuzzy Sets, Fuzzy Relations, Fuzzy Logic, Fuzzy Rule-Based Systems

UNIT- III

Fuzzy Decision Making, Particle Swarm Optimization.

UNIT- IV

Genetic Algorithms: Basic Concepts, Basic Operators for Genetic Algorithms, Crossover and Mutation Properties, Genetic Algorithm Cycle, Fitness Function, Applications of Genetic Algorithm.

UNIT- V

Rough Sets, Rule Induction, and Discernibility Matrix, Integration of Soft Computing Techniques.

COURSE OUTCOMES:

On successful completion of the course, students will be able to		POS
CO1	Understand the concepts on Soft computing and methods and Characteristics.	PO1, PO2, P03,
CO2	Understand and develop Fuzzy Systems: Fuzzy Sets, Fuzzy Relations, Fuzzy Logic	PO1, PO2, P03,
CO3	Understand the concepts Fuzzy Decision Making, Particle Swarm Optimization	PO1, PO2, P03,
CO4	Understand concepts Genetic Algorithms: Basic Concepts, Basic Operators for Genetic Algorithms, Crossover and Mutation Properties	PO1, PO2, P03,
CO5	Understand the importance Rough Sets, Rule Induction, and Discernibility Matrix, Integration of Soft Computing Techniques	PO1, PO2, P03,

III B. Tech– V Semester

23OCE351A	GREEN BUILDINGS (OPEN ELECTIVE -I)	L	T	P	C
		3	0	0	3

Course Objectives:

The objective of this course are to make the student:

1. **To understand** the fundamental concepts of green buildings, their necessity, and sustainable features.
2. **To analyze** green building concepts, rating systems, and their benefits in India.
3. **To apply** green building design principles, energy efficiency measures, and renewable energy sources.
4. **To evaluate** air conditioning systems, HVAC designs, and energy modeling for sustainable buildings.
5. **To assess** material conservation strategies, waste management, and indoor environmental quality in green buildings.

Course Outcomes (COs)

Upon successful completion of the course, students will be able to:

1. **Understand** the importance of green buildings, their necessity, and sustainable features.
2. **Analyze** various green building practices, rating systems, and their impact on environmental sustainability.
3. **Apply** principles of green building design to enhance energy efficiency and incorporate renewable energy sources.
4. **Evaluate** HVAC systems, energy-efficient air conditioning techniques, and their role in sustainable building design.
5. **Assess** material conservation techniques, waste reduction strategies, and indoor air quality management in green buildings.

CO-PO Articulation Matrix

Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
CO-1	3	-	-	-	-	2	3	-	-	-	-	-	3	3
CO-2	-	3	-	-	2	-	3	-	-	-	-	2	3	3
CO-3	-	-	3	3	3	-	3	-	-	-	-	-	3	3
CO-4	-	-	3	3	3	-	3	-	-	-	-	-	3	3
CO-5	-	-	-	-	-	3	3	3	2	-	-	-	-	3

UNIT– I

Introduction to Green Building– Necessity of Green Buildings, Benefits of Green Buildings, Green Building Materials and Equipment in India, Key Requisites for Constructing a Green Building, Important Sustainable Features for Green Buildings.

UNIT– II

Green Building Concepts and Practices– Indian Green Building Council, Green Building Movement in India, Benefits Experienced in Green Buildings, Launch of Green Building Rating Systems, Residential Sector, Market Transformation; Green Building Opportunities and Benefits: Opportunities of Green Buildings, Green Building Features, Material and Resources, Water Efficiency, Optimum Energy Efficiency, Typical Energy-Saving Approaches in Buildings, LEED India Rating System, and Energy Efficiency.

UNIT– III

Green Building Design– Introduction, Reduction in Energy Demand, Onsite Sources and Sinks, Maximizing System Efficiency, Steps to Reduce Energy Demand and Use Onsite Sources and Sinks, Use of Renewable Energy Sources, Eco-Friendly Captive Power Generation for Factories, Building Requirements.

UNIT– IV

Air Conditioning– Introduction, CII Godrej Green Business Centre, Design Philosophy, Design Interventions, Energy Modeling, HVAC System Design, Chiller Selection, Pump Selection, Selection of Cooling towers, Selection of Air Handling Units, Pre-Cooling of Fresh Air, Interior Lighting Systems, Key Features of The Building, Eco-Friendly Captive Power Generation for Factories, Building Requirements.

UNIT– V

Material Conservation– Handling of Non-Process Waste, Waste Reduction During Construction, Materials with Recycled Content, Local Materials, Material Reuse, Certified Wood, Rapidly Renewable Building Materials and Furniture. Indoor Environment Quality and Occupational Health– Air Conditioning, Indoor Air Quality, Sick Building Syndrome, tobacco Smoke.

TEXT BOOKS:

1. Handbook on Green Practices published by Indian Society of Heating Refrigerating and Air conditioning Engineers, 2009.
2. Green Building Handbook by Tom Woolley and Sam Kimings, 2009.

REFERENCE BOOKS:

1. Complete Guide to Green Buildings by Trish Riley
2. Standard for the design for High Performance Green Buildings by Kent Peterson, 2009
3. Energy Conservation Building Code– ECBC-2020, published by BEE

Online Learning Resources:

<https://archive.nptel.ac.in/courses/105/102/105102195/>

III B. Tech– V Semester

23OCE351B	CONSTRUCTION TECHNOLOGY AND MANAGEMENT (OPENELECTIVE– I)	L	T	P	C
		3	0	0	3

Course Objectives:

The objectives of this course are to make the student:

1. To understand project management fundamentals, organizational structures, and leadership principles in construction.
2. To analyze manpower planning, equipment management, and cost estimation in civil engineering projects.
3. To apply planning, scheduling, and project management techniques such as CPM and PERT.
4. To evaluate various contract types, contract formation, and legal aspects in construction management.
5. To assess safety management practices, accident prevention strategies, and quality management systems in construction.

Course Outcomes (COs):

Upon successful completion of the course, students will be able to:

1. Understand (Cos) project management fundamentals, organizational structures, and leadership principles in construction.
2. Analyze manpower planning, equipment management, and cost estimation in civil engineering projects.
3. Apply planning, scheduling, and project management techniques such as CPM and PERT.
4. Evaluate various contract types, contract formation, and legal aspects in construction management.
5. Assess safety management practices, accident prevention strategies, and quality management systems in construction.

CO–PO Articulation Matrix

Course Outcomes	PO										P			PS	
	1	2	3	4	5	6	7	8	9	10	11	12	O1	O2	
CO-1	3	-	-	-	-	2	-	2	2	-	-	-	3	3	
CO-2	-	3	-	-	2	-	-	-	-	-	-	2	3	3	
CO-3	-	-	3	3	3	-	-	-	-	2	-	-	3	3	
CO-4	-	-	3	3	3	-	-	2	-	-	-	-	3	3	
CO-5	-	-	-	-	-	3	3	3	2	-	-	-	-	3	

UNIT– I

Introduction: Project forms, Management Objectives and Functions; Organizational Chart of a Construction Company; Manager's Duties and Responsibilities; Public Relations; Leadership and Team - Work; Ethics, Morale, Delegation and Accountability.

UNIT– II

Man, and Machine: Man-Power Planning, Training, Recruitment, Motivation, Welfare Measures and Safety Laws; Machinery for Civil Engineering., Earth Movers and Hauling Costs, Factors Affecting Purchase, Rent, and Lease of Equipment, and Cost Benefit Estimation.

UNIT– III

Planning, Scheduling and Project Management: Planning Stages, Construction Schedules and Project Specification, Monitoring and Evaluation; Bar-Chart, CPM, PERT, Network-formulation and Time Computation.

UNIT– IV

Contracts: Types of Contracts, formation of Contract – Contract Conditions – Contract for Labour, Material, Design, and Construction – Drafting of Contract Documents Based On IBRD/ MORTH Standard Bidding Documents – Construction Contracts – Contract Problems – Arbitration and Legal Requirements Computer Applications in Construction Management: Software for Project Planning, Scheduling and Control.

UNIT– V

Safety Management – Implementation and Application of QMS in Safety Programs, ISO 9000 Series, Accident Theories, Cost of Accidents, Problem Areas in Construction Safety, Fall Protection, Incentives, Zero Accident Concepts, Planning for Safety, Occupational Health and Ergonomics.

TEXT BOOKS:

1. Construction Project Management, SK. Sears, GA. Sears, RH. Clough, John Wiley and Sons, 6th Edition, 2016.
2. Construction Project Scheduling and Control by Saleh Mubarak, 4th Edition, 2019
3. Pandey, I.M (2021) Financial Management 12th edition. Pearson India Education Services Pvt. Ltd.

REFERENCE BOOKS:

1. Brien, J.O. and Plotnick, F.L., CPM in Construction Management, McGraw Hill, 2010.
2. Punmia, B.C., and Khandelwal, K.K., Project Planning and control with PERT and CPM, Laxmi Publications, 2002.
3. Construction Methods and Management: Pearson New International Edition 8 th Edition Stephens Nunnally.
4. Rhoden, M and Cato B, Construction Management and Organisational Behaviour, Wiley-Blackwell, 2016.

Online Learning Resources:

<https://archive.nptel.ac.in/courses/105/104/105104161/>

<https://archive.nptel.ac.in/courses/105/103/105103093/>

**SREENIVASAINSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)**

**Department of Electrical and Electronics Engineering
Open Electives**

230EE351A	ELECTRICAL SAFETY PRACTICES AND STANDARDS	L	T	P	C
		3	0	0	3

PRE-REQUISITES: NIL

COURSE EDUCATIONAL OBJECTIVES:

1. To introduce the fundamentals of electrical safety, electric shock, and physiological effects of current on the human body.
2. To familiarize students with electrical safety components, protective equipment, and methods of protection against over-voltages and static electricity.
3. To explain the principles and practices of system grounding, equipment grounding, and safe earthing methods.
4. To develop awareness of safe operating procedures, first aid measures, and safety practices in various electrical installations and special locations.
5. To provide knowledge of national and international acts, rules, regulations, and standards related to electrical safety and statutory compliance.

UNIT –1: Introduction to Electrical Safety: (9)
Fundamentals of Electrical Safety-Electric Shock- physiological effects of electric current - Safety requirements -Hazards of electricity- Arc - Blast- Causes for electrical failure.

UNIT –2: Safety Components: (9)
Introduction to conductors and insulators- voltage classification -safety against over voltages- safety against static electricity-Electrical safety equipment's - Fire extinguishers for electrical safety.

UNIT –3: Grounding: (9)
General requirements for grounding and bonding- Definitions- System grounding- Equipment grounding -The Earth - Earthing practices- Determining safe approach distance- Determining arc hazard category.

UNIT –4: Safety Practices: (9)
General first aid-Safety in handling handheld electrical appliances tools- Electrical safety in train stations-swimming pools, external lighting installations, medical locations-Case studies.

UNIT –5: Standards For Electrical Safety: (9)
Electricity Acts- Rules & regulations- Electrical standards-NFPA 70 E-OSHA standards-IEEE standards-National Electrical Code 2005 - National Electric Safety code NESC-Statutory requirements from electrical inspectorate

Total Hours: 45



III B.Tech. - V Semester

23OECE351A

ELECTRONIC CIRCUITS

L T P C
3 0 0 3

PRE-REQUISITES: Nil

COURSE EDUCATIONAL OBJECTIVES:

1. To understand semiconductor diodes, their characteristics and applications.
2. To explore the operation, configurations, and biasing of BJTs.
3. To study the operation, analysis, and coupling techniques of BJT amplifiers.
4. To learn the operation, applications and uses of feedback amplifiers and oscillators.
5. To analyze the characteristics, configurations, and applications of operational amplifiers.

UNIT -1: SEMICONDUCTOR DIODES (9)

Semiconductor Diode and Applications: Introduction, PN junction diode – structure, operation and VI characteristics, Half-wave, Full-wave and Bridge Rectifiers with and without Filters, Positive and Negative Clipping and Clamping circuits (Qualitative treatment only).

Special Diodes: Zener and Avalanche Breakdowns, VI Characteristics of Zener diode, Zener diode as voltage regulator.

UNIT -2: BJT AND ITS BIASING (9)

Bipolar Junction Transistor (BJT): Principle of Operation, Common Emitter, Common Base and Common Collector Configurations, Transistor as a switch and Amplifier, Transistor Biasing and Stabilization - Operating point, DC & AC load lines, Biasing - Fixed Bias, Self Bias.

UNIT -3: SINGLE STAGE AMPLIFIER (9)

Single stage amplifiers: Classification of Amplifiers - Distortion in amplifiers, Analysis of CE, CC and CB configurations with simplified hybrid model.

UNIT -4: FEEDBACK AMPLIFIERS AND OSCILLATORS (9)

Feedback amplifiers: Concepts of feedback, Classification of feedback amplifiers, Effect of feedback on amplifier characteristics, Voltage Series, Voltage Shunt, Current Series and Current Shunt Feedback Configurations (Qualitative treatment only).

Oscillators: Classification of oscillators, Condition for oscillations, RC Phase shift Oscillators, Generalized analysis of LC Oscillators-Hartley and Colpitts Oscillators

UNIT -5: OPAMP AND ITS APPLICATIONS (9)

Op-amp: Classification of IC'S, basic information of Op-amp, ideal and practical Op-amp, 741 op-amp and its features, modes of operation-inverting, non-inverting, differential.

Applications of op-amp: Summing, scaling and averaging amplifiers, Integrator, Differentiator, phase shift oscillator and comparator.

Total Hours: 45

**SREENIVASAINSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)**

DEPARTMENT OF MECHANICAL ENGINEERING

III B.Tech. - V Semester

230MEC351A

**SUSTAINABLE ENERGY TECHNOLOGIES
(Mechanical Branch)**

**L T P C
3 0 0 3**

PRE-REQUISITES: The objectives of the course are to

COURSE EDUCATIONAL OBJECTIVES:

1. To demonstrate the importance the impact of solar radiation, solar PV modules
2. To understand the principles of storage in PV systems
3. To discuss solar energy storage systems and their applications.
4. To get knowledge in wind energy and bio-mass
5. To gain insights in geothermal energy, ocean energy and fuel cells.

UNIT –1: SOLAR RADIATION:

(9)

Roles and potential of new and renewable sources, the solar energy option, Environmental impact of solar power, structure of the sun, the solar constant, sun-earth relationships, coordinate systems and coordinates of the sun, extraterrestrial and terrestrial solar radiation, solar radiation on tilted surface, instruments for measuring solar radiation and sun shine, solar radiation data, numerical problems.

SOLAR PV MODULES AND PV SYSTEMS: PV Module Circuit Design, Module Structure, Packing Density, Interconnections, Mismatch and Temperature Effects, Electrical and Mechanical Insulation, Lifetime of PV Modules, Degradation and Failure, PV Module Parameters, Efficiency of PV Module, Solar PV Systems-Design of Off Grid Solar Power Plant. Installation and Maintenance

UNIT –2: STORAGE IN PV SYSTEMS:

(9)

Battery Operation, Types of Batteries, Battery Parameters, Application and Selection of Batteries for Solar PV System, Battery Maintenance and Measurements, Battery Installation for PV System.

UNIT –3:

(9)

SOLAR ENERGY COLLECTION: Flat plate and concentrating collectors, classification of concentrating collectors, orientation.

SOLAR ENERGY STORAGE AND APPLICATIONS: Different methods, sensible, latent heat and stratified storage, solar ponds, solar applications- solar heating/cooling technique, solar distillation and drying, solar cookers, central power tower concept and solar chimney.

UNIT –4:

(9)

WIND ENERGY: Sources and potentials, horizontal and vertical axis windmills, performance characteristics, betz criteria, types of winds, wind data measurement.

BIO-MASS: Principles of bio-conversion, anaerobic/aerobic digestion, types of bio-gas digesters, gas yield, utilization for cooking, bio fuels, I.C. engine operation and economic aspects.

UNIT –5:

(9)

GEOTHERMAL ENERGY: Origin, Applications, Types of Geothermal Resources, Relative Merits.
OCEAN ENERGY: Ocean Thermal Energy; Open Cycle & Closed Cycle OTEC Plants, Environmental Impacts, Challenges.

FUEL CELLS: Introduction, Applications, Classification, Different Types of Fuel Cells Such as Phosphoric Acid Fuel Cell, Alkaline Fuel Cell, PEM Fuel Cell, MC Fuel Cell.

Total Hours: 45

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES::CHITTOOR

**Department of Science & Humanities
III B Tech- V Semester**

23OSH351A	<i>MATHEMATICS FOR MACHINE LEARNING AND AI</i>	L	T	P	C
	OPEN ELECTIVE-I(COMMON TO ALL)	3	-	-	3

COURSE EDUCATIONAL OBJECTIVES:

1. To provide a strong mathematical foundation for understanding and developing AI/ML algorithms.
2. To enhance the ability to apply linear algebra, probability, and calculus in AI/ML models.
3. To equip students with optimization techniques and graph-based methods used in AI applications.
4. To develop critical problem-solving skills for analysing mathematical formulations in AI/ML.

UNIT I: Linear Algebra for Machine Learning (09)

Review of Vector spaces, basis, linear independence, Vector and matrix norms, Matrix factorization techniques, Eigen values, eigen vectors, diagonalization, Singular Value Decomposition (SVD) and Principal Component Analysis (PCA).

UNIT II: Probability and Statistics for AI (09)

Probability distributions: Gaussian, Binomial, Poisson. Bayes' Theorem, Maximum Likelihood Estimation (MLE), and Maximum a Posteriori (MAP). Entropy and Kullback - Leibler (KL) Divergence in AI, Cross entropy loss, Markov chains.

UNIT III: Optimization Techniques for ML (09)

Multivariable calculus: Gradients, Hessians, Jacobians. Constrained optimization: Lagrange multipliers and KKT conditions. Gradient Descent and its variants (Momentum, Adam) Newton's method, BFGS method.

UNIT IV: Vector Calculus & Transformations (09)

Vector calculus: Gradient, divergence, curl. Fourier Transform & Laplace Transform in ML applications.

UNIT V: Graph Theory for AI (09)

Graph representations: Adjacency matrices, Laplacian matrices. Bayesian Networks & Probabilistic Graphical Models. Introduction to Graph Neural Networks (GNNs).

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		POs
CO1	Apply linear algebra concepts to ML techniques like PCA and regression.	PO1,PO2,PO3,PO4,PO5,PO12
CO2	Analyze probabilistic models and statistical methods for AI applications.	PO1,PO2,PO3,PO4,PO5,PO12
CO3	Implement optimization techniques for machine learning algorithms.	PO1,PO2,PO3,PO4,PO5,PO6,PO12
CO4	Utilize vector calculus and transformations in AI-based models.	PO1,PO2,PO3,PO4,PO5,PO12
CO5	Develop graph-based AI models using mathematical representations.	PO1,PO2,PO3,PO4,PO5,PO12

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES::CHITTOOR

TEXT BOOKS:

1. Mathematics for Machine Learning by Marc Peter Deisenroth, A.Aldo Faisal, Cheng Soon Ong, Cambridge University Press, 2020.
2. Pattern Recognition and Machine Learning by Christopher Bishop, Springer.

REFERENCE BOOKS:

1. Gilbert Strang, Linear Algebra and Its Applications, Cengage Learning, 2016.
2. Jonathan Gross, Jay Yellen, Graph Theory and Its Applications, CRC Press, 2018.

REFERENCE WEBSITE:

- MIT–MathematicsforMachineLearning<https://ocw.mit.edu>
- StanfordCS229–MachineLearningCourse <https://cs229.stanford.edu/>
- Deep AI–MathematicalFoundationsforAI<https://deepai.org>

Course Articulation Matrix:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C01	3	3	2	2	1	-	-	-	-	-	-	1
C02	3	3	2	3	2	-	-	-	-	-	-	2
C03	3	3	3	3	2	1	-	-	-	-	-	2
C04	3	3	2	2	1	-	-	-	-	-	-	1
C05	3	3	3	3	2	-	-	-	-	-	-	2

• 3=StrongMapping,2=ModerateMapping,1=SlightMapping,-=NoMapping

DEPARTMENT OF SCIENCE AND HUMANITIES

III B.TECH. - V SEMESTER

23OSH351B	MATERIALS CHARACTERIZATION TECHNIQUES (OPEN ELECTIVE-I)	L	T	P	C
	(Common to all branches)	3	0	0	3

PRE-REQUISITES: Nil

COURSE EDUCATIONAL OBJECTIVES:

1. To provide **exposure** to various **characterization techniques**.
2. To explain the **fundamental principles** and analytical methods of different **spectroscopic techniques**.
3. To **describe** the working principle, limitations, and applications of the Scanning Electron Microscope (**SEM**).
4. To **illustrate** the operation of the Transmission Electron Microscope (**TEM**), including Selected Area Electron Diffraction (**SAED**) patterns and its applications.
5. To **educate** on the use of **advanced electrical and magnetic instruments** in material characterization.

UNIT-I: STRUCTURE ANALYSIS BY POWDER X-RAY DIFFRACTION (9)

Introduction, Bragg's law of diffraction, Intensity of Diffracted beams, Factors affecting Diffraction, Intensities, Structure of polycrystalline Aggregates, Determination of crystal structure, Crystallite size by Scherer and Williamson-Hall (W-H) Methods, Small angle X-ray scattering (SAXS) (in brief).

UNIT-II: MICROSCOPY TECHNIQUE -1- SCANNING ELECTRON MICROSCOPY (SEM) (9)

Introduction, Principle, Construction and working principle of Scanning Electron Microscopy, Specimen preparation, Different types of modes used (Secondary Electron and Backscatter Electron), Advantages, limitations and applications of SEM.

UNIT-III: MICROSCOPY TECHNIQUE -2 - TRANSMISSION ELECTRON MICROSCOPY (TEM) (9)

Construction and Working principle, Resolving power and Magnification, Bright and dark fields, Diffraction and image formation, Specimen preparation, Selected Area Diffraction, Applications of Transmission Electron Microscopy, Difference between SEM and TEM, Advantage and Limitations of Transmission Electron Microscopy

UNIT-IV: SPECTROSCOPY TECHNIQUES (9)

Principle, Experimental arrangement, Analysis and advantages of the spectroscopic techniques – (i) UV-Visible spectroscopy (ii) Raman Spectroscopy, (iii) Fourier Transform infrared (FTIR) spectroscopy, (iv) X-ray photoelectron spectroscopy (XPS).

UNIT V ELECTRICAL & MAGNETIC CHARACTERIZATION TECHNIQUES (9)

Electrical Properties analysis techniques (DC conductivity, AC conductivity) Activation Energy, Effect of Magnetic field on the electrical properties (Hall Effect). Magnetization measurement by induction method, Vibrating sample Magnetometer (VSM) and SQUID.

**SREENIVASAINSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)**

	Course Outcomes On successful completion of the course, students will be able to	PO2
CO1	Employ different analytical methods to analyze the crystal structure and crystallite sizes	PO1, PO2,PO3,PO4,PO5
CO2	Investigate the morphology of the sample by using a Scanning Electron Microscope	PO1, PO2,PO3,PO4,PO5
CO3	Analyze the morphology and crystal structure of the sample by using Transmission Electron Microscope	PO1, PO2,PO3,PO4,PO5
CO4	Describe the principle and experimental arrangement of various spectroscopic techniques	PO1, PO2,PO3,PO4
CO5	Understand the construction and working principle of various Electrical & Magnetic Characterization technique	PO1, PO2,PO3,PO4

Course Articulation Matrix:

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

Textbooks:

1. Material Characterization: Introduction to Microscopic and Spectroscopic Methods – Yang Leng – John Wiley & Sons (Asia) Pvt. Ltd. 2013.
2. Microstructural Characterization of Materials - David Brandon, Wayne D Kalpan, John Wiley & Sons Ltd., 2008

Reference Books:

1. Fundamentals of Molecular Spectroscopy – IV Ed. – Colin Neville Banwell and Elaine M. McCash, Tata McGraw-Hill, 2008.
2. Elements of X-ray diffraction – Bernard Dennis Cullity & Stuart R Stocks, Prentice Hall, 2001 – Science.
3. Practical Guide to Materials Characterization: Techniques and Applications - Khalid Sultan – Wiley – 2021.
4. Materials Characterization Techniques -Sam Zhang, Lin Li, Ashok Kumar -CRC Press - 2008

NPTEL courses link :

1. <https://nptel.ac.in/courses/115/103/115103030/>
2. https://nptel.ac.in/content/syllabus_pdf/113106034.pdf
3. <https://nptel.ac.in/noc/courses/noc19/SEM1/noc19-mm08/>

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES: CHITTOOR

Department of Science & Humanities

23A51501

III B Tech- I Semester

23OSH351C	CHEMISTRY OF ENERGY SYSTEMS	L	T	P	C
	OPEN ELECTIVE-I(COMMON TO ALL)	3	-	-	3

COURSE EDUCATIONAL OBJECTIVES:

1. To make the student understand basic electrochemical principles such as standard electrode potentials, emf and applications of electrochemical principles in the design of batteries.
2. To understand the basic concepts of processing and limitations of Fuel cells & their applications.
3. To impart knowledge to the students about fundamental concepts of photo chemical cells, reactions and applications.
4. Necessarily of harnessing alternate energy resources such as solar energy and its basic concepts.
5. To impart knowledge to the students about fundamental concepts of hydrogen storage in different materials and liquification method.

UNIT-1: Electrochemical Systems:

(09)

Galvanic cell, Nernst equation, standard electrode potential, application of EMF, electrical double layer, polarization, Batteries- Introduction, Lead-acid, Nickel- cadmium, Lithium-ion batteries and their applications.

UNIT-2: Fuel Cells:

(09)

Fuel cell- Introduction, Basic design of fuel cell, working principle, Classification of fuel cells, Polymer electrolyte membrane (PEM) fuel cells, Solid-oxide fuel cells (SOFC), Fuel cell efficiency and applications.

UNIT-3: Photo and Photo electrochemical Conversions:

Photochemical cells Introduction and applications of photochemical reactions, specificity of photo electrochemical cell, advantage of photoelectron catalytic conversions and their applications.

UNIT-4: Solar Energy:

(09)

Introduction and prospects, photovoltaic (PV) technology, concentrated solar power (CSP), Solar cells and applications. .

UNIT-5: Hydrogen Storage:

(09)

Hydrogen storage and delivery: State-of-the art, Established technologies, Chemical and Physical methods of hydrogen storage, Compressed gas storage, Liquid hydrogen storage, other storage methods, Hydrogen storage in metal hydrides, metal organic frameworks (MOF), Metal oxide porous structures, hydrogel, and Organic hydrogen carriers.

Total Hours: 45

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES: CHITTOOR

COURSE OUTCOMES:

On successful completion of the course, students will be able to		POs
CO1	Solve the problems based on electrode potential, Describe the Galvanic Cell Differentiate between Lead acid and Lithium-ion batteries, Illustrate the electrical double layer	PO1, PO2, PO2, PO4, PO5
CO2	Describe the working Principle of Fuel cell, Explain the efficiency of the fuel cell Discuss about the Basic design of fuel cells, Classify the fuel cell	PO1, PO2, PO2, PO4, PO6
CO3	Differentiate between Photo and Photo electrochemical Conversions, Illustrate the photochemical cells, Identify the applications of photochemical reactions, Interpret advantages of photoelectron catalytic conversion.	PO1, PO2, PO2, PO4, PO5
CO4	Apply the photo voltaic technology, Demonstrate about solar energy and prospects Illustrate the Solar cells, discuss about concentrated solar power	PO1, PO2, PO2, PO4, PO5
CO5	Differentiate Chemical and Physical methods of hydrogen storage, Discuss the metal organic frame work, Illustrate the carbon and metal oxide porous structures Describe the liquification methods.	PO1, PO2, PO2, PO4, PO5

Text books

1. Physical chemistry by Ira N. Levine
2. Essentials of Physical Chemistry, Bahl and Bahl and Tuli.
3. Inorganic Chemistry, Silver and Atkins

Reference Books:

1. Fuel Cell Hand Book 7th Edition, by US Department of Energy (EG&G technical services And corporation)
2. Hand book of solar energy and applications by Arvind Tiwari and Shyam.
3. Solar energy fundamental, technology and systems by Klaus Jagar et.al.
4. Hydrogen storage by Levine Klebonoff

Mapping between Course Outcomes and Programme Outcomes

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

3=StrongMapping, 2=ModerateMapping, 1=Slight Mapping, -=No Mapping

**SREENIVASAINSTITUTE OF TECHNOLOGY AND
MANAGEMENT STUDIES: CHITTOOR
(AUTONOMOUS)**

Department of Science & Humanities

III B Tech- V Semester

23OSH351D	ENGLISH FOR COMPETITIVE EXAMINATIONS	L	T	P	C
	(Open Elective-I) (Common to All Branches)	3	0	0	3

Course Objectives:

1. To enable the students to learn about the structure of competitive English
2. To understand the grammatical aspects and identify the errors
3. To enhance verbal ability and identify the errors
4. To improve word power to answer competitive challenges
5. To make the ready to crack competitive exams

UNIT-I

GRAMMAR-1

Lecture Hrs-9

Nouns-classification-errors-Pronouns-types-errors-Adjectives-types-errors-Articles-definite-indefinite-Degrees of Comparison-Adverbs-types- errors-Conjunctions-usage-repositions-usage- Tag Questions,types-identifying errors-Practice

UNIT-II

GRAMMAR-2

Lecture Hrs-9

Verbs-tenses-structure-usages-negatives-positives-timeadverbs-Sequenceoftenses-IfClause-Voice-activevoiceandpassivevoice-reportedSpeech-Agreement-subjectandverb-Modals-SpottingErrors-Practices

UNIT-III

VERBALABILITY

Lecture Hrs-9

Sentence completion-Verbal analogies-Word Groups-Instructions-Critical reasoning-Verbal Deduction-Select appropriate pair - Reading Comprehension - Paragraph - Jumbles - Selecting the proper statement byreading a given paragraph.

UNIT-IV READING COMPREHENSION AND VOCUBULARY

Lecture Hrs-9

Competitive Vocabulary – Word building – Memory Techniques – Synonyms, Antonyms, Affixes - Prefixes&suffix–OneWord Substitutes–Compound words–Phrasal Verbs –Idioms and phrases-Homophones – Linking words – Modifiers – Intensifiers – Mastering Competitive Vocabulary – Cracking the unknowing passage –Speed Read info Techniques–Skimming and Scanning- Types of answering – Elimination methods.

UNIT-V

WRITING FOR COMPETITIVE EXAMINATIONS **Lecture Hrs-9**

Punctuations and Spelling rules –Word order–Sub skills of Writing –paragraph meaning –Salient features – types – Note making – Note taking- Summarizing - precise writing - Expansion of proverbs – Essay Writing – types.

**SREENIVASAINSTITUTE OF TECHNOLOGY AND
MANAGEMENT STUDIES: CHITTOOR
(AUTONOMOUS)**

	Course Outcomes(CO):	Blooms Level
	By the end of the program students will be able to	
1.	Identify the basics of English grammar and its importance	PO2
2.	Explain the use of grammatical structures in sentences	PO5
3.	Demonstrate the ability to use various concepts in grammar and vocabulary and the applications in every day use and in competitive exams	PO6,PO10
4.	Analyze an unknown passage and reach conclusions about it.	PO10
5.	Choose the appropriate form of verbs in framing sentences	PO4
6.	Develop speed reading and comprehending ability thereby perform better in competitive exams	PO4

Text Books:

1. Wren Martin, English for competitive examinations, S. hand & Co, 2021.
2. Objective English for competitive examinations, Tata McGraw Hill, New Delhi, 2014.

Reference Books:

1. Hari Mohan Prasad objective English for competitive examination Tata McGrawhill, New Delhi, 2014.
2. Philip Sunil Solomon English for Success in competitive exams, Oxford 2016.
3. Shalini Verma, Word power made Handy S. Chand Publications.
4. Neira Anjanna Dev & Co, Creative Writing: A Beginner's Manual Pearson Education India, 2008.
5. Abhishek Jain, Vocabulary learning Techniques Vol I & IIRRG Global Publishers 2013.
6. Michael Swan, Practical English Usage, Oxford, 2006.

Online Services:

1. <https://www.grammar.cl/English/partsofspeech.htm>
2. <https://academicguides.waldenu.edu/writingcenter/grammar/PartsofSpeech>
3. <https://learnEnglish.britishcouncil.org/grammar/enlgish-grammar—reference/active-passive-voice>.
4. <https://www.languagetool.org/Insights/post/verb/tenses/>
5. <https://www.britishcouncil.in/blog/best/freeEnglish-learningresources-Britishcouncil>
6. <https://www.careeride.com/post/social-essays-for-competitive-exams-586.aspx>

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



**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

III B. Tech – V SEMESTER

23ESC351T	INTRODUCTION TO QUANTUM TECHNOLOGIES AND APPLICATIONS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES (COBJ):

- Introduce fundamental quantum concepts like superposition and entanglement.
- Understand theoretical structure of qubits and quantum information.
- Explore conceptual challenges in building quantum computers.
- Explain principles of quantum communication and computing.
- Examine real-world applications and the future of quantum technologies.

COURSE OUTCOMES (CO):

- Explain core quantum principles in a non-mathematical manner.
- Compare classical and quantum information systems.
- Identify theoretical issues in building quantum computers.
- Discuss quantum communication and computing concepts.
- Recognize applications, industry trends, and career paths in quantum technology.

Unit 1:

Introduction to Quantum Theory and Technologies The transition from classical to quantum physics, Fundamental principles explained conceptually: Superposition, Entanglement, Uncertainty Principle, Wave-particle duality, Classical vs Quantum mechanics – theoretical comparison, Quantum states and measurement: nature of observation, Overview of quantum systems: electrons, photons, atoms, The concept of quantization: discrete energy levels, Why quantum? Strategic, scientific, and technological significance, A snapshot of quantum technologies: Computing, Communication, and Sensing, National and global quantum missions: India's Quantum Mission, EU, USA, China

UNIT 2:

Theoretical Structure of Quantum Information Systems What is a qubit? Conceptual understanding using spin and polarization, Comparison: classical bits vs quantum bits, Quantum systems: trapped ions, superconducting circuits, photons (non- engineering view), Quantum coherence and decoherence – intuitive explanation, Theoretical concepts: Hilbert spaces, quantum states, operators – only interpreted in abstract, The role of entanglement and non-locality in systems, Quantum information vs classical information: principles and differences, Philosophical implications: randomness, determinism, and observer role

UNIT 3:

Building a Quantum Computer – Theoretical Challenges and Requirements What is required to build a quantum computer (conceptual overview)?, Fragility of quantum systems: decoherence, noise, and control, Conditions for a functional quantum system: Isolation, Error management, Scalability, Stability, Theoretical barriers: Why maintaining entanglement is difficult, Error correction as a theoretical necessity, Quantum hardware platforms (brief conceptual comparison), Superconducting circuits, Trapped ions, Photonics, Visions reality: what's working and what remains elusive, The role of quantum software in managing theoretical complexities



**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
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UNIT 4:

Quantum Communication and Computing – Theoretical Perspective Quantum vs Classical Information, Basics of Quantum Communication, Quantum Key Distribution (QKD), Role of Entanglement in Communication, The Idea of the Quantum Internet – Secure Global Networking, Introduction to Quantum Computing, Quantum Parallelism (Many States at Once), Classical vs Quantum Gates, Challenges: Decoherence and Error Correction, Real-World Importance and Future Potential

UNIT 5:

Applications, Use Cases, and the Quantum Future Real-world application domains: Healthcare (drug discovery), Material science, Logistics and optimization, Quantum sensing and precision timing, Industrial case studies: IBM, Google, Microsoft, PsiQuantum, Ethical, societal, and policy considerations, Challenges to adoption: cost, skills, standardization, Emerging careers in quantum: roles, skillsets, and preparation pathways, Educational and research landscape – India's opportunity in the global quantum race

TEXTBOOKS:

1. Michael A. Nielsen, Isaac L. Chuang, Quantum Computation and Quantum Information, Cambridge University Press, 10th Anniversary Edition, 2010.
2. Eleanor Rieffel and Wolfgang Polak, Quantum Computing: A Gentle Introduction, MIT Press, 2011.
3. Chris Bernhardt, Quantum Computing for Everyone, MIT Press, 2019.

REFERENCE BOOKS:

1. David McMahon, Quantum Computing Explained, Wiley, 2008.
2. Phillip Kaye, Raymond Laflamme, Michele Mosca, An Introduction to Quantum Computing, Oxford University Press, 2007.
3. Scott Aaronson, Quantum Computing Since Democritus, Cambridge University Press, 2013.
4. Alastair I.M. Rae, Quantum Physics: A Beginner's Guide, Oneworld Publications, Revised Edition, 2005.
5. Eleanor G. Rieffel, Wolfgang H. Polak, Quantum Computing: A Gentle Introduction, MIT Press, 2011.
6. Leonard Susskind, Art Friedman, Quantum Mechanics: The Theoretical Minimum, Basic Books, 2014.
7. Bruce Rosenblum, Fred Kuttner, Quantum Enigma: Physics Encounters Consciousness, Oxford University Press, 2nd Edition, 2011.
8. Giuliano Benenti, Giulio Casati, Giuliano Strini, Principles of Quantum Computation and Information, Volume I: Basic Concepts, World Scientific Publishing, 2004.
9. K.B. Whaley et al., Quantum Technologies and Industrial Applications: European Roadmap and Strategy Document, Quantum Flagship, European Commission, 2020.
10. Department of Science & Technology (DST), Government of India, National Mission on Quantum Technologies & Applications – Official Reports and Whitepapers, MeitY/DST Publications, 2020 onward.



**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

23CAI355L	III B. Tech – V SEMESTER ARTIFICIAL INTELLIGENCE: PRINCIPLES AND TECHNIQUES LAB	L	T	P	C
		-	-	3	1.5

PRE-REQUISITES: Nil.

COURSE OBJECTIVES:

- To teach the methods of implementing algorithms using artificial intelligence techniques
- To illustrate search algorithms To demonstrate the building of intelligent agents Course Outcomes: After completion of the course, students will be able to
- Implement search algorithms
- Solve Artificial intelligence problems
- Design chatbot and virtual assistant

LIST OF EXPERIMENTS:

1. Write a program to implement DFS and BFS
2. Write a Program to find the solution for traveling salesman Problem
3. Write a program to implement Simulated Annealing Algorithm
4. Write a program to find the solution for the wumpus world problem
5. Write a program to implement 8 puzzle problem
6. Write a program to implement Towers of Hanoi problem
7. Write a program to implement A* Algorithm
8. Write a program to implement Hill Climbing Algorithm
9. Build a Chatbot using AWS Lex, Pandora bots.
10. Build a bot that provides all the information related to your college.
11. Build a virtual assistant for Wikipedia using Wolfram Alpha and Python
12. The following is a function that counts the number of times a string occurs in another string:

```
# Count the number of times string s1 is found in string s2
def count_substring(s1,s2):
count = 0
for i in range(0,len(s2)- len(s1)+1):
if s1 == s2[i:I +len(s1)]:
count += 1
return co un t
```

For instance, count_substring ('ab','cabalaba') returns 2.
Write a recursive version of the above function. To get the rest of a string (i.e. everything but the first character).
13. Higher order functions. Write a higher-order function count that counts the number of elements in a list that satisfy a given test. For instance: count (lambda x: x>2, [1, 2, 3, 4, 5]) should return 3, as there are three elements in the list larger than 2. Solve this task without using any existing higher order function.
14. Brute force solution to the Knapsack problem. Write a function that allows you to generate random problem instances for the knapsack program. This function should generate a list of items containing N items that each have a unique name, a random size in the range 1.....5 and a random value in the range 1. 10. Next, you should perform performance measurements to see how long the given knapsack solver take to solve different problem sizes. You should perform at least 10 runs with different randomly generated problem instances for the problem sizes 10,12,14,16,18,20 and 22.



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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

23CSE355L	III B. Tech – V SEMESTER COMPUTER NETWORKS & INTERNET PROTOCOLS LAB	L T P C
		- - 3 1.5

PRE-REQUISITES: Nil.

COURSE OBJECTIVES:

- To understand the different types of networks
- To discuss the software and hardware components of a network
- To enlighten the working of networking commands supported by operating system
- To impart knowledge of Network simulator 2/3
- To familiarize the use of networking functionality supported by JAVA

Course Outcomes:

After completion of the course, students will be able to

- Design scripts for Wired network simulation
- Design scripts of static and mobile wireless networks simulation
- Analyze the data traffic using tools
- Design JAVA programs for client-server communication
- Construct a wired and wireless network using the real hardware

List of Experiments:

1. Study different types of Network cables (Copper and Fiber) and prepare cables (Straight and Cross) to connect Two or more systems. Use crimping tool to connect jacks. Use LAN tester to connect the cables. - - Install and configure Network Devices: HUB, Switch and Routers. Consider both manageable and non-manageable switches. Do the logical configuration of the system. Set the bandwidth of different ports. Install and Configure Wired and Wireless NIC and transfer files between systems in Wired LAN and Wireless LAN. Consider both adhoc and infrastructure mode of operation.
2. Work with the commands Ping, Tracert, Ipconfig, pathping, telnet, ftp, getmac, ARP, Hostname, Nbtstat, netdiag, and Nslookup
3. Find all the IP addresses on your network. Unicast, Multicast, and Broadcast on your network.
4. Use Packet tracer software to build network topology and configure using Distance vector routing protocol.
5. Use Packet tracer software to build network topology and configure using Link State routing protocol.
6. Using JAVA RMI Write a program to implement Basic Calculator
7. Implement a Chatting application using JAVA TCP and UDP sockets.
8. Hello command is used to know whether the machine at the other end is working or not. Echo command is used to measure the round-trip time to the neighbour. Implement Hello and Echo commands using JAVA.
9. Using Wire shark perform the following operations:
 - i. Inspect HTTP Traffic
 - ii. Inspect HTTP Traffic from a Given IP Address
 - iii. Inspect HTTP Traffic to a Given IP Address,
 - iv. Reject Packets to Given IP Address,
 - v. Monitor Apache and My SQL Network Traffic.
10. Install Network Simulator 2/3. Create a wired network using dumbbell topology. Attach agents, generate both FTP and CBR traffic, and transmit the traffic. Vary the data rates and evaluate the performance using metric throughput, delay, jitter and packet loss.
11. Create a static wireless network. Attach agents, generate both FTP and CBR traffic, and transmit the traffic. Vary the data rates and evaluate the performance using metric throughput, delay, jitter and packet loss.
12. Create a mobile wireless network. Attach agents, generate both FTP and CBR traffic, and transmit the traffic. Vary the data rates and evaluate the performance using metric throughput, delay, jitter and packet loss.



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REFERENCES:

1. Shivendra S.Panwar, Shiwen Mao, Jeong- dong Ryoo, and Yihan Li, —TCP/IP Essentials A Lab-Based Approach, Cambridge University Press, 2004.
2. Cisco Networking Academy, —CCNA1 and CCNA2 Companion Guidell, Cisco Networking Academy Program, 3rd edition, 2003.
3. Elloitte Rusty Harold, —Java Network Programming, 3rd edition, O'REILLY, 2011.

ONLINE LEARNING RESOURCES/VIRTUAL LABS:

- <https://www.netacad.com/courses/packet-tracer-> Cisco Packet Tracer.
- Ns Manual, Available at: <https://www.isi.edu/nsnam/ns/ns- documentation.html>, 2011.
- https://www.wireshark.org/docs/wsug_html_chunked/-Wireshark.
- <https://nptel.ac.in/courses/106105183/25>
- <http://www.nptelvideos.in/2012/11/computer-networks.html>
- <https://nptel.ac.in/courses/106105183/3>

COURSE OUTCOMES:

On successful completion of the course, students will be able to		POS
CO1	Demonstrate knowledge on various network simulator tools	PO1, PO2,
CO2	Create different program using TCL commands	PO1, PO2, PO3,
CO3	Demonstrate knowledge on various existing agent and design new agent using TCL and C++ for communication	PO1, PO2, PO3,PO4
CO4	Demonstrate knowledge on various existing routing protocols and design new routing protocols	PO1, PO2, PO3,PO4,PO5
CO5	Analysis the different routing protocols performance based on number of nodes and speed using different tools.	PO1, PO2, PO3,PO5
CO6	Follow ethical principles in designing and implementation of various routing algorithms	PO8
CO7	Do experiments effectively as an individual and as a member in a group	PO9
CO8	Communicate verbally and in written form, the understanding about the experiment	PO10
CO9	Continue updating their skill related to Networking and routing algorithms	PO12

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	3	2	-	-	-	-	-	-	-
CO.5	3	3	3	3	2	-	-	-	-	-	-	-
CO.6	-	-	-	-	-	-	-	3	-	-	-	-
CO.7	-	-	-	-	-	-	-	-	3	-	-	-
CO.8	-	-	-	-	-	-	-	-	-	3	-	-
CO.9	-	-	-	-	-	-	-	-	-	-	-	3
CO*	3	3	3	3	2	-	-	3	3	3	-	3



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23CSE356L	III B. Tech – V SEMESTER FULL STACK DEVELOPMENT -II (SKILL ENCHANCEMENT COURSE)	L T P C
		- 1 2 2

PRE-REQUISITES: Nil.

COURSE EDUCATIONAL OBJECTIVES: Course Objectives:

The main objectives of the course are to

- Make use of Modern- day JavaScript with ES6 standards for designing Dynamic web pages
- Building robust & responsive User Interfaces using popular JavaScript library `_React.js`.
- Building robust backend APIs using `_Express.js`
- Establishing the connection between frontend (React) Use interfaces

List of Experiments:

1. Introduction to Modern JavaScript and DOM
 - a) Write a JavaScript program to link JavaScript file with the HTML page
 - b) Write a JavaScript program to select the elements in HTML page using selectors
 - c) Write a JavaScript program to implement the event listeners
 - d) Write a JavaScript program to handle the click events for the HTML button elements
 - e) Write a JavaScript program to With three types of functions
 - i. Function declaration
 - ii. Function definition
 - iii. Arrow functions
2. Basics of React. Js
 - a) Write a React program to implement a counter button using react class components
 - b) Write a React program to implement a counter button using react functional components
 - c) Write a React program to handle the button click events in functional component
 - d) Write a React program to conditionally render a component in the browser
 - e) Write a React program to display text using String literals
3. Important concepts of React. js
 - a) Write a React program to implement a counter button using React use State hook
 - b) Write a React program to fetch the data from an API using React use Effect hook
 - c) and bac Write a React program with two react components sharing data using Props.
 - d) Write a React program to implement the forms in react
 - e) Write a React program to implement the iterative rendering using `map()` function.
4. Introduction to Git and GitHub
 - a. Setup
 - o Install Git on local machine.
 - o Configure Git (user name, email).
 - o Create GitHub account and generate a personal access token.
 - b. Basic Git Workflow
 - o Create a local repository using `git init`
 - o Create and add files → `git add .`
 - o Commit files → `git commit -m "Initial commit"`
 - o Connect to GitHub remote → `git remote add origin`
 - o Push to GitHub → `git push -u origin main`
 - c. Branching and Collaboration
 - o Create a branch → `git checkout -b feature1`
 - o Merge branch to main → `git merge feature1`
 - o Resolve merge conflicts (guided)
5. Upload React Project to GitHub
 - o Create a new React app using `npx create-react-app myapp`
 - o Initialize a git repo and push to GitHub
 - o Use `.gitignore` to exclude `node_modules`
 - o Create multiple branches: `feature/navbar`, `feature/form`
 - o Practice merge and pull requests (can use GitHub GUI)



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6. Introduction to Node. js and Express. js

- a. Write a program to implement the `'hello world'` message in the route through the browser using Express
- b. Write a program to develop a small website with multiple routes using Express. js
- c. Write a program to print the `'hello world'` in the browser console using Express. js
- d. Write a program to implement the CRUD operations using Express. js
- e. Write a program to establish the connection between API and Database using Express – My SQL driver

7. Introduction to My SQL

- a. Write a program to create a Database and table inside that database using My SQL Command line client
- b. Write a My SQL queries to create table, and insert the data, update the data in the table
- c. Write a My SQL queries to implement the subqueries in the My SQL command line client
- d. Write a My SQL program to create the script files in the My SQL workbench
- e. Write a My SQL program to create a database directory in Project and initialize a database. sql file to integrate the database into API

8. Team Collaboration Using GitHub

- o Form groups of 2–3 students
- o Create a shared GitHub repo
- o Assign tasks and work in branches
- o Use Issues, Pull Requests, and Code Reviews
- o Document code with README.md

TEXTBOOKS:

1. Web Design with HTML, CSS, JavaScript and JQuery Set Book by Jon Duckett Professional JavaScript for Web Developers Book by Nicholas C. Zakas
2. John Dean, Web Programming with HTML5, CSS and JavaScript, Jones & Bartlett Learning, 2019.
3. Pro MERN Stack: Full Stack Web App Development with Mongo, Express, React, and Node, Vasam Subramanian, 2nd edition, APress, O'Reilly.
4. Learning PHP, MySQL, JavaScript, CSS & HTML5: A Step-by- Step Guide to Creating Dynamic Websites by Robin Nixon
5. AZAT MARDAN, Full Stack Java Script: Learn Back bone. js, Node.jsand Mongo DB.2015

REFERENCE BOOKS:

1. Full-Stack JavaScript Development by Eric Bush.
2. Programming the World Wide Web, 7th Edition, Robert W Sebesta, Pearson, 2013.
3. 3. Tomasz Dyl , Kamil Przeorski , Maciej Czarnecki, Mastering Full Stack React Web Development 2017



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COURSE OUTCOMES:

On successful completion of the course, students will be able to		POS
CO1	Demonstrate knowledge on web page design elements	PO1
CO2	Analyze user requirements to develop web applications.	PO2
CO3	Design client-server applications using web technologies.	PO3
CO4	Manually Test the functionality of the web application	PO4
CO5	select appropriate design tools and procedure to implement web applications	PO5
CO6	Follow ethical principles in designing, and implementing various Technologies.	PO6
CO7	Do experiments effectively as an individual and as a member in a group.	PO7
CO8	Communicate verbally and in written form, the understanding about the experiment	PO8
CO9	Continue updating their skill related to Networking and routing algorithms	PO9

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	3	2	-	-	-	-	-	-	-
CO.5	3	3	3	3	2	-	-	-	-	-	-	-
CO.6	-	-	-	-	-	-	-	3	-	-	-	-
CO.7	-	-	-	-	-	-	-	-	3	-	-	-
CO.8	-	-	-	-	-	-	-	-	-	3	-	-
CO.9	-	-	-	-	-	-	-	-	-	-	-	3
CO*	3	3	3	3	2	-	-	3	3	3	-	3



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III B. Tech – V SEMESTER
THINKERING LAB

23ESC352L

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The aim of tinkering lab for engineering students is to provide a hands-on learning environment where students can explore, experiment, and innovate by building and testing prototypes. These labs are designed to demonstrate practical skills that complement theoretical knowledge.

Course objectives: The objectives of the course are to	
1	Encourage Innovation and Creativity
2	Provide Hands-on Learning and Impart Skill Development
3	Foster Collaboration and Teamwork
4	Enable Interdisciplinary Learning, Prepare for Industry and Entrepreneurship
5	Impart Problem-Solving mind-set

These labs bridge the gap between academia and industry, providing students with the practical experience. Some students may also develop entrepreneurial skills, potentially leading to start-ups or innovation-driven careers. Tinkering labs aim to cultivate the next generation of engineers by giving them the tools, space, and mind-set to experiment, innovate, and solve real-world challenges.

LIST OF EXPERIMENTS:

1. Make your own parallel and series circuits using breadboard for any application of your choice.
2. Design and 3D print a Walking Robot
3. Design and 3D Print a Rocket.
4. Temperature & Humidity Monitoring System (DHT11 + LCD)
5. Water Level Detection and Alert System
6. Automatic Plant Watering System
7. Bluetooth-Based Door Lock System
8. Smart Dustbin Using Ultrasonic Sensor
9. Fire Detection and Alarm System
10. RFID-Based Attendance System
11. Voice-Controlled Devices via Google Assistant
12. Heart Rate Monitoring Using Pulse Sensor
13. Soil Moisture-Based Irrigation
14. Smart Helmet for Accident Detection
15. Milk Adulteration Detection System
16. Water Purification via Activated Carbon
17. Solar Dehydrator for Food Drying
18. Temperature-Controlled Chemical Reactor
19. Ethanol Mini-Plant Using Biomass
20. Smart Fluid Flow Control (Solenoid + pH Sensor)
21. Portable Water Quality Tester
22. AI Crop Disease Detection
23. AI-based Smart Irrigation
24. ECG Signal Acquisition and Plotting
25. AI-Powered Traffic Flow Prediction
26. Smart Grid Simulation with Load Monitoring
27. Smart Campus Indoor Navigator
28. Weather Station Prototype
29. Firefighting Robot with Sensor Guidance
30. Facial Recognition Dustbin



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31. Barcode-Based Lab Inventory System
32. Growth Chamber for Plants
33. Biomedical Waste Alert System
34. Soil Classification with AI
35. Smart Railway Gate
36. Smart Bin Locator via GPS and Load Sensors
37. Algae-Based Water Purifier
38. Contactless Attendance via Face Recognition

- Note: The students can also design and implement their own ideas, apart from the list of experiments mentioned above.
- Note: A minimum of 8 to 10 experiments must be completed by the students.



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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	3	2	-	-	-	-	-	-	-
CO.5	3	3	3	3	2	-	-	-	-	-	-	-
CO.6	-	-	-	-	-	-	-	3	-	-	-	-
CO.7	-	-	-	-	-	-	-	-	3	-	-	-
CO.8	-	-	-	-	-	-	-	-	-	3	-	-
CO.9	-	-	-	-	-	-	-	-	-	-	-	3
CO*	3	3	3	3	2	-	-	3	3	3	-	3



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**II B.TECH. – VI SEMESTER
MACHINE LEARNING**

23CSM241T

**L T P C
3 0 0 3**

PRE-REQUISITES:

COURSE EDUCATIONAL OBJECTIVES:

1. Define machine learning and its different types (supervised and unsupervised) and understand their applications.
2. Apply supervised learning algorithms including decision trees and k-nearest neighbors (k-NN).
3. Implement unsupervised learning techniques, such as K-means clustering.

UNIT I: INTRODUCTION TO MACHINE LEARNING (9)

Evolution of Machine Learning, Paradigms for ML, Learning by Rote, Learning by Induction, Reinforcement Learning, Types of Data, Matching, Stages in Machine Learning, Data Acquisition, Feature Engineering, Data Representation, Model Selection, Model Learning, Model Evaluation, Model Prediction, Search and Learning, Data Sets.

UNIT 2: NEAREST NEIGHBOUR-BASED MODELS (9)

Introduction to Proximity Measures, Distance Measures, Non-Metric Similarity Functions, Proximity Between Binary Patterns, Different Classification Algorithms Based on the Distance Measures ,K-Nearest Neighbor Classifier, Radius Distance Nearest Neighbor Algorithm, KNN Regression, Performance of Classifiers, Performance of Regression Algorithms.

UNIT 3: MODELS BASED ON DECISION TREES (9)

Decision Trees for Classification, Impurity Measures, Properties, Regression Based on Decision Trees, Bias-Variance Trade-off, Random Forests for Classification and Regression.

The Bayes Classifier: Introduction to the Bayes Classifier, Bayes' Rule and Inference, The Bayes Classifier and its Optimality, Multi-Class Classification | Class Conditional Independence and Naive Bayes Classifier (NBC)

UNIT 4: LINEAR DISCRIMINANTS FOR MACHINE LEARNING (9)

Introduction to Linear Discriminants, Linear Discriminants for Classification, Perceptron Classifier, Perceptron Learning Algorithm, Support Vector Machines, Linearly Non-Separable Case, Non-linear SVM, Kernel Trick, Logistic Regression, Linear Regression, Multi-Layer Perceptrons (MLPs), Backpropagation for Training an MLP.

UNIT 5: CLUSTERING (9)

Introduction to Clustering, Partitioning of Data, Matrix Factorization |Clustering of Patterns, Divisive Clustering, Agglomerative Clustering, Partitional Clustering, K-Means Clustering, Soft Partitioning, Soft Clustering, Fuzzy C-Means Clustering, Rough Clustering, Rough K-Means Clustering Algorithm, Expectation Maximization-Based Clustering, Spectral Clustering.

Total Hours: 45



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COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Identify machine learning techniques suitable for a given problem.	PO6, PO7, PO8, PO9, PO12
CO2	Solve real-world problems using various machine learning techniques.	PO6, PO7, PO8, PO9, PO12
CO3	Apply Dimensionality reduction techniques for data preprocessing.	PO6, PO7, PO8, PO9, PO12
CO4	Explain what is learning and why it is essential in the design of intelligent machines.	PO6, PO7, PO8, PO9, PO12
CO5	Evaluate Advanced learning models for language, vision, speech, decisionmaking etc.	PO6, PO7, PO8, PO9, PO12

TEXT BOOKS:

1. "Machine Learning Theory and Practice", M N Murthy, V S Ananthanarayana, Universities Press (India), 2024

REFERENCE BOOKS:

1. "Machine Learning", Tom M. Mitchell, McGraw-Hill Publication, 2017.
2. "Machine Learning in Action", Peter Harrington, DreamTech, 2012.
3. "Introduction to Data Mining", Pang-Ning Tan, Michel Stenbach, Vipin Kumar, 7th Edition, 2019.

CO-PO MAPPING:

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	2	2	3	2	-	-	3
CO2	-	-	-	-	-	2	2	3	2	-	-	3
CO3	-	-	-	-	-	2	2	3	2	-	-	3
CO4	-	-	-	-	-	2	2	3	2	-	-	3
CO5	-	-	-	-	-	2	2	3	2	-	-	3
CO6	-	-	-	-	-	2	2	3	2	-	-	3
CO*	-	-	-	-	-	2	2	3	2	-	-	3



III B.Tech. - VI Semester

23CSE361T

CLOUD COMPUTING

L T P C
3 0 0 3

Course Objectives:

- To explain the evolving computer model called cloud computing.
- To introduce the various levels of services that can be achieved by cloud.
- To describe the security aspects in cloud.

Course Out comes(CO):

After completion of the course, students will be able to

- Ability to create cloud computing environment
- Ability to design applications for Cloud environment
- Design & develop back up strategies for cloud data based on features.
- Use and Examine different cloud computing services.
- Apply different cloud programming model as per need.

UNIT I

Lecture 8Hrs

Basics of Cloud computing

Introduction to cloud computing: Introduction, Characteristics of cloud computing, Cloud Models, Cloud Services Examples, Cloud Based services and applications

Cloud concepts and Technologies: Virtualization, Load balancing, Scalability and Elasticity, Deployment, Replication, Monitoring, Software defined, Network function virtualization, Map Reduce, Identity and Access Management, services level Agreements, Billing.

Cloud Services and Plat forms: Compute Services, Storage Services, Data, base Services, Application services, Content delivery services Analytics Services, Deployment and Management Services, Identity and Access Management services, Open Source Private Cloud software.

UNIT II

Lecture 9Hrs

Hadoop and Python

Hadoop Map Reduce: Apache Hadoop, Hadoop Map Reduce Job Execution, Hadoop Schedulers, Hadoop Clusterset up.

Cloud Application Design: Reference Architecture for Cloud Applications, Cloud Application Design Methodologies, Data Storage Approaches.

Python Basics: Introduction, Installing Python, Python data Types & Data Structures, Controlflow, Function, Modules, Packages, Filehandling, Date/Time Operations, Classes.

UNIT III

Lecture 8Hrs

Python for Cloud computing

Python for Cloud: Python for Amazon web services, Python for Google Cloud Platform, Python for windows Azure, Python for Map Reduce, Python packages of Interest, Python web Application Frame work, Designing a REST ful web API.

Cloud Application Development in Python: Design Approaches, Image Processing APP, Document Storage App, Map Reduce App, Social Media Analytics App.

UNIT IV Lecture 8Hrs

Big data, multimedia and Tuning

Big Data Analytics: Introduction, Clustering Big Data, Classification of Big data Recommendation of Systems.

Multimedia Cloud: Introduction, Case Study: Live video Streaming App, Streaming Protocols, case Study: Video Trans coding App.



Cloud Application Bench marking and Tuning: Introduction, Work load Character is tics, Application Performance Metrics, Design Considerations for a Bench marking Methodology, Bench marking Tools, Deployment Prototyping, Load Testing & Bottleneck Detection case Study, Hadoop bench marking case Study.

UNIT V

Lecture 9Hrs

Applications and Issues in Cloud

Cloud Security: Introduction, CSA Cloud Security Architecture, Authentication, Authorization, Identity Access Management, Data Security, Key Management, Auditing.

Cloud for Industry, Health care & Education: Cloud Computing for Health care, Cloud computing for Energy Systems, Cloud Computing for Transportation Systems, Cloud Computing for Manufacturing Industry, Cloud computing for Education.

Migrating in to a Cloud: Introduction, Broad Approaches to migrating into the cloud, the seven- step model of migration in to a cloud.

Organizational readiness and Change Management in The Cloud Age: Introduction, Basic concepts of Organizational Readiness, Drivers for changes: A frame work to comprehend the competitive environment, common change management models, change management maturity models, Organizational readiness self- assessment

Legal Issues in Cloud Computing: Introduction, Data Privacy and security Issues, cloud contracting models, Jurisdictional issues raised by virtualization and at a location, commercial and business considerations, Special Topics.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course the student will be		POs related to COs
CO1	Demonstrate Different types of Computing Systems, CloudComputing Basics, Types of Cloud Computing	PO1, PO2
CO2	Understand the different services of cloud.	PO1, PO2
CO3	Understand the Privacy and security aspects of cloud.	PO1, PO8
CO4	Demonstrate knowledge on common standards for Cloud	PO1, PO6
CO5	Develop s kill to setup ourownprivatecloud a nd tokn ow applications of clou d .	PO1, PO2, PO3, PO5,PO9, PO12

Text books:

1. Cloud computing Ahands - on Approach ||By Arshdeep Bahga, Vijay Madiseti, Universities Press, 2016
2. Cloud Computing Principles and Paradigms: By RajKumar Buyya, James Broberg, Andrzej Goscinski, Wiley, 2016.

Reference Books:

1. Masterin g Cloud Computing by Rajkumar Buyya, Christian Vecchiola, S Thamarai Selvi, TMH
2. Cloud computing AHands-On Approach by Arshdeep Bahga and Vijay Madiseti.
3. Cloud Computing: A Practical Approach, Anthony T.Velte, To by J.Velte, Robert Elsenpeter, Tata Mc Graw Hill, rp 2011.
4. Enterprise Cloud Computing, Gautam Shroff, Cambridge University Press, 2010.
5. Cloud Application Architectures: Building Applications and Infrastructure in the Cloud, George Reese,O_Reilly, SPD, rp 2011.
6. Essentials of Cloud Computing by K.Chandrasekaran. CRC Press.

Online Learning Resources:

Cloud computing – Course (nptel.ac.in)



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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	-	-	-	-
CO4	3	-	-	-	-	2	-	-	-	-	-	-
CO5	3	3	3	-	2	-	-	-	2	-	-	3
CO*	3	3	3	-	2	2	-	3	2	-	-	3

SREENIVASAINSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
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**Department of Computer Science and
Engineering**
III B.Tech. - II Semester

23CSE362T

CRYPTOGRAPHY & NETWORK SECURITY

L T P C
3 0 0 3

PRE-REQUISITES : A course on Computer Networks

COURSE EDUCATIONAL OBJECTIVES:

1. To understand basics of Cryptography and Network Security. Identify computer and network security threats, classify the threats and develop a security model to prevent, detect and recover from the attacks.
2. Encrypt and decrypt messages using block ciphers, sign and verify messages using well known signature generation and verification algorithms.
3. Analyze existing authentication and key agreement protocols; identify the weaknesses of these protocols.
4. Download and install an e-mail and file security software, PGP and efficiently use the code to encrypt and sign messages.
5. Develop SSL or Firewall based solutions against security threats, employ access control techniques.

UNIT -1:

(9)

Computer and Network Security Concepts: Computer Security Concepts, The OSI Security Architecture, Security Attacks, Security Services, Security Mechanisms, A Model for Network Security, Classical Encryption Techniques: Symmetric Cipher Model, Substitution Techniques, Transposition Techniques, Steganography, Block Ciphers: Traditional Block Cipher Structure, The Data Encryption Standard, Advanced Encryption Standard: AES Structure, AES Transformation Functions

UNIT -2:

(9)

Number Theory: The Euclidean Algorithm, Modular Arithmetic, Fermat's and Euler's Theorems, The Chinese Remainder Theorem, Discrete Logarithms, Finite Fields: Finite Fields of the Form $GF(p)$, Finite Fields of the Form $GF(2^n)$. **Public Key Cryptography:** Principles, Public Key Cryptography Algorithms, RSA Algorithm, Diffie Hellman Key Exchange, Elliptic Curve Cryptography.

UNIT -3:

(9)

Cryptographic Hash Functions: Application of Cryptographic Hash Functions, Requirements & Security, Secure Hash Algorithm, Message Authentication Functions, Requirements & Security, HMAC & CMAC. **Digital Signatures:** NIST Digital Signature Algorithm, Distribution of Public Keys, X.509 Certificates, Public-Key Infrastructure

UNIT -4:

(9)

User Authentication: Remote User Authentication Principles, Kerberos. Electronic Mail Security: Pretty Good Privacy (PGP) And S/MIME. **IP Security:** IP Security Overview, IP Security Policy, Encapsulating Security Payload, Combining Security Associations, Internet Key Exchange.

SREENIVASAINSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

UNIT –5:

(8)

Transport Level Security: Web Security Requirements, Transport Layer Security (TLS), HTTPS, Secure Shell (SSH) **Fire walls:** Fire wall Characteristics and Access Policy, Types of Fire walls, Firewall Location and Configurations.

Total Hours: 44

COURSE OUTCOMES

On successful completion of the course, students will be able to		POs
CO1	Understand basics of Cryptography and Network Security.	PO1, PO2
CO2	Encrypt and decrypt messages, sign and verify messages using well known signature generation and verification algorithms.	PO1, PO2
CO3	Analyze existing authentication and key agreement protocols.	PO1, PO2, PO3, PO4
CO4	Use e-mail and file security software's.	PO1, PO2, PO3, PO5
CO5	Develop SSL/Firewall.	PO1, PO2, PO3, PO4

TEXT BOOKS:

1. Cryptography and Network Security–William Stallings, Pearson Education, 8th Edition.
2. Cryptography, Network Security and Cyber Laws– Bernard Menezes, Cengage Learning, 2010 edition.

REFERENCE BOOKS:

1. Cryptography and Network Security-Behrouz A Forouzan, Debdeep Mukhopadhyaya, Mc- Graw Hill, 3rd Edition, 2015.
2. Network Security Illustrated, Jason Albanese and Wes Sonnenreich, MGH Publishers, 2003.

REFERENCE WEBSITE:

1. <https://nptel.ac.in/courses/106/105/106105031/lecture>
2. [https://nptel.ac.in/courses/106/105/106105162/lectureby Dr.SouravMukhopadhyay](https://nptel.ac.in/courses/106/105/106105162/lectureby%20Dr.SouravMukhopadhyay)
IIT Kharagpur [VideoLecture]
3. [https://www.mitel.com/articles/web-communication-cryptography-and-network-security web articles by Mitel Power Connections](https://www.mitel.com/articles/web-communication-cryptography-and-network-security-web-articles-by-mitel-power-connections)

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	2	3	3	2	-	-	-	-	-	-	-	-
CO.2	3	3	3	3	-	-	-	-	-	-	-	-
CO.3	3	3	2	3	-	-	-	-	-	-	-	-
CO.4	2	3	2	-	1	-	-	-	-	-	-	-
CO.5	2	3	3	2	2	-	-	-	-	-	-	-
CO*	2.4	3	2.6	2.5	1.5	-	-	-	-	-	-	-



III B.Tech. - VI Semester

23ECE364C

EMBEDDED SYSTEM DESIGN
(PROFESSIONAL ELECTIVE II)

L T P C
3 0 0 3

PRE-REQUISITES: Nil

COURSE OBJECTIVES:

1. To understand the history, classification, and design process of embedded systems.
2. To explore the core components of embedded systems, including processors, memory, and I/O components.
3. To introduce onboard and external communication interfaces used in embedded systems.
4. To explain different firmware design approaches and programming techniques for embedded systems.
5. To provide an understanding of real-time operating systems and task management in embedded systems.

UNIT I - INTRODUCTION TO EMBEDDED SYSTEMS (9)

History of embedded systems, Classification of embedded systems based on generation and complexity, Purpose of embedded systems, The embedded system design process-requirements, specification, architecture design, designing hardware and software, components, system integration, Applications of embedded systems, and characteristics of embedded systems.

UNIT II TYPICAL EMBEDDED SYSTEM (9)

Core of the embedded system-general purpose and domain specific processors, ASICs, PLDs, COTs; Memory-ROM, RAM, memory according to the type of interface, memory shadowing, memory selection for embedded systems, Sensors, actuators, I/O components: seven segment LED, relay, piezo buzzer, push button switch, other sub-systems: reset circuit, brownout protection circuit, oscillator circuit real time clock, watch dog timer.

UNIT III COMMUNICATION INTERFACE (9)

Onboard communication interfaces-I2C, SPI, CAN, parallel interface; External communication interfaces-RS232 and RS485, USB, infrared, Bluetooth, Wi-Fi, ZigBe, GPRS, GSM.

UNIT IV EMBEDDED FIRMWARE DESIGN AND DEVELOPMENT (9)

Embedded firmware design approaches-super loop based approach, operating system based approach; embedded firmware development languages-assembly language based development, high level language based development.

UNIT V RTOS BASED EMBEDDED SYSTEM DESIGN (9)

Operating system basics, types of operating systems, tasks, process and threads, multiprocessing and multitasking, task scheduling: non-pre-emptive and pre-emptive scheduling; task communication-shared memory, message passing, Remote Procedure Call and Sockets, Task Synchronization: Task Communication/ Synchronization Issues, Task Synchronization Techniques

Total Hours:45

SREENIVASAINSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

Department of Computer Science Engineering
III B.Tech. - II Semester

23CSE363A	Introduction to Cyber Security	L	T	P	C
	(Common to IT, CSE(DS), CSE(IOT) Branches)	3	0	0	3

COURSE OBJECTIVES

The course is designed to provide awareness on different cyber crimes, cyber offenses, tools and methods used in cybercrime.

COURSE OUTCOMES

After completion of the course, students will be able to

- Classify the cybercrimes and understand the Indian ITA 2000
- Analyse the vulnerabilities in any computing system and find the solutions
- Predict the security threats of the future
- Investigate the protection mechanisms
- Design security solutions for organizations

UNIT –1: Introduction to Cybercrime (8)

Introduction, Cybercrime, and Information Security, Who are Cybercriminals, Classifications of Cybercrimes, And Cybercrime: The legal Perspectives and Indian Perspective, Cybercrime and the Indian ITA 2000, A Global Perspective on Cybercrimes

UNIT –2: Cyber Offenses: How Criminals Plan Them (9)

Introduction, How Criminals plan the Attacks, Social Engineering, Cyber stalking, Cyber cafe and Cybercrimes, Botnets: The Fuel for Cybercrime, Attack Vector, Cloud Computing

UNIT –3: Cybercrime: Mobile and Wireless Devices (9)

Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication service Security, Attacks on Mobile/Cell Phones, Mobile Devices: Security Implications for Organizations, Organizational Measures for Handling Mobile, Organizational Security Policies and Measures in Mobile Computing Era, Laptops.

UNIT –4: Tools and Methods Used in Cybercrime (8)

Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Keyloggers and Spywares, Virus and Worms, Trojan Horse and Backdoors, Steganography, DoS and DDoS attacks, SQL Injection, Buffer Overflow.

UNIT –5: Cyber Security: Organizational Implications (8)

Introduction, Cost of Cybercrimes and IPR issues, Web threats for Organizations, Security and Privacy Implications, Social media marketing: Security Risks and Perils for Organizations, Social Computing and the associated challenges for Organizations.

Total Hours: 42

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Demonstrated and applied the knowledge of the various methods to determine the resultant forces.	PO1, PO2, PO3, PO4
CO2	Analyze the equilibrium acting on a particle, bodies subjected to friction, simple frames and apply principle of virtual work to find reactions.	PO1, PO2, PO3, PO4
CO3	Find the location of centroid, center of gravity and moment of inertia for the given appropriate sections.	PO1, PO2, PO3, PO4
CO4	Analyze the kinematics of a body undergoing rectilinear, curvilinear motion.	PO1, PO2, PO3, PO4

SREENIVASAINSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

Department Computer Science Engineering
III B.Tech. - II Semester

23CSE363B	DevOps	L	T	P	C
	Professional Elective-II	3	0	0	3

PRE-REQUISITES: Fundamentals of software development and maintenance

COURSE EDUCATIONAL OBJECTIVES:

1. Understand collaboration and productivity by automating infrastructure and workflows
2. Familiarize with continuous measuring applications performance To apply the concepts of centroids/center of gravity of various sections.

UNIT -1 (8)

Dev Ops: An Overview, Dev Ops: Origins, Dev Ops: Roots, Dev Ops: Practices Dev Ops: Culture. Adopting Dev Ops: Developing the Playbook. Developing a Business Case for a Dev Ops: Developing the Business Case.

UNIT -2 (9)

Completing the Business Model Canvas, Customer Segments, Value Segments, Value Propositions, Channels, Customer Relationships, Revenue Streams, Key Resources, Key Activities, Key Partnerships, Cost Structures. Dev Ops Plays for Optimizing the delivery Pipeline: Dev Ops as an optimization Exercise, Core Themes, The Dev Ops Plays, Specializing Core Plays.

UNIT -3 (8)

Dev Ops Plays for Driving Innovation: Optimize to Innovate, The Uber Syndrome, Innovation and the Role of Technology, Core Themes, play: Build a Dev Ops Platform, play: Deliver Micro services Architectures, play: DevOps an API Economy, play: Organizing for Innovation.

UNIT -4 (10)

Scaling Dev Ops for the Enterprise: Core Themes, play: Dev Ops Center of Competency, play: Developing Culture of Innovation at Scale, play: Developing a Culture of continuous Improvement, play: Team Models for Dev Ops, play: Standardization of Tools and Process, play: Security Considerations for Dev Ops, Play: Dev Ops and Outsourcing..

UNIT -5 (10)

Leading Dev Ops Adoption in the Enterprise: Play: Dev Ops as a transformation Exercise, play: Developing a Culture of Collaboration and Trust, play: Dev Ops Thinking for the Line of Business, play: starting with Pilot Projects, Play: Rearing Unicorns on an Aircrafts Carrier. Appendix Case Study: Example Dev Ops Adoption Roadmap Organization Background, Roadmap Structure, Adoption Roadmap

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Demonstrated and applied the knowledge of the various methods to determine the resultant forces.	PO1, PO2, P03, PO4
CO2	Analyze the equilibrium acting on a particle, bodies subjected to friction, simple frames and apply principle of virtual work to find reactions.	PO1, PO2, P03, PO4
CO3	Find the location of centroid, center of gravity and moment of inertia for the given appropriate sections.	PO1, PO2, P03, PO4

SREENIVASAINSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

Department of Computer Science and Engineering

III B.Tech. - II Semester

23CSE363C	SOFTWARE TESTING METHODOLOGIES	L	T	P	C
	(Professional Elective-II)	3	0	0	3

PRE-REQUISITES: A course on Software Engineering

COURSE EDUCATIONAL OBJECTIVES:

1. To understand different testing levels on software models.
2. To create control flow graphs from programs and specifying the requirements of complicated transaction flow.
3. To Identify structured and unstructured flow graphs and representing path and regular expressions.
4. To model logic based testing with decision tables and state graphs.
5. To Acquire Basic Knowledge of Testing Tools like Win Runner and Load Runner.

UNIT -1: (9)

Introduction:-Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of bugs, Flow graphs and Path testing:- Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

UNIT -2: (8)

Transaction Flow Testing:-transaction flows, transaction flow testing techniques. Dataflow testing:- Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing.

UNIT -3: (8)

Domain Testing:-domains and paths, Nice & ugly domains, domain testing, domains and interfaces testing, domain and interface testing, domains and testability.

UNIT -4: (9)

Paths, Path products and Regular expressions:- path products & path expression, reduction procedure, applications, regular expressions & flow anomaly detection. Logic Based Testing:-overview, decision tables, path expressions, kv charts, specifications.

UNIT -5: (9)

State, State Graphs and Transition testing:- state graphs, good & bad state graphs, state testing, Testability tips. Graph Matrices and Application:-Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm, building tools

Total Hours: 43

COURSE OUTCOMES:

On successful completion of the course, students will be able to		POs
CO1	Identify the various bugs and correcting them after knowing the consequences of the bug.	PO1, PO2

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(Autonomous)**

CO2	Perform functional testing using control flow and transaction flowgraphs.	PO1, PO2, PO3
CO3	Design the path expression and reduce them very well when needed.	PO1, PO2, PO3
CO4	Test logic or an application and identifying the nice and ugly domains.	PO1, PO2, PO3, PO4
CO5	Use appropriate software testing tools, techniques and methods for even more effective systems during both the test planning and test execution phases of a software development project.	PO1, PO2, PO3, PO5

TEXT BOOKS:

1. Software Testing techniques – Boris Beizer, Dreamtech, second edition.
2. Software Testing Tools – Dr. K.V.K.K. Prasad, Dreamtech.

REFERENCE BOOKS:

1. The craft of software testing – Brian Marick, Pearson Education.
2. Software Testing Techniques – SPD (Oreille)
3. Software Testing in the Real World – Edward Kit, Pearson.
4. Effective methods of Software Testing, Perry, John Wiley.
5. Art of Software Testing – Meyers, John Wiley.

REFERENCE WEBSITE:

1. https://onlinecourses.nptel.ac.in/noc21_cs73/preview

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



23CAI353T

NATURAL LANGUAGE PROCESSING

L T P C
3 0 0 3

PRE-REQUISITES: Artificial Intelligence

COURSE EDUCATIONAL OBJECTIVES:

1. Basics of NLP, Morphology, Tokenization, N-gram Models
2. POS Tagging, Parsing, Treebank's, Ambiguity Handling
3. Word Sense Disambiguation, Semantic Parsing, Sentiment Analysis
4. Machine Translation, Transformers, BERT/GPT, Ethical NLP
5. Speech Recognition, Feature Extraction, Discourse Analysis

UNIT –1: INTRODUCTION TO NLP (9)

Introduction to NLP: Origins and Challenges, Language and Grammar in NLP, Regular Expressions and Finite-State Automata, Tokenization: Text Segmentation and Sentence Splitting, Morphological Parsing: Stemming and Lemmatization, Spelling Error Detection and Correction, Minimum Edit Distance and Applications, Statistical Language Models: Unigram, Bigram, and Trigram Models, Processing Indian Languages in NLP.

UNIT –2: WORD-LEVEL AND SYNTACTIC ANALYSIS (9)

Introduction, Part-of-Speech (POS) Tagging: Rule-Based, Stochastic and Transformation-Based Approaches, Hidden Markov Models (HMM) and Maximum Entropy Models for POS Tagging, Context-Free Grammar (CFG) and Constituency Parsing, Treebanks and Normal Forms for Grammar, Top-Down and Bottom-Up Parsing Strategies, CYK Parsing Algorithm, Probabilistic Context-Free Grammars (PCFGs), Feature Structures and Unification.

UNIT –3: TEXT CLASSIFICATION AND INFORMATION RETRIEVAL (9)

Naïve Bayes Classifier for Text Classification, Training and Optimization for Sentiment Analysis, Information Retrieval: Basic Concepts and Design Features, Information Retrieval Models: Classical, Non-Classical, and Alternative Models, Cluster Model, Fuzzy Model, and LSTM-Based Information, Retrieval, Word Sense Disambiguation (WSD) Methods: Supervised and Dictionary-Based Approaches.

UNIT –4: MACHINE TRANSLATION AND SEMANTIC PROCESSING (9)

Introduction to Machine Translation (MT), Language Divergence and Typology in MT Encoder- Decoder Model for Machine Translation, Translating in Low-Resource Scenarios, MT Evaluation Metrics and Techniques, Bias and Ethical Issues in NLP and Machine Translation, Semantic Analysis and First-Order Logic in NLP, Thematic Roles and Selectional Restrictions in Semantics, Word Senses and Relations Between Senses.

UNIT –5: SPEECH PROCESSING AND ADVANCED NLP MODELS (9)

Speech Fundamentals: Phonetics and Acoustic Phonetics, Digital Signal Processing in Speech Analysis, Feature Extraction in Speech: Short-Time Fourier Transform (STFT), Mel-Frequency Cepstral Coefficients (MFCC) and Perceptual Linear Prediction (PLP), Hidden Markov Models (HMMs) in Speech Recognition.

Total Hours: 45

COURSE OUTCOMES:



On successful completion of the course, students will be able to		Pos
CO1	Understand morphological processing and the structure of words and documents.	PO1, PO2
CO2	Analyze syntactic structures using various parsing algorithms.	PO1, PO3
CO3	Apply semantic parsing techniques to interpret natural language text.	PO1, PO2, PO4
CO4	Understand predicate-argument structures and meaning representation systems.	PO1, PO2, PO3, PO4
CO5	Apply cross-lingual language models and speech recognition techniques in NLP applications	PO1, PO2, PO4, PO5

TEXT BOOKS:

1. Daniel Jurafsky & James H. Martin – Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics, and Speech Recognition, Pearson Education, 2023.
2. Tanveer Siddiqui & U.S. Tiwary – Natural Language Processing and Information Retrieval, Oxford University Press.

REFERENCE BOOKS:

1. T.V. Geetha – Understanding Natural Language Processing – Machine Learning and Deep Learning Perspectives, Pearson, 2024.
2. Akshay Kulkarni & Adarsha Shivananda – Natural Language Processing Recipes - Unlocking Text Data with Machine Learning and Deep Learning using Python, Apress, 2019.

REFERENCE WEBSITE:

1. <https://www.youtube.com/watch?v=M7SWr5xObkA>
2. https://onlinecourses.nptel.ac.in/noc23_cs45/preview
3. <https://archive.nptel.ac.in/courses/106/106/106106211/>

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	2	-	2	-	-	-	-	-	-	-	-
CO.4	3	3	3	2	-	-	-	-	-	-	-	-
CO.5	3	3	-	3	2	-	-	-	-	-	-	-
CO*	3	2.8	3	2.3	2	-	-	-	-	-	-	-

SREENIVASAINSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

Department of Computer Science and Engineering

III B.Tech. - II Semester

23CSE264B	DISTRIBUTED OPERATING SYSTEMS	L	T	P	C
	(Professional Elective-III)	3	0	0	3

Course Objective:

- To study, learn, and understand the main concepts of advanced operating systems (parallel processing systems, distributed systems, real time systems, network operating systems, and open source operating systems) Hardware and software features that support these systems

Course Outcomes:

- Understand the design approaches of advanced operating systems
- Analyze the design issues of distributed operating systems.
- Evaluate design issues of multiprocessor operating systems.
- Identify the requirements Distributed File System and Distributed Shared Memory.
- Formulate the solutions to schedule the real time applications

UNIT –1: Architectures of Distributed Systems (9)

System Architecture Types, Distributed Operating Systems, Issues in Distributed Operating Systems, Communication Primitives. Theoretical Foundations: Inherent Limitations of a Distributed System, Lamport's Logical Clocks, Vector Clocks, Causal Ordering of Messages, Termination Detection.

UNIT –2: Distributed Mutual Exclusion (9)

The Classification of Mutual Exclusion Algorithms, Non-Token –Based Algorithms: Lamport's Algorithm, The Ricart-Agrawala Algorithm, Maekawa's Algorithm, Token- Based Algorithms: Suzuki-Kasami's Broadcast Algorithm, Singhal's Heuristic Algorithm, Raymond's Heuristic Algorithm.

UNIT –3: Distributed Deadlock Detection (9)

Preliminaries, Deadlock Handling Strategies in Distributed Systems, Issues in Deadlock Detection and Resolution, Control Organizations for Distributed Deadlock Detection, Centralized-Deadlock–Detection Algorithms, Distributed Deadlock Detection Algorithms, Hierarchical Deadlock Detection Algorithms

UNIT –4: Multiprocessor System Architectures (9)

Introduction, Motivation for multiprocessor Systems, Basic Multiprocessor System Architectures Multi Processor Operating Systems: Introduction, Structures of Multiprocessor Operating Systems, Operating Design Issues, Threads, Process Synchronization, Processor Scheduling. Distributed File Systems: Architecture, Mechanisms for Building Distributed File Systems, Design Issues

UNIT –5: Distributed Scheduling (9)

Issues in Load Distributing, Components of a Load Distributed Algorithm, Stability, Load Distributing Algorithms, Requirements for Load Distributing, Task Migration, Issues in task Migration Distributed Shared Memory: Architecture and Motivation, Algorithms for Implementing DSM, Memory Coherence, Coherence Protocols, Design Issues.

Total Hours: 45

SREENIVASAINSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

Department of Computer Science and Engineering
III B.Tech. - II Semester

23CSE364D	MOBILE ADHOC NETWORKS	L	T	P	C
	(Professional Elective-III)	3	0	0	3

Course Objective:

Knowledge of mobile ad hoc networks, design and implementation issues, and available solutions.

- Knowledge of routing mechanisms and the three classes of approaches: proactive, on-demand, and hybrid.
- Knowledge of clustering mechanisms and the different schemes that have been employed, e.g., hierarchical, flat, and leaderless.
- Knowledge of the 802.11 Wireless Lan (WiFi) and Bluetooth standards.

Course Outcomes:

Describe the unique issues in ad-hoc/sensor networks.

- Describe current technology trends for the implementation and deployment of wireless ad-hoc/sensor networks.
- Discuss the challenges in designing MAC, routing and transport protocols for wireless ad-hoc/sensor networks.
- Discuss the challenges in designing routing and transport protocols for wireless Adhoc/sensor networks.
- Comprehend the various sensor network Platforms, tools and applications

UNIT –1: Introduction to Ad Hoc Networks (9)

Characteristics of MANETs, Applications of MANETs and challenges of MANETs -Routing in MANETs: Criteria for classification, Taxonomy of MANET routing algorithms, Topology based routing algorithms, Position based routing algorithms, Other routing algorithms.

UNIT –2: Data Transmission: (9)

Broadcast storm problem, Broadcasting, Multicasting and Geocasting -TCP over Ad Hoc: TCP protocol overview, TCP and MANETs, Solutions for TCP over Ad hoc

UNIT –3: Basics of Wireless, Sensors and Applications (9)

Applications, Classification of sensor networks, Architecture of sensor network, Physical layer, MAC layer, Link layer.

UNIT –4: Data Retrieval in Sensor Networks: (9)

Routing layer, Transport layer, High-level application layer support, Adapting to the inherent dynamic nature of WSNs, Sensor Networks and mobile robots-Security: Security in Ad Hoc networks, Key management, Secure routing, Cooperation in MANETs, Intrusion Detection systems.

UNIT –5: Sensor Network Platforms and Tools: (9)

Sensor Network Hardware, Berkeley motes, Sensor Network Programming Challenges, Node-Level Software Platforms -Operating System: Tiny OS -Imperative Language: nesC, Data flow style language: Tiny GALS, Node Level Simulators, ns-2 and its sensor network extension.

Total Hours: 45

COURSE OUTCOMES:

		Pos
CO1	Demonstrated and applied the knowledge of the various methods to determine the resultant forces.	PO1, PO2, PO3, PO4
CO2	Analyze the equilibrium acting on a particle, bodies subjected to friction, simple frames and apply principle of virtual work to find reactions.	PO1, PO2, PO3, PO4

SREENIVASAINSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

Department of Computer Science and Engineering

III B.Tech. - II Semester

23CSE364E	SOFTWARE PROJECT MANAGEMENT	L	T	P	C
		3	0	0	3

Course Objective:

This course is designed to enable the students to understand the fundamental principles of Software Project management & will also have a good knowledge of the responsibilities of a project manager and how to handle them.

Course Outcomes:

After completion of the course, students will be able to

- Describe the fundamentals of Project Management
- Recognize and use Project Scheduling Techniques
- Familiarize with Project Control Mechanisms
- Understand Team Management
- Recognize the importance of Project Documentation and Evaluation

UNIT –1: conventional software Management: (9)

The waterfall model, conventional software Management performance Evolution of Software Economics: software Economics. Pragmatic Software Cost Estimation Improving Software Economics: Reducing Software Product Size, Improving Software Processes, Improving Team Effectiveness, Improving Automation, Achieving Required Quality, Peer Inspections.

UNIT –2: The old way and the new (9)

The principles of conventional software Engineering, principles of modern software management, transitioning to an iterative process. Lifecycle phases: Engineering and production stages, inception, Elaboration, construction, transition phases. Artifacts of the process: The artifact sets, Management artifacts, Engineering artifacts, programmatic artifacts

UNIT –3: Work Flows of the process (9)

Software process work flows, Inter Trans work flows. Check points of the Process: Major Milestones, Minor Milestones, Periodic status assessments. Iterative Process Planning: work break down structures, planning guidelines, cost and schedule estimating, Iteration planning process, Pragmatic planning

UNIT –4: Process Automation (9)

Automation Building Blocks, The Project Environment. Project Control and Process instrumentation: The seven core Metrics, Management indicators, quality indicators Tailoring the Process: Process discriminants. Managing people and organizing teams.

UNIT –5: Project Organizations and Responsibilities (9)

Line - of-Business Organizations, Project Organizations, evolution of Organizations. Future Software Project Management: modern Project Profiles, Next generation Software economics, modern process transitions. Case Study: The Command Center Processing and Display System- Replacement (CCPDS-R)

Total Hours: 45

23OCE361A	III B.Tech–VI Semester	DISASTER MANAGEMENT	L	T	P	C
			3	0	0	3

(OE – II)

Course Objectives:

The objectives of this course are to make the student :

1. To understand the fundamental concepts of natural disasters, their occurrence, and disaster risk reduction strategies.
2. To analyze the impact of cyclones on structures and explore retrofitting techniques for adaptive reconstruction.
3. To apply wind engineering principles and computational techniques in designing wind-resistant structures.
4. To evaluate earthquake effects on buildings and develop strategies for seismic retrofitting.
5. To assess seismic safety planning, design considerations, and innovative construction materials for disaster-resistant structures.

Course Outcomes:

After successful completion of this course, students will be able to:

1. Understand the fundamental concepts of natural disasters, their occurrence, and disaster risk reduction strategies.
2. Analyze the impact of cyclones on structures and explore retrofitting techniques for adaptive reconstruction.
3. Apply wind engineering principles and computational techniques in designing wind resistant structures.
4. Evaluate earthquake effects on buildings and develop strategies for seismic retrofitting.
5. Assess seismic safety planning, design considerations, and innovative construction materials for disaster-resistant structures.

CO–PO Articulation Matrix

Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
CO-1	3	-	-	-	-	2	-	2	2	-	-	-	3	3
CO-2	-	3	-	-	2	-	-	-	-	-	-	2	3	-
CO-3	3	-	-	3	-	-	3	-	-	2	-	-	-	3
CO-4	-	-	3	-	3	-	-	2	-	-	-	-	3	-
CO-5	-	-	-	3	-	3	3	3	2	-	-	-	-	3

UNIT– I

Introduction to Natural Disasters– Brief Introduction to Different Types of Natural Disasters, Occurrence of Disasters in Different Climatic and Geographical Regions, Hazard Maps (Earthquake and Cyclone) of The World and India, Regulations for Disaster Risk Reduction, Post-Disaster Recovery and Rehabilitation (Socioeconomic Consequences).

UNIT– II

Cyclones and Their Impact– Climate Change and Its Impact On Tropical Cyclones, Nature of Cyclonic Wind, Velocities and Pressure, Cyclone Effects, Storm Surges, Floods, and Landslides. Behavior of Structures in Past Cyclones and Windstorms, Case Studies. Cyclonic Retrofitting, Strengthening of Structures, and Adaptive Sustainable Reconstruction. Life-Line Structures Such as Temporary Cyclone Shelters.

UNIT– III

Wind Engineering and Structural Response– Basic Wind Engineering, Aerodynamics of Bluff Bodies, Vortex Shedding, and Associated Unsteadiness Along and Across Wind forces. Lab: Wind Tunnel Testing and Its Salient Features. Introduction to Computational Fluid Dynamics (CFD). General Planning and Design Considerations Under Windstorms and Cyclones. Wind Effects On Buildings, towers, Glass Panels, Etc., and Wind-Resistant Features in Design. Code Provisions, Design Wind Speed, Pressure Coefficients. Coastal Zoning Regulations for Construction and Reconstruction in Coastal Areas. Innovative Construction Materials and Techniques, Traditional Construction Techniques in Coastal Areas.

UNIT– IV

Seismology and Earthquake Effects– Causes of Earthquakes, Plate Tectonics, Faults, Seismic Waves; Magnitude, Intensity, Epicenter, Energy Release, and Ground Motions. Earthquake Effects– On Ground, Soil Rupture, Liquefaction, Landslides. Performance of Ground and Buildings in Past Earthquakes– Behavior of Various Types of Buildings and Structures, Collapse Patterns; Behavior of Non-Structural Elements Such as Services, Fixtures, and Mountings – Case Studies. Seismic Retrofitting– Weakness in Existing Buildings, Aging, Concepts in Repair, Restoration, and Seismic Strengthening.

UNIT– V

Planning and Design Considerations for Seismic Safety– General Planning and Design Considerations; Building forms, Horizontal and Vertical Eccentricities, Mass and Stiffness Distribution, Soft Storey Effects, Etc.; Seismic Effects Related to Building Configuration. Plan and Vertical Irregularities, Redundancy, and Setbacks. Construction Details– Various Types of Foundations, Soil Stabilization, Retaining Walls, Plinth Fill, Flooring, Walls, Openings, Roofs, Terraces, Parapets, Boundary Walls, Underground and Overhead Tanks, Staircases, and Isolation of Structures. Innovative Construction Materials and Techniques. Local Practices– Traditional Regional Responses. Computational Investigation Techniques.

TEXT BOOKS:

1. David Alexander, Natural Disasters, 1st Edition, CRC Press, 2017.
2. Edward A. Keller and Duane E. DeVecchio, Natural Hazards: Earth's Processes as Hazards, Disasters, and Catastrophes, 5th Edition, Routledge, 2019.

REFERENCE BOOKS:

1. Ben Wisner, J.C. Gaillard, and Ilan Kelman (Editors), Handbook of Hazards and Disaster Risk Reduction and Management, 2nd Edition, Routledge, 2012.
2. Damon P. Coppola, Introduction to International Disaster Management, 4th Edition, Butterworth-Heinemann, 2020.
3. Bimal Kanti Paul, Environmental Hazards and Disasters: Contexts, Perspectives and Management, 2nd Edition, Wiley-Blackwell, 2020.

Online Learning Resources:

<https://nptel.ac.in/courses/124107010>

https://onlinecourses.swayam2.ac.in/cec19_hs20/preview

III B.Tech– VI Semester

23OCE361B	SUSTAINABILITY IN ENGINEERING PRACTICES	L	T	P	C
	(OE – II)	3	0	0	3

Course Objectives:

The objectives of this course are to make the student :

1. To understand the fundamentals of sustainability, the carbon cycle, and the environmental impact of construction materials.
2. To analyze sustainable construction materials, their durability, and life cycle assessment.
3. To apply energy calculations in construction materials and assess their embodied energy.
4. To evaluate green building standards, energy codes, and performance ratings.
5. To assess the environmental effects of energy use, climate change, and global warming.

Course Outcomes:

After successful completion of this course, students will be able to:

1. Understand the fundamentals of sustainability, the carbon cycle, and the environmental impact of construction materials.
2. Analyze sustainable construction materials, their durability, and life cycle assessment.
3. Apply energy calculations in construction materials and assess their embodied energy.
4. Evaluate green building standards, energy codes, and performance ratings.
5. Assess the environmental effects of energy use, climate change, and global warming.

CO–PO Articulation Matrix

Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	P O 10	P O 11	P O 12	PS O1	PS O2
CO-1	3	-	-	-	-	2	3	2	-	-	-	-	3	3
CO-2	-	3	-	-	2	-	3	-	-	-	-	2	3	3
CO-3	-	-	3	3	3	-	2	-	-	2	-	-	3	3
CO-4	-	-	3	3	3	-	3	2	-	-	-	-	3	3
CO-5	-	-	-	-	-	3	3	3	-	-	-	-	-	3

UNIT– I

INTRODUCTION

Introduction and Definition of Sustainability - Carbon Cycle - Role of Construction Material: Concrete and Steel, Etc. - CO2 Contribution From Cement and Other Construction Materials.

UNIT– II

MATERIALS USED IN SUSTAINABLE CONSTRUCTION

Construction Materials and Indoor Air Quality - No/Low Cement Concrete - Recycled and Manufactured Aggregate - Role of QC and Durability - Life Cycle and Sustainability.

UNIT– III

ENERGY CALCULATIONS

Components of Embodied Energy - Calculation of Embodied Energy for Construction Materials - Energy Concept and Primary Energy - Embodied Energy Via-A-Vis Operational Energy in Conditioned Building - Life Cycle Energy Use

UNIT– IV

GREEN BUILDINGS

Control of Energy Use in Building - ECBC Code, Codes in Neighboring Tropical Countries - OTTV Concepts and Calculations – Features of LEED and TERI – GRIHA Ratings - Role of Insulation and Thermal Properties of Construction Materials - Influence of Moisture Content and Modeling - Performance Ratings of Green Buildings - Zero Energy Building

UNIT– V

ENVIRONMENTALEFFECTS

Non-Renewable Sources of Energy and Environmental Impact– Energy Norm, Coal, Oil, Natural Gas - Nuclear Energy - Global Temperature, Green House Effects, Global Warming - Acid Rain: Causes, Effects and Control Methods - Regional Impacts of Temperature Change.

TEXT BOOKS:

1. Charles J Kibert, Sustainable Construction: Green Building Design & Delivery, 4th Edition, Wiley Publishers 2016.
2. Steve Goodhew, Sustainable Construction Process, Wiley Blackwell, UK, 2016.

REFERENCEBOOKS:

1. Craig A. Langston & Grace K.C. Ding, Sustainable Practices in the Built Environment, Butterworth Heinemann Publishers, 2011.
2. William P Spence, Construction Materials, Methods & Techniques (3e), Yesdee Publication Pvt. Ltd, 2012.

Online Learning Resources:

<https://archive.nptel.ac.in/courses/105/105/105105157/>

**SREENIVASAINSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)**

230EE361A	RENEWABLE ENERGY SOURCES	L	T	P	C
		3	0	0	3

PRE-REQUISITES: NIL

COURSE EDUCATIONAL OBJECTIVES:

1. To introduce the fundamentals of solar radiation, solar geometry, and solar energy collection and storage systems.
2. To provide an understanding of photovoltaic (PV) effect, PV technologies, module characteristics, and PV system configurations.
3. To explain the principles, components, design considerations, and performance estimation of wind energy conversion systems.
4. To familiarize students with geothermal energy resources, technologies, applications, and their prospects in India.
5. To expose students to emerging and miscellaneous renewable energy technologies such as ocean energy, biomass energy, and fuel cells along with their advantages, limitations, and applications.

UNIT -1: Solar Energy: (9)

Solar radiation - beam and diffuse radiation, solar constant, Sun at Zenith, attenuation and measurement of solar radiation, local solar time, derived solar angles, sunrise, sunset and day length. flat plate collectors, concentrating collectors, storage of solar energy-thermal storage.

UNIT -2: PV Energy Systems: (9)

Introduction, The PV effect in crystalline silicon basic principles, the film PV, Other PV technologies, Solar PV modules from solar cells, mismatch in series and parallel connections design and structure of PV modules, Electrical characteristics of silicon PV cells and modules, Stand-alone PV system configuration, Grid connected PV systems.

UNIT -3: Wind Energy: (9)

Principle of wind energy conversion; Basic components of wind energy conversion systems; windmill components, various types and their constructional features; design considerations of horizontal and vertical axis wind machines: analysis of aerodynamic forces acting on wind mill blades; wind data and energy estimation and site selection considerations

UNIT -4: Geothermal Energy: (9)

Estimation and nature of geothermal energy, geothermal sources and resources like hydrothermal, geopressured hot dry rock, magma. Advantages, disadvantages and application of geothermal energy, prospects of geothermal energy in India.

UNIT -5: Miscellaneous Energy Technologies: (9)

Ocean Energy: Tidal Energy-Principle of working, Operation methods, advantages and limitations.

Wave Energy-Principle of working, energy and power from waves, wave energy conversion devices, advantages and limitations.

Bio mass Energy: Biomass conversion technologies, Biogas generation plants, Classification, advantages and disadvantages, constructional details, site selection, digester design consideration

Fuel cell: Principle of working of various types of fuel cells and their working, performance and limitations.

Total Hours: 45



III B.Tech. - VI Semester

23OECE361A

DIGITAL ELECTRONICS

L T P C
3 0 0 3

PRE-REQUISITES: Basic Mathematics

COURSE EDUCATIONAL OBJECTIVES:

1. To Learn Boolean algebra, logic simplification techniques, and combinational circuit design.
2. To analyze combinational circuits like adders, subtractors, and code converters.
3. To explore combinational logic circuits and their applications in digital design.
4. To understand sequential logic circuits, including latches, flip-flops, counters, and shift registers.
5. To gain knowledge about programmable logic devices and digital IC's.

UNIT -1 INTRODUCTION

(9)

Logic Simplification and Combinational Logic Design: Review of Boolean Algebra and De Morgan's Theorem, SOP & POS forms, Canonical forms, Introduction to Logic Gates, Ex-OR, Ex-NOR operations, Minimization of Switching Functions: Karnaugh map method, Logic function realization: AND-OR, OR-AND and NAND/NOR realizations.

UNIT-II INTRODUCTION TO COMBINATIONAL DESIGN 1

(9)

Introduction to Combinational Design 1: Binary Adders, Subtractors and BCD adder, Code converters - Binary to Gray, Gray to Binary, BCD to excess3, BCD to Seven Segment display.

UNIT-III COMBINATIONAL LOGIC DESIGN 2

(9)

Combinational Logic Design 2: Decoders, Encoders, Priority Encoder, Multiplexers, Demultiplexers, Comparators, Implementations of Logic Functions using Decoders and Multiplexers.

UNIT-IV SEQUENTIAL LOGIC DESIGN

(9)

Sequential Logic Design: Latches, Flip-flops, S-R, D, T, JK and Master-Slave JK FF, Edge triggered FF, set up and hold times, Ripple counters, Shift registers.

UNIT-V PROGRAMMABLE LOGIC DEVICES AND DIGITAL ICs

(9)

Programmable Logic Devices: ROM, Programmable Logic Devices (PLA and PAL).

Digital IC's: Decoder (74x138), Priority Encoder (74x148), multiplexer (74x151) and demultiplexer (74x155), comparator (74x85).

Total Hours: 45

**SREENIVASAINSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)**

DEPARTMENT OF MECHANICAL ENGINEERING

III B.Tech. - VI Semester

23OME361A

**PRINCIPLES OF AUTOMATION AND ROBOTICS
(Mechanical Branch)**

**L T P C
3 0 0 3**

PRE-REQUISITES: The objectives of the course are to

COURSE EDUCATIONAL OBJECTIVES:

1. Fundamentals of industrial automation, production types, automation strategies, and hardware elements used in modern manufacturing processes.
2. Understanding of automated manufacturing systems, and strategies for improving productivity and flexibility in industrial automation.
3. Knowledge of industrial automation and robotics, sensors, and end-effector design for modern manufacturing environments.
4. Explain industrial automation and robotics, and trajectory planning for intelligent and efficient manufacturing applications.
5. Familiarity of industrial automation and robotics, and practical applications in manufacturing processes.

UNIT -1: INTRODUCTION TO AUTOMATION: (9)

Introduction to Automation, Need, Types, Basic elements of an automated system, Manufacturing Industries, Types of production, Functions in manufacturing, Organization and information processing in manufacturing, Automation strategies and levels of automation, Hardware components for automation and process control, mechanical feeders, hoppers, orienters, high speed automatic insertion devices.

UNIT -2: AUTOMATED FLOW LINES: (9)

Automated flow lines, Part transfer methods and mechanisms, types of Flow lines, flow line with/without buffer storage, Quantitative analysis of flow lines. Assembly line balancing: Assembly process and systems assembly line, line balancing methods, ways of improving line balance, flexible assembly lines.

UNIT -3: INTRODUCTION TO INDUSTRIAL ROBOTICS: (9)

Introduction to Industrial Robotics, Classification of Robot Configurations, functional line diagram, degrees of freedom. Components common types of arms, joints grippers, factors to be considered in the design of grippers. Robot actuators and Feedback components: Actuators, Pneumatic, Hydraulic actuators, Electric & Stepper motors, comparison. Position sensors - potentiometers, resolvers, encoders - velocity sensors, Tactile sensors, Proximity sensors.

UNIT -4: MANIPULATOR KINEMATICS: (9)

Manipulator Kinematics: Manipulator Kinematics, Homogenous transformations as applicable to rotation and translation - D-H notation, Forward inverse kinematics. Manipulator Dynamics: Differential transformations, Jacobians, Lagrange - Euler and Newton - Euler formations. Trajectory Planning: Trajectory Planning and avoidance of obstacles path planning, skew motion, joint integrated motion - straight line motion.

UNIT -5: ROBOT PROGRAMMING AND APPLICATIONS: (9)

Robot Programming: Lead through programming - Robot language structure - Motion commands of move, speed control, workplace, path, frames, end effector operation, sensor operation and react statement - Program sequence and subroutine - Teach pendant programming - VAL II programming. Robot Applications: Material transfer and machine loading / unloading - Processing applications in spray coating, spot and arc welding - Assembly and inspection automation - Selection of robots in industry applications

Total Hours: 45

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES::CHITTOOR

**Department of Science & Humanities
III B Tech- VI Semester**

230SH361A	OPTIMIZATION TECHNIQUES FOR ENGINEERS	L	T	P	C
	OPEN ELECTIVE-II(COMMON TO ALL)	3	-	-	3

COURSE EDUCATIONAL OBJECTIVES:

1. Impart knowledge on theory of optimization and conditions for optimality for unconstrained and constraint optimization problems
2. Inculcate modeling skills necessary to describe and formulate optimization problems in design and manufacturing
3. Familiarize with the working principle of optimization algorithms used to solve linear and non-linear problems
4. Train the students to solve optimization problems using software tools

UNIT-I:Linear programming I

(09)

Introduction, Applications of Linear Programming, Standard form of a Linear Programming Problem, Geometry of Linear Programming Problems, Basic Definitions in Linear Programming. Simplex Method, Simplex Algorithm and Two phase Simplex Method, Big-M method.

UNIT-II: Linear programming II: Duality in Linear Programming

(09)

Symmetric Primal-Dual Relations, General Primal-Dual Relations, Duality Theorem, Dual Simplex Method, Transportation Problem and assignment problem, Complementary slackness Theorem

UNIT-III: Non - linearprogramming: Unconstrained optimization techniques (09)

Introduction:Classification of Unconstrained minimization methods,

Direct Search Methods: Random Search Methods: Descent Method and Fletcher Powell Method, Grid Search Method

UNIT-IV:Non-linear programming: Constrained optimization techniques (09)

Introduction, Characteristics of a constrained problem, Random Search Methods, complex method, Sequential linear programming, Basic approach in methods of Feasible directions, Zoutendijk's method of feasible directions: direction finding problem, determination of step length, Termination criteria.

UNIT-V: Geometric Programming

(09)

Unconstrained Minimization Problems: solution of unconstrained geometric programming using differential calculus and arithmetic-geometric inequality.

Constrained minimization Problems: Solution of a constrained geometric programming problem, primal-dual programming in case of less-than inequalities, geometric programming with mixed inequality constraints.

Total Hours: 45

COURSE OUTCOMES:

	On successful completion of the course, students will be able to	POs
CO1	Understand the meaning, purpose, tools of Operations Research and linear programming in Solving practical problems in industry.	PO1,PO2,PO3,PO4,PO5,PO12
CO2	Interpret the transportation models' solutions and infer solutions to the real-world problems.	PO1,PO2,PO3,PO4,PO5,PO12
CO3	Develop mathematical skills to analyze and solve non linear programming models arising from a wide range of applications.	PO1,PO2,PO3,PO4,PO5,PO12

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES::CHITTOOR

CO4	Apply the concept to non-linear programming for solving the problems involving non-linear constraints and objectives	PO1,PO2,PO3,PO4,PO5,PO12
CO5	Apply the concept of unconstrained geometric programming for solving the problems involving non-linear constraints and objectives.	PO1,PO2,PO3,PO4,PO5,PO12

TEXTBOOKS:

1. SingiresuSRao.,EngineeringOptimization:TheoryandPractices,NewAgeInt.(P)Ltd. Publishers, New Delhi.
2. J.C.Panth,IntroductiontoOptimizationTechniques,(7-e)JainBrothers,NewDelhi.

REFERENCE BOOKS:

1. HarveyM.Wagner,PrinciplesofOperationResearch,Printice-HallofIndiaPvt.Ltd.New Delhi.
2. Peressimi A.L., Sullivan F.E., Vhl, J. J. Mathematics of Non-linear Programming, Springer -Verlag.

REFERENCE WEBSITE:

- https://onlinecourses.nptel.ac.in/noc24_ee122/preview
- <https://archive.nptel.ac.in/courses/111/105/111105039/>
- https://onlinecourses.nptel.ac.in/noc21_ce60/preview

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

1-Slightly, 2-Moderately,3-Substantially.

Science and Humanities
III B.Tech. - VI Semester

230SH361C	PHYSICS OF ELECTRONIC MATERIALS AND DEVICES (Open Elective-II)	L	T	P	C
	(Common to all branches)	3	0	0	3

PRE-REQUISITES: Nil

COURSE EDUCATIONAL OBJECTIVES:

1. To **facilitate** a deeper understanding of **crystal growth, defects in crystals, and thin-films.**
2. To examine and understand the **properties, characteristics, and applications of various semiconducting materials**, and their role in advancing technology.
3. To establish a solid foundation in the principles and practices of semiconductor physics and devices engineering.
4. To examine the fundamental principles governing excitonic and luminescent processes in **solid-state materials, and their significance in optoelectronic applications.**
5. To gain insight into the principles, innovations, and applications of **modern display systems.**

UNIT-I Fundamentals of Materials Science (9)

Introduction, Phase rule, Phase Diagram, Elementary idea of Nucleation and Growth, Methods of crystal growth. The basic idea of point, line, and planar defects. Concept of thin films, preparation of thin films, Deposition of thin film using sputtering methods (RF and glow discharge).

UNIT II Semiconductors (9)

Introduction, charge carriers in semiconductors, effective mass, Diffusion and drift, Diffusion and recombination, Diffusion length. The Fermi level & Fermi-Dirac distribution, Electron and Hole in quantum-well, Change of electron-hole concentration- Qualitative analysis, Temperature dependency of carrier concentration, Conductivity and mobility, Effects of temperature and doping on mobility, High field effects.

UNIT III Physics of Semiconductor Devices: (9)

Introduction, Band structure, PN junctions and their typical characteristics under equilibrium and under bias, Hetero junctions, Transistors, MOSFETs.

UNIT IV Excitons and Luminescence: (9)

Luminescence: Different types of luminescence, basic definitions, Light emission in solids, Inter-band luminescence, Direct and indirect gap materials. Photoluminescence: General Principles of photoluminescence, Excitation and relaxation, OLED, Quantum-dot. Electro-luminescence: General Principles of electroluminescence, light emitting diode, diode laser.

UNIT V Display devices: (9)

LCD, three-dimensional display: Holographic display, light-field displays: Head-mounted display, MOEMS (Micro-Opto-Electro-Mechanical Systems) and MEMS displays.

**SREENIVASAINSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)**

	Course Outcomes On successful completion of the course, students will be able to	Pos
CO1	Understand the principles of crystal growth and techniques for thin film fabrication	PO1, PO2,PO3,PO4,PO5
CO2	Summarize fundamental concepts of semiconductors and their classification	PO1, PO2,PO3,PO4,PO5
CO3	Illustrate the operating principles of various semiconductor devices	PO1, PO2,PO3,PO4,PO5
CO4	Analyze different luminescent phenomena and the functioning of devices based on these mechanisms	PO1, PO2,PO3,PO4
CO5	Explain the construction and working principles of various types of display devices	PO1, PO2,PO3,PO4

Course Articulation Matrix:

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

Text books:

1. Principles of Electronic Materials and Devices-S.O. Kasap, McGraw-Hill Education (India) Pvt. Ltd., 4th edition, 2021.
2. Semiconductor physics & devices: basic principles, 4th Edition, McGraw-Hill, 2012.

Reference Books:

3. Solid State Electronic Devices-B.G.Streetman and S.Banerjee, PHI Learning, 6th edition.
4. An Introduction to Electronic Materials for Engineers-Wei Gao, Zhengwei Li, Nigel Sammes, World Scientific Publishing Co. Pvt. Ltd. 2nd Edition, 2011.

NPTEL course links:

1. <https://nptel.ac.in/courses/113/106/113106062/>
https://onlinecourses.nptel.ac.in/noc20_ph24/preview

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT

STUDIES: CHITTOOR

Department of Science & Humanities

III B Tech- II Semester

23OSH361D	Chemistry of Polymers and Applications	L	T	P	C
	OPEN ELECTIVE-II(COMMON TO ALL)	3	-	-	3

COURSE EDUCATIONAL OBJECTIVES:

1. To understand the basic principles of polymers
2. To understand natural polymers and their applications.
3. To impart knowledge to the students about synthetic polymers, their preparation and importance.
4. To enumerate the applications of hydrogel polymers
5. To enumerate applications of conducting and degradable polymers in engineering

Unit – I: Polymers-Basics and Characterization: -

(09)

Basic concepts: monomers, repeating units, degree of polymerization, linear, branched and network polymers, classification of polymers, Polymerization: addition, condensation, copolymerization and coordination polymerization. Average molecular weight concepts: number, weight and viscosity average molecular weights, polydispersity and molecular weight distribution. Measurement of molecular weight: End group, viscosity, light scattering, osmotic and ultracentrifugation methods, analysis and testing of polymers.

Unit – II: Natural Polymers & Modified cellulosic

(09)

Natural Polymers: Chemical & Physical structure, properties, source, important chemical modifications, applications of polymers such as cellulose, lignin, starch, rosin, shellac, latexes, vegetable oils and gums, proteins.

Modified cellulosic: Cellulose esters and ethers such as Ethyl cellulose, CMC, HPMC, cellulose acetals, Liquid crystalline polymers; speciality plastics- PES, PAES, PEEK, PEA.

Unit – III: Synthetic Polymers

(09)

Addition and condensation polymerization processes– Bulk, Solution, Suspension and Emulsion polymerization. Preparation and significance, classification of polymers based on physical properties. Thermoplastics, Thermosetting plastics, Fibers and elastomers, General Applications. Preparation of Polymers based on different types of monomers, Olefin polymers (PE, PVC), Butadiene polymers (BUNA-S, BUNA-N), nylons, Urea-formaldehyde, phenol – formaldehyde, Melamine Epoxy and Ion exchange resins.

Unit-IV: Hydrogels of Polymer networks

(09)

Definitions of Hydrogel, polymer networks, Types of polymer networks, Methods involved in hydrogel preparation, Classification, Properties of hydrogels, Applications of hydrogels in drug delivery.

Unit – V: Conducting and Degradable Polymers:

(09)

Conducting polymers: Introduction, Classification, Mechanism of conduction in Poly Acetylene, Poly Aniline, Poly Thiophene, Doping, Applications.

Degradable polymers: Introduction, Classifications, Examples, Mechanism of degradation, poly lactic acid, Nylon-6, Polyesters, applications.

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES: CHITTOOR

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		POs
CO1	Classify the polymers, explain polymerization mechanism, differentiate addition, condensation polymerizations, Describe measurement of molecular weight of polymer	PO1, PO2, PO2, PO4, PO5
CO2	Describe the physical and chemical properties of natural polymers and modified cellulosic.	PO1, PO2, PO2, PO4, PO6
CO3	Differentiate Bulk, solution, Suspension and emulsion polymerization, describe fibers and elastomers, Identify the thermosetting and thermos polymers.	PO1, PO2, PO2, PO4, PO5,PO12
CO4	Identify types of polymer networks, describe methods involve in hydrogel preparation, Explain applications of hydrogels in drug delivery.	PO1, PO2, PO2, PO4, PO5
CO5	Explain classification and mechanism of conducting and degradable polymers.	PO1, PO2, PO2, PO4, PO5

TEXT BOOKS:

1. A Text book of Polymer science, Billmayer
2. Polymer Chemistry – G.S. Mishra
3. Polymer Chemistry – Gowarikar

REFERENCE BOOKS:

1. Organic polymer Chemistry, K.J. Saunders, Chapman and Hall
2. Advanced Organic Chemistry, B. Miller, Prentice Hall
3. Polymer Science and Technology by Premamoy Ghosh, 3rd edition, McGraw-Hill, 2010.

Mapping between Course Outcomes and Programme Outcomes

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

3=StrongMapping, **2**=ModerateMapping, **1**=Slight Mapping, **-**=No Mapping

**SREENIVASAINSTITUTE OF TECHNOLOGY AND
MANAGEMENT STUDIES: CHITTOOR
(AUTONOMOUS)**

**Department of Science & Humanities
III B Tech- VI Semester**

23OSH361E	ACADEMIC WRITING AND PUBLIC SPEAKING	L	T	P	C
	(Open Elective-II) (Common to All Branches of Engineering)	3	0	0	3

Course Objectives:

1. To encourage all round development of the students by focusing on writing skills
2. To make the students aware of non-verbal skills
3. To develop analytical skills
4. To deliver effective public speeches

UNIT-I Introduction to Academic Writing Lecture Hrs-9

Introduction to Academic Writing – Essential Features of Academic Writing – Courtesy– Clarity– Conciseness–Correctness–Coherence–Completeness–Types–Descriptive, Analytical, Persuasive, Critical writing

UNIT-II Academic Journal Article Lecture Hrs-9

Art of condensation-summarizing and paraphrasing-Abstract Writing, writing Project Proposal, writing application for internship, Technical/Research/Journal Paper Writing – Conference Paper writing - Editing, Proof Reading - Plagiarism

UNIT-III Essay & Writing Reviews Lecture Hrs-9

Compare and Contrast – Argumentative Essay– Exploratory Essay–Features and Analysis of Sample Essays – Writing Book Report, Summarizing, Book/film Review- So P.

UNIT-IV Public Speaking Lecture Hrs-9

Introduction, Nature, characteristics, significance of Public Speaking – Presentation – 4Ps of Presentation–Stage Dynamics–Answering Strategies–Analysis of Impactful Speeches-Speeches for Academic events

UNIT-V Public Speaking and Non-Verbal Delivery Lecture Hrs-9

Body Language–Facial Expressions–Kinesics–Oculesics–Proxemics–Haptics–Chronemics-Paralanguage-Signs

**SREENIVASAINSTITUTE OF TECHNOLOGY AND
MANAGEMENT STUDIES: CHITTOOR
(AUTONOMOUS)**

	Course Outcomes(CO):	Blooms Level
	By the end of the program students will be able to	
1	Understand various elements of Academic Writing	L1,L2
2	Identify sources and avoid plagiarism	L1,L2
3	Demonstrate the knowledge in writing a Research chapter	L3
4	Analyse different types of essays	L4
5	Assess the speeches of other and know the positive strengths of speakers	L5
6	Build confidence in giving an impactful presentation to the audience	L3

TextBooks:

1. Critical Thinking ,Academic Writing and Presentation Skills :MG University Edition Paperback– 1 January 2010 Pearson Education; First edition (1 January 2010)
2. Pease,Allan&Barbara.TheDefinitiveBookofBodyLanguageRHUSPublishers,2016

ReferenceBooks:

1. AliceSavage,MasoudShafieiEffectiveAcademicWriting,2Ed.,2014.
2. ShaliniVerma,BodyLanguage,SCchandPublications 2011.
3. SanjayKumarandPushpalata, CommunicationSkills2E 2015, Oxford.
4. SharonGerson,StevenGerson, TechnicalCommunicationProcessandProduct,Pearson,New Delhi, 2014
5. Elbow,Peter.WritingwithPower.OUPUSA,1998

Online Services:

1. <https://youtu.be/NNhTIT81nH8>
2. <https://www.youtube.com/watch?v=478ccrWKY-A>
3. <https://www.youtube.com/watch?v=nzGo5ZC1gMw>
4. <https://www.youtube.com/watch?v=Qve0ZBmJMh4>
5. <https://courses.lumenlearning.com/publicspeakingprinciples/chapter/chapter-12-nonverbal-aspects-of-delivery/>
6. https://onlinecourses.nptel.ac.in/noc21_hs76/preview
7. <https://archive.nptel.ac.in/courses/109/107/109107172/#>
8. <https://archive.nptel.ac.in/courses/109/104/109104107/>

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



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
(ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

II B.Tech. - IV Semester

23CSM243L

MACHINE LEARNING LAB

L T P C
0 0 3 1.5

PRE-REQUISITES: A course on Python Programming

COURSE EDUCATIONAL OBJECTIVES:

1. To learn about computing central tendency measures and Data preprocessing techniques
2. To learn about classification and regression algorithms
3. To apply different clustering algorithms for a problem.

Software Required for ML: Python/R/Weka

List of Experiments

Lab should cover the concepts studied in the course work, sample list of Experiments:

1. Compute Central Tendency Measures: Mean, Median, Mode Measure of Dispersion: Variance, Standard Deviation.
2. Apply the following Pre-processing techniques for a given dataset.
 - a. Attribute selection
 - b. Handling Missing Values
 - c. Discretization
 - d. Elimination of Outliers
3. Apply KNN algorithm for classification and regression
4. Demonstrate decision tree algorithm for a classification problem and perform parameter tuning for better results
5. Demonstrate decision tree algorithm for a regression problem
6. Apply Random Forest algorithm for classification and regression
7. Demonstrate Naïve Bayes Classification algorithm.
8. Apply Support Vector algorithm for classification
9. Demonstrate simple linear regression algorithm for a regression problem
10. Apply Logistic regression algorithm for a classification problem
11. Demonstrate Multi-layer Perceptron algorithm for a classification problem
12. Implement the K-means algorithm and apply it to the data you selected. Evaluate performance by measuring the sum of the Euclidean distance of each example from its class center. Test the performance of the algorithm as a function of the parameters K
13. Demonstrate the use of Fuzzy C-Means Clustering
14. Demonstrate the use of Expectation Maximization based clustering algorithm.
15. Real-time case studies / Micro projects.



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REFERENCE BOOKS:

1. Python Machine Learning Work book for beginners, AI Publishing, 2020.
2. Anuradha Srinivasaraghavan and Vincy Joseph, "Machine Learning", Wiley Publisher, 2019.
3. SaikatDutt, Subramanian Chandramouli and Amit Kumar Das, "Machine Learning", Pearson, 2019.
4. Alpaydin Ethem, "Introduction to Machine Learning", 3rd Edition, PHI learning private limited, 2019.

REFERENCE WEBSITE:

1. Machine Learning A-Z (Python & R in Data Science Course) | Udemy
2. Machine Learning | Coursera

COURSE OUTCOMES:

On successful completion of the course, students will be able to		POs
CO1	Understand the python libraries.	PO1
CO2	Analyze the use of data sets in implementing ML algorithms	PO2
CO3	Understand the different searching algorithms for solving problems, Analyze and identify the problem solving techniques.	PO3
CO4	Identify and implement appropriate unsupervised learning algorithm for solving complex problems.	PO4
CO5	Identify the appropriate tools and data sets for real-time implementation.	PO5
CO6	Follow the ethical principles in implementing the programs	PO8
CO7	Do experiments effectively as an individual and as a team member in a group	PO9
CO8	Communicate verbally and in written form, the understanding about the experiments	PO10
CO9	Continue update skill related to Python and Weka Tool and implementing programs in future	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
CO*	3	3	3	3	3	-	-	3	3	3	-	3



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
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**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT
STUDIES**

(Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

III B.Tech. - II Semester

23CSE363L	CRYPTOGRAPHY AND NETWORK SECURITY LAB	L	T	P	C
	Common to CSE,CSE(AI),CSE(AI&ML) & CSE(DS)	-	-	3	1.5

PRE-REQUISITES: Nil.

Course Objectives:

- Make use of Data sets in implementing the machine learning algorithms
- Implement the machine learning concepts and algorithms in any suitable language of choice.

Course Outcomes (CO):

After completion of the course, students will be able to

- Understand the Mathematical and statistical prospective of machine learning algorithms Through python programming
- Appreciate the importance of visualization in the data analytics solution.
- Derive insights using Machine learning algorithms.

List for Exercises:

1. Write a C program that contains a string (char pointer) with a value `_Hello world'`. The program should XOR each character in this string with 0 and displays the result.
2. Write a C program that contains a string (char pointer) with a value `_Hello world'`. The program should AND or and XOR each character in this string with 127 and display the result.
3. Write a Java program to perform encryption and decryption using the following algorithms
a. Ceaser cipher b. Substitution cipher c. Hill Cipher
4. Write a C/JAVA program to implement the DES algorithm logic.
5. Write a C/JAVA program to implement the Blowfish algorithm logic.
6. Write a C/JAVA program to implement the Rijndael algorithm logic.
7. Write the RC4 logic in Java Using Java cryptography; encrypt the text `—Hello world||` using Blowfish. Create your own key using Java key tool.
8. Write a Java program to implement RSA algorithm.
9. Implement the Diffie-Hellman Key Exchange mechanism using HTML and JavaScript.
10. Calculate the message digest of a text using the SHA-1 algorithm in JAVA.
11. Calculate the message digest of a text using the MD5 algorithm in JAVA.

References:

- Cryptography and Network Security-BehrouzA Forouzan, Debdeep Mukhopadhyaya, Mc- Graw Hill, 3rd Edition, 2015.
Network Security Illustrated, Jason Albanese and Wes Sonnenreich, MGH Publishers,2003.

III B.Tech II Semester

23HSM241L	SOFTSKILLS	L	T	P	C
		1	0	2	2

Course Objectives:		
<ul style="list-style-type: none"> To encourage all round development of the students by focusing on soft skills To make the students aware of critical thinking and problem-solving skills To enhance healthy relationship and understanding within and outside an organization To function effectively with heterogeneous teams 		
Course Outcomes (CO):		
COs	Statements	Blooms level
CO1	List out various elements of soft skills	L1, L2,
CO2	Describe methods for building professional image	L1, L2
CO3	Apply critical thinking skills in problem solving	L3
CO4	Analyse the needs of an individual and team for well-being	L4
CO5	Assess the situation and take necessary decisions	L5
CO6	Create a productive work place atmosphere using social and work-life skills ensuring personal and emotional well-being	L6
SYLLABUS		
UNIT – I	Soft Skills & Communication Skills	Lecture Hrs
Soft Skills - Introduction, Need - Mastering Techniques of Soft Skills – Communication Skills - Significance, process, types - Barriers of communication - Improving techniques		
Activities:		
Intrapersonal Skills- Narration about self- strengths and weaknesses- clarity of thought – self-expression – articulating with felicity (The facilitator can guide the participants before the activity citing examples from the lives of the great, anecdotes and literary sources)		
Interpersonal Skills- Group Discussion – Debate – Team Tasks - Book and film Reviews by groups - Group leader presenting views (non- controversial and secular) on contemporary issues or on a given topic.		
Verbal Communication- Oral Presentations- Extempore- brief addresses and speeches- convincing- negotiating- agreeing and disagreeing with professional grace.		
Non-verbal communication – Public speaking – Mock interviews – presentations with an objective to identify non- verbal clues and remedy the lapses on observation		
UNIT – II	Critical Thinking	Lecture Hrs
Active Listening – Observation – Curiosity – Introspection – Analytical Thinking – Open-mindedness – Creative Thinking - Positive thinking - Reflection		
Activities:		
Gathering information and statistics on a topic - sequencing – assorting – reasoning – critiquing issues – placing the problem – finding the root cause - seeking viable solution – judging with rationale – evaluating the views of others - Case Study, Story Analysis		
UNIT – III	Problem Solving & Decision Making	Lecture Hrs
Meaning & features of Problem Solving – Managing Conflict – Conflict resolution – Team building - Effective decision making in teams – Methods & Styles		
Activities:		

Placing a problem which involves conflict of interests, choice and views – formulating the problem – exploring solutions by proper reasoning – Discussion on important professional, career and organizational decisions and initiate debate on the appropriateness of the decision. Case Study & Group Discussion		
UNIT – IV	Emotional Intelligence & Stress Management	Lecture Hrs
Managing Emotions – Thinking before Reacting – Empathy for Others – Self-awareness – Self-Regulation – Stress factors – Controlling Stress – Tips Activities: Providing situations for the participants to express emotions such as happiness, enthusiasm, gratitude, sympathy, and confidence, compassion in the form of written or oral presentations. Providing opportunities for the participants to narrate certain crisis and stress –ridden situations caused by failure, anger, jealousy, resentment and frustration in the form of written and oral presentation, Organizing Debates		
UNIT – V	Corporate Etiquette	Lecture Hrs
Etiquette- Introduction, concept, significance - Corporate etiquette - meaning, modern etiquette, benefits - Global and local culture sensitivity - Gender Sensitivity - Etiquette in interaction- Cell phone etiquette - Dining etiquette - Netiquette - Job interview etiquette -Corporate grooming tips - Overcoming challenges Activities Providing situations to take part in the Role Plays where the students will learn about bad and good manners and etiquette - Group Activities to showcase gender sensitivity, dining etiquette etc. - Conducting mock job interviews - Case Study - Business Etiquette Games NOTE:- 1. The facilitator can guide the participants before the activity citing examples from the lives of the great, anecdotes, epics, scriptures, autobiographies and literary sources which bear true relevance to the prescribed skill. 2. Case studies may be given wherever feasible for example for Decision Making- The decision of King Lear.		
Prescribed Books:		
<ol style="list-style-type: none"> 1. Mitra Barun K, <i>Personality Development and Soft Skills</i>, Oxford University Press, Pap/Cdr edition 2012 2. Dr Shikha Kapoor, <i>Personality Development and Soft Skills: Preparing for Tomorrow</i>, K I 2018 ,esuoH gnihsilbuP lanoitanretnI 		
Reference Books		
<ol style="list-style-type: none"> 1. Sharma, Prashant, <i>Soft Skills: Personality Development for Life Success</i>, BPB Publications 2018. 2. Alex K, <i>Soft Skills</i> S.Chand & Co, 2012 (Revised edition) 3. Gajendra Singh Chauhan & Sangeetha Sharma, <i>Soft Skills: An Integrated Approach to Maximise Personality</i> Published by Wiley, 2013 4. Pillai, Sabina & Fernandez Agna, <i>Soft Skills and Employability Skills</i>, Cambridge University Press, 2018 5. Dr. Rajiv Kumar Jain, Dr. Usha Jain, <i>Life Skills</i> (Paperback English) Publisher : Vayu Education of India, 2014 		

Online Learning Resources:

1. https://youtu.be/DUlsNJtg2L8?list=PLLy_2iUCG87CQhELCyvXh0E_y-bOO1_g
2. https://youtu.be/xBaLgJZ0t6A?list=PLzf4HHIsQFwJZel_j2PUy0pwjVUgj7KlJ
3. <https://youtu.be/-Y-R9hDI7IU>
4. <https://youtu.be/gkLsn4ddmTs>
5. <https://youtu.be/2bf9K2rRWwo>
6. <https://youtu.be/FchfE3c2jzc>
7. <https://www.businesstrainingworks.com/training-resource/five-free-business-etiquette-training-games/>
8. https://onlinecourses.nptel.ac.in/noc24_hs15/preview
9. https://onlinecourses.nptel.ac.in/noc21_hs76/preview

III B.Tech II Semester

23MAC351U	TECHNICAL REPORT WRITING & IPR	L	T	P	C
		2	0	0	0

Course Objectives:

1. To enable the students to practice the basic skills of research paper writing
2. To make the students understand the importance of IP and to educate them on the basic concepts of Intellectual Property Rights.
3. To practice the basic skills of performing quality literature review
4. To help them in knowing the significance of real life practice and procedure of Patents.
5. To enable them learn the procedure of obtaining Patents, Copyrights, & Trade Marks

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

COURSE OUTCOMES: At the end of the course, students will be able to		Blooms Level
CO1	Identify key secondary literature related to their proposed technical paper writing	L1, L2
CO2	Explain various principles and styles in technical writing	L1, L2
CO3	Use the acquired knowledge in writing a research/technical paper	L3
CO4	Analyse rights and responsibilities of holder of Patent, Copyright, Trademark, International Trademark etc.	L4
CO5	Evaluate different forms of IPR available at national & international level	L5
CO6	Develop skill of making search of various forms of IPR by using modern tools and techniques.	L3, L6

UNIT – I:

Principles of Technical Writing: styles in technical writing; clarity, precision, coherence and logical sequence in writing-avoiding ambiguity- repetition, and vague language -highlighting your findings- discussing your limitations -hedging and criticizing -plagiarism and paraphrasing .

UNIT – II:

Technical Research Paper Writing: Abstract- Objectives-Limitations-Review of Literature- Problems and Framing Research Questions- Synopsis

UNIT – III:

Process of research: publication mechanism: types of journals- indexing-seminars- conferences- proof reading – plagiarism style; seminar & conference paper writing; Methodology-discussion-results- citation rules

IT – IV:

Introduction to Intellectual property: Introduction, types of intellectual property, International organizations, agencies and ties, importance of intellectual property rights

Trade Marks: Purpose and function of trademarks, acquisition of trade mark rights, protectable matter, selecting and creating trade mark, trade mark registration processes.

UNIT – V:

Law of copy rights: Fundamentals of copy right law, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, copy right registration, notice of copy right, international copy right law

Law of patents: Foundation of patent law, patent searching process, ownership rights and transfer. Patent law, intellectual property audits.

Textbooks:

1. Deborah. E. Bouchoux, *Intellectual Property Rights*, Cengage Learning India, 2013
2. Meenakshi Raman, Sangeeta Sharma. *Technical Communication: Principles and practices*. Oxford.

Reference Books:

1. R.Myneni, *Law of Intellectual Property*, 9th Ed, Asia law House, 2019.
2. Prabuddha Ganguli, *Intellectual Property Rights* Tata Mcgraw Hill, 2001
3. P.Naryan, *Intellectual Property Law*, 3rd Ed ,Eastern Law House, 2007.
4. Adrian Wallwork. *English for Writing Research Papers* Second Edition. Springer Cham Heidelberg New York ,2016
5. Dan Jones, Sam Dragga, *Technical Writing Style*

Online Resources

1. <https://theconceptwriters.com.pk/principles-of-technical-writing/>
2. <https://www.ewh.ieee.org/soc/emcs/acstrial/newsletters/summer10/TechPaperWriting.html>
3. <https://www.ewh.ieee.org/soc/emcs/acstrial/newsletters/summer10/TechPaperWriting.html>
4. <https://www.manuscriptedit.com/scholar-hangout/process-publishing-research-paper-journal/>
5. <https://www.icsi.edu/media/website/IntellectualPropertyRightLaws&Practice.pdf>
6. <https://lawbhoomi.com/intellectual-property-rights-notes/>
7. <https://www.extension.purdue.edu/extmedia/ec/ec-723.pdf>



III B.Tech.- VI Semester

23CSM362T

DEEP LEARNING
(PROFESSIONAL CORE)

L T P C
3 - - 3

PRE-REQUISITES: Machine Learning basics

COURSE EDUCATIONAL OBJECTIVES:

1. Demonstrate the major technology trends driving Deep Learning
2. Build, train, and apply fully connected deep neural networks
3. Implement efficient (vectorized) neural networks
4. Analyse the key parameters and hyper parameters in a neural network's architecture
5. Demonstrate the sequence modeling and Networks of Deep Learning

UNIT-I: LINEAR ALGEBRA, PROBABILITY AND NUMERICAL COMPUTATION (9)

Linear Algebra: Scalars, Vectors, Matrices and Tensors, Matrix operations, types of matrices, Norms, Eigen decomposition, Singular Value Decomposition, Principal Components Analysis.

Probability and Information Theory: Random Variables, Probability Distributions, Marginal Probability, Conditional Probability, Expectation, Variance and Covariance, Bayes' Rule, Information Theory.

Numerical Computation: Overflow and Underflow, Gradient-Based Optimization, Constrained Optimization, Linear Least Squares.

UNIT-II: MACHINE LEARNING AND DEEP FEED FORWARD NETWORKS (9)

Machine Learning: Basics and Under fitting, Hyper parameters and Validation Sets, Estimators, Bias and Variance, Maximum Likelihood, Bayesian Statistics, Supervised and Unsupervised Learning, Stochastic Gradient Descent, Challenges Motivating Deep Learning.

Deep Feed forward Networks: Learning XOR, Gradient-Based Learning, Hidden Units, Architecture Design, Back-Propagation and other Differentiation Algorithms.

UNIT-III: REGULARIZATION AND OPTIMIZATION OF DL MODELS (9)

Regularization for Deep Learning: Parameter Norm Penalties, Norm Penalties as Constrained Optimization, Regularization and Under-Constrained Problems, Dataset Augmentation, Noise Robustness, Semi-Supervised Learning, Multi-Task Learning, Early Stopping, Parameter Tying and Parameter Sharing, Sparse Representations, Bagging and Other Ensemble Methods, Dropout, Adversarial Training, Tangent Distance, Tangent Prop and Manifold Tangent Classifier.

Optimization for Training Deep Models: Pure Optimization, Challenges in Neural Network Optimization, Basic Algorithms, Parameter Initialization Strategies, Algorithms with Adaptive Learning Rates, Approximate Second-Order Methods, Optimization Strategies and Meta-Algorithms.

UNIT-IV: CONVOLUTIONAL NETWORKS (9)

Convolutional Networks: The Convolution Operation, Pooling, Convolution, Basic Convolution Functions, Structured Outputs, Data Types, Efficient Convolution Algorithms, Random or Unsupervised Features, Basis for Convolutional Networks.

UNIT-V: SEQUENCE MODELING (9)

Sequence Modeling: Recurrent and Recursive Nets: Unfolding Computational Graphs, Recurrent Neural Networks, Bidirectional RNNs, Encoder-Decoder Sequence-to-Sequence Architectures, Deep Recurrent Networks, Recursive Neural Networks, Echo State Networks, LSTM, Gated RNNs, Optimization for Long-Term Dependencies, Auto encoders, Deep Generative Models.

Total Hours:45



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

DEPARTMENT OF MANAGEMENT STUDIES

IV B. Tech –VII semester

Course Code	E-Business	L	T	P	C
23HSM471B	(Common to All branches of Engineering)	4	-	-	3

PRE - REQUISITES: NIL

COURSE EDUCATIONAL OBJECTIVES:

1. To provide knowledge on emerging concept on E-Business related aspects
2. To understand various electronic markets & business models.
3. To impart the information about electronic payment systems & banking.
4. To create awareness on security risks and challenges in E-commerce.
5. To make the students aware on different e-marketing channels & strategies

UNIT – I: Electronic Business: (8)

Introduction – Nature, meaning, significance, functions and advantages - Definition of Electronic Business - Functions of **Electronic Commerce (EC)**-Advantages & Disadvantages of E-Commerce –E-Commerce and E-Business, Internet Services, Online Shopping- E-Commerce Opportunities for Industries.

UNIT – II: Electronic Markets and Business Models: (9)

Introduction –E-Shops-E-Malls E-Groceries - Portals - Vertical Portals-Horizontal Portals - Advantages of Portals -Business Models- **Business to Business (B2B)**-Business to Customers (B2C) - Business to Government(B2G)-Auctions-B2B Portals in India

UNIT – III: Electronic Payment Systems: (9)

Introduction to electronic payment systems (EPS) -Types of electronic payments - Credit/debit cards, e- wallets, UPI, and crypto currencies -Smart cards and digital wallets: Features and usage -**Electronic Fund Transfer (EFT)**: Role in business transactions - Infrastructure requirements and regulatory aspects of e-payments

UNIT – IV: E-Security: (10)

Security risks and challenges in electronic commerce - Cyber threats - Phishing, hacking, identity theft, and malware - Digital Signatures & Certificates - Security protocols over public networks (HTTP, SSL, TLS) - Firewalls in securing e-business platforms.

UNIT – V: E-Marketing: (9)

Introduction – Online Marketing – Advantages of Online Marketing – Internet Advertisement – Advertisement Methods – Conducting Online Market Research– – E-marketing planning: Online branding, social media marketing, and email marketing - E-business strategies: Digital advertising, content marketing, and analytics
E-Customer Relationship Management (e CRM) E-supply chain management (e-SCM)

Total Hours: 45



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

COURSE OUTCOMES:

On successful completion of the course, student will be able to		POs
CO1	Outline the concept of E-Business & its scope and functions.	PO9,PO11,PO12
CO2	Apply the E-market-Models in various business situations and organizations	PO9,PO11,PO12
CO3	Analyze the various E-payment systems & importance of net banking	PO8,PO9, PO11,PO12
CO4	Demonstrate the knowledge gained in E -security and its challenges	PO1,PO6,PO8, PO9, PO11,PO12
CO5	Evaluate market research strategies& E-advertisements.	PO8,PO9,PO10, PO11,PO12

Text Books:

1. Arati Oturkar & Sunil Khilari. E-Business. Everest Publishing House, 2022
2. P.T.S Joseph. E-Commerce, Fourth Edition, Prentice Hall of India, 2011

Reference Books:

1. Debjani, Kamalesh K Bajaj. E-Commerce, Second Edition Tata McGraw-Hill's, 2005
2. Dave Chaffey.E-Commerce E-Management, Second Edition, Pearson, 2012.
3. Henry Chan. E-Commerce Fundamentals and Application, Raymond Leatham Wiley India 2007
4. S. Jaiswal. E-Commerce Galgotia Publication Pvt Ltd., 2003.

Reference website:

1. <https://www.slideshare.net/fatimahAlkreem/e-businessppt-67935771>
2. <https://www.slideshare.net/VikramNani/e-commerce-business-models>
3. <https://www.slideshare.net/RiteshGoyal/electronic-payment-system>
4. <https://www.slideshare.net/WelingkarDLP/electronic-security>



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.

(AUTONOMOUS)

DEPARTMENT OF MANAGEMENT STUDIES

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	-	-	-	-	-	-	-	-	2	-	3	3
CO.2	-	-	-	-	-	-	-	-	2	-	3	3
CO.3	-	-	-	-	-	-	-	2	3	-	3	3
CO.4	2	-	-	-	-	2	-	2	3	-	3	3
CO.5	-	-	-	-	-	-	-	2	2	3	3	3
CO*	2	-	-	-	-	2	-	2	2.6	3	3	3



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

IV B.Tech – VII Semester

Subject Code	Management Science	L	T	P	C
23HSM471C	(Common to All Branches)	4	0	0	3

PRE-REQUISITES: Nil.

COURSE EDUCATIONAL OBJECTIVES:

The objectives of this course are

1. To provide fundamental knowledge on Management, Administration, Organization & its concepts;
2. To make the students understand the role of management in Production;
3. To impart the concept of HRM in order to have an idea on Recruitment, Selection, Training & Development, Job Evaluation and Merit Rating concepts;
4. To create awareness on identify Strategic Management areas & the PERT/CPM for better Project Management;
5. To make the students aware of the contemporary issues in modern management.

UNIT- I INTRODUCTION TO MANAGEMENT (9)

Management - Concept and meaning - Nature-Functions - Management as a Science and Art and both - Schools of Management Thought - Taylor's Scientific Theory - Henry Fayol's principles - Elton Mayo's Human relations - Organizational Designs - Line organization - Line & Staff Organization - Functional Organization - Matrix Organization - Project Organization - Committee form of Organization - Social Responsibilities of Management.

UNIT - II OPERATIONS MANAGEMENT (9)

Principles and Types of Plant Layout - Methods of Production (Job, batch and Mass Production), Work Study - Statistical Quality Control- Material Management - Objectives Inventory-Functions - Types, Inventory Techniques – EOQ - ABC Analysis - Marketing Management - Concept - Meaning – Nature - Functions of Marketing - Marketing Mix - Channels of Distribution - Advertisement and Sales Promotion - Marketing Strategies based on Product Life Cycle.

UNIT - III HUMAN RESOURCES MANAGEMENT (HRM) (9)

HRM - Definition and Meaning – Nature - Managerial and Operative Functions - Job Analysis - Human Resource Planning (HRP) - Employee Recruitment - Sources of Recruitment - Employee Selection - Process - Employee Training and Development - Methods - Performance Appraisal Concept - Methods of Performance Appraisal – Placement - Employee Induction - Wage and Salary Administration.

UNIT - IV STRATEGIC & PROJECT MANAGEMENT (9)

Definition & Meaning - Setting of Vision - Mission - Goals - Corporate Planning Process - Environmental Scanning - Steps in Strategy Formulation and Implementation - SWOT Analysis - Project Management - Network Analysis - Programme Evaluation and Review Technique (PERT) - Critical Path Method (CPM) Identifying Critical Path - Probability of Completing the project within given time - Project Cost- Analysis - Project Crashing (Simple problems).

UNIT - V CONTEMPORARY ISSUES IN MANAGEMENT (9)

Customer Relations Management (CRM) - Total Quality Management (TQM) - Six Sigma



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

Concept - Supply Chain Management (SCM) - Enterprise Resource Planning (ERP) - Performance Management – Employee Engagement and Retention - Business Process Re-engineering and Bench Marking - Knowledge Management – Change Management – Sustainability and Corporate Social Responsibility.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		POs
CO1	Remember the concepts & principles of management and designs of organization in a practical world	PO6, PO9, PO10, PO11, PO12
CO2	Understand the knowledge of Work-study principles & Quality Control techniques in industry	PO2, PO9, PO10, PO11, PO12
CO3	Apply the process of Recruitment & Selection in organization.	PO9, PO10, PO11, PO12
CO4	Analyze the concepts of HRM & different training methods.	PO2, PO3, PO4, PO5, PO9, PO10, PO11, PO12
CO5	Evaluate PERT/CPM Techniques for projects of an enterprise and estimate time & cost of project & to analyze the business through SWOT	PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO9, PO10, PO11, PO12

TEXT BOOKS:

1. Frederick S. Hillier, Mark S. Hillier. Introduction to Management Science, October 26, 2023.
2. A.R Aryasri, Management Science, TMH, 2019

REFERENCE BOOKS:

1. Stoner, Freeman, Gilbert. Management, Pearson Education, New Delhi, 2019.
2. Introduction to Management Science, 12e, Bernard W. Taylor, Pearson Education, New Delhi, 2016
3. Koontz & Weihrich, Essentials of Management, 6/e, TMH, 2005.
4. Kanishka Bedi, Production and Operations Management, Oxford University Press, 2004.
5. Samuel C. Certo, Modern Management, 9/e, PHI, 2005
6. [R.K. Rajput](#), "A Textbook of Manufacturing Technology: Manufacturing Processes", 2/e, Laxmi Publications (P) Ltd., New Delhi, 2017.

REFERENCE WEBSITE:

1. <https://www.slideshare.net/slideshow/introduction-to-management-and-organization231308043/23130804>
2. <https://nptel.ac.in/courses/112107238>
3. <https://archive.nptel.ac.in/courses/110/104/110104068/>
4. <https://archive.nptel.ac.in/courses/110/105/110105069/>
5. https://onlinecourses.nptel.ac.in/noc24_mg112



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CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C01	-	-	-	-	-	2	-	-	3	2	2	3
C02	-	2	-	-	-	-	-	-	2	2	2	3
C03	-	-	-	-	-	-	-	-	3	2	2	3
C04	-	2	2	2	2	-	-	-	2	2	2	3
C05	-	2	2	2	2	2	2	3	2	2	2	3
CO*	-	2	2	2	2	2	2	3	2.6	2	2	3



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DEPARTMENT OF MANAGEMENT STUDIES

IV B.Tech. - VII Semester

COURSE CODE	BUSINESS ETHICS AND CORPORATE GOVERNANCE	L	T	P	C
23HSM471A	(Common to All Branches)	4	0	0	3

PRE-REQUISITES: Nil.

COURSE EDUCATIONAL OBJECTIVES: The objectives of this course are

1. To make the student understand the principles of business ethics
2. To enable them in knowing about the ethics in management
3. To facilitate the student' role in corporate culture
4. To impart knowledge about the legal Frame-work
5. To provide awareness about the corporate governance

UNIT-I: INTRODUCTION TO ETHICS (9)

Ethics Introduction – Meaning – Nature, Scope, significance, Loyalty, and ethical behavior. Value systems - Business Ethics - Types, Characteristics, Factors, Contradictions and Ethical Practices in Management Corporate Social Responsibility – Issues of Management – Crisis Management.

UNIT-II: ETHICS IN MANAGEMENT (9)

Ethics in production, finance, Human resource management and Marketing Management - The Ethical Value System – Universalism, Utilitarianism, Distributive Justice, Social Contracts, Individual Freedom of Choice, Professional Codes; Culture and Ethics – Ethical Values in different Cultures - Culture and Individual Ethics – professional ethics and technical ethics.

UNIT-III: CORPORATE CULTURE (10)

Introduction - Meaning, definition, Nature, and significance – Key elements of corporate culture, shared values, beliefs and norms, rituals, symbols and language - Types of corporate culture, hierarchical culture, market driven culture – Organization leadership and corporate culture, leadership styles and their impact on culture, transformational leadership and culture change.

UNIT- IV: LEGAL FRAME WORK (9)

Law and Ethics -Agencies enforcing Ethical Business Behavior - Legal Impact – Environmental Protection, Fair Trade Practices, legal Compliances, Safeguarding Health and wellbeing of Customers – Corporate law, Securities and financial regulations, corporate governance codes and principles.

UNIT -V: CORPORATE GOVERNANCE (9)

Introduction - Meaning – Corporate governance code, transparency & disclosure -Role of auditors, board of directors and shareholders. Global issues, accounting and regulatory frame work - Corporate scams - Committees in India and abroad, corporate social responsibility. BoDs composition, Cadbury Committee Various committees - Reports - Benefits and Limitations.



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COURSE OUTCOMES

At the end of the course, students will be able to		POS
CO1	Understand the Ethics and different types of ethics.	PO6, PO8,PO9,PO10,PO12
CO2	Understand business ethics and ethical practices in management	PO6,PO8,PO9,PO10,P O12
CO3	Understand the role of ethics in management	PO6, PO8,PO9,PO10,PO12
CO4	Apply the knowledge of professional ethics & technical ethics	PO6, PO8,PO9,PO10,PO12
CO5	Analyze corporate law, ethics, codes & principles, Evaluate corporate governance & corporate scams	PO6, PO8,P10,PO12

TEXT BOOKS:

1. Murthy CSV: Business Ethics and Corporate Governance, HPH July 2017
2. Bholananth Dutta, S.K. Podder – Corporation Governance, VBH. June 2010

REFERENCE BOOKS:

1. Dr. K. Nirmala, KarunakaraReaddy. Business Ethics and Corporate Governance, HPH
2. H.R.Machiraju: Corporate Governance, HPH, 2013
3. K. Venkataramana, Corporate Governance, SHBP.
4. N.M.Khandelwal. Indian Ethos and Values for Manager

REFERENCE WEBSITE:

1. https://onlinecourses.nptel.ac.in/noc21_mg46/
2. <https://archive.nptel.ac.in/courses/110/105/110105138/>
3. https://onlinecourses.nptel.ac.in/noc21_mg54/
4. https://onlinecourses.nptel.ac.in/noc22_mg54/
5. <https://archive.nptel.ac.in/courses/109/106/109106117/>



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(AUTONOMOUS)

DEPARTMENT OF MANAGEMENT STUDIES

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C01	-	-	-	-	-	2	-	3	2	2	-	3
C02	-	-	-	-	-	2	-	3	2	2	-	3
C03	-	-	-	-	-	2	-	3	2	2	-	3
C04	-	-	-	-	-	2	-	3	2	2	-	3
C05	-	-	-	-	-	2	-	3	-	2	-	3
CO	-	-	-	-	-	2	-	3	2	2	-	3



**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

IV B.Tech – VII Semester

23CSE471C SOFTWARE ARCHITECTURE AND DESIGN PATTERN **L T P C**
3 0 0 3

Course Objectives:

After completing this course, the student should be able to:

- To understand the concept of patterns and the Catalog.
- To discuss the Presentation tier design patterns and their affect on: sessions, client access, validation and consistency.
- To understand the variety of implemented bad practices related to the Business and Integration tiers.

Course Out comes:

- To highlight the evolution of patterns.
- To learn how to add functionality to designs while minimizing complexity
- To learn what design patterns really are, and are not
- To know about specific design patterns.
- To learn how to use design patterns to keep code quality high without over design.

UNIT – I

Envisioning Architecture: The Architecture Business Cycle, What is Software Architecture, Architectural patterns, reference models, reference architectures, architectural structures and views. Creating an Architecture: Quality Attributes, Achieving qualities, Architectural styles and patterns, designing the Architecture, Documenting software architectures, Reconstructing Software Architecture.

UNIT – II

Analyzing Architectures: Architecture Evaluation, Architecture design decision making, ATAM, CBAM. Moving from one system to many: Software Product Lines, Building systems from off the shelf components, Software architecture in future.

UNIT – III

Patterns: Pattern Description, Organizing catalogs, role in solving design problems, Selection and usage. Creational and Structural patterns: Abstract factory, builder, factory method, prototype, singleton, adapter, bridge, composite, façade, flyweight

UNIT – IV

Behavioural patterns: Chain of responsibility, command, Interpreter, iterator, mediator, memento, observer, state, strategy. template method, visitor.

UNIT – V

Case Studies: A-7E – A case study in utilizing architectural structures, The World Wide Web - a case study in interoperability, Air Traffic Control – a case study in designing for high availability, Celsius Tech – a case study in product line development

TEXT BOOKS:

1. Software Architecture in Practice, second edition, Len Bass, Paul Clements & Rick Kazman, Pearson Education, 2003.
2. Design Patterns, Erich Gamma, Pearson Education.

REFERENCE BOOKS:

1. Beyond Software architecture, Luke Hohmann, Addison wesley, 2003.
2. Software architecture, David M. Dikel, David Kane and James R. Wilson, Prentice Hall PTR, 2001
3. Software Design, David Budgen, second edition, Pearson education, 2003
4. Head First Design patterns, Eric Freeman & Elisabeth Freeman, O'REILLY, 2007.
5. Design Patterns in Java, Steven John Metsker & William C. Wake, Pearson education, 2006
6. J2EE Patterns, Deepak Alur, John Crupi & Dan Malks, Pearson education, 2003.



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

23CSE471B

IV B.Tech – VII Semester
BLOCK CHAIN TECHNOLOGY

L T P C
3 0 0 3

Course Objectives:

- Understand how block chain systems (mainly Bit coin and Ethereum) work and to securely interact with them.
- Design, build, and deploy smart contracts and distributed applications.
- Integrate ideas from block chain technology into their own projects.

Course Outcomes (CO):

After completion of the course, students will be able to

1. Demonstrate the foundation of the Block chain technology and understand the processes in payment and funding.
2. Identify the risks involved in building Block chain applications.
3. Review of legal implications using smart contracts.
4. Choose the present landscape of Blockchain implementations and Understand Crypto currency markets
5. Examine how to profit from trading crypto currencies.

UNIT - I Introduction

Lecture 8Hrs

Introduction, Scenarios, Challenges Articulated, Block chain, Block chain Characteristics, Opportunities Using Block chain, History of Block chain. Evolution of Block chain: Evolution of Computer Applications, Centralized Applications, Decentralized Applications, Stages in Block chain Evolution, Consortia, Forks, Public Block chain Environments, Type of Players in Block chain Ecosystem, Players in Market.

UNIT - II Block chain Concepts

Lecture 9Hrs

Block chain Concepts: Introduction, Changing of Blocks, Hashing, Merkle-Tree, Consensus, Mining and Finalizing Blocks, Currency aka tokens, security on block chain, data storage on block chain, wallets, coding on block chain: smart contracts, peer-to-peer network, types of block chain nodes, risk associated with bloc chain solutions, life cycle of block chain transaction

UNIT - III Architecting Block chain solutions

Lecture 9Hrs

Architecting Block chain solutions: Introduction, Obstacles for Use of Block chain, Block chain Relevance Evaluation Framework, Block chain Solutions Reference Architecture, Types of Block chain Applications. Cryptographic Tokens, Typical Solution Architecture for Enterprise Use Cases, Types of Block chain Solutions, Architecture Considerations, Architecture with Block chain Platforms, Approach for Designing Block chain Applications



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UNIT - IV Ethereum Block chain Implementation

Lecture 8Hrs

Ethereum Block chain Implementation: Introduction, Tuna Fish Tracking Use Case, Ethereum Ecosystem, Ethereum Development, Ethereum Tool Stack, Ethereum Virtual Machine, Smart Contract Programming, Integrated Development Environment, Truffle Framework, Ganache, Unit Testing, Ethereum Accounts, My Ether Wallet, Ethereum Networks/Environments, Infura, Ether scan, Ethereum Clients, Decentralized Application, Metamask, Tuna Fish Use Case Implementation, Open Zeppelin in Contracts .

UNIT - V Hyper ledger Block chain Implementation

Lecture 8Hrs

Hyper ledger Implementation: Introduction, Use Case – Car Ownership Tracking, Hyper ledger Fabric, Hyper ledger Fabric Transaction Flow, FabCar Use Case Implementation, Invoking Chain code Functions Using Client Application.

Advanced Concepts in Block chain: Introduction, Inter Planetary File System (IPFS), Zero Knowledge Proofs, Oracles, Self-Sovereign Identity, Block chain with IoT and AI/ML Quantum Computing and Block chain, Initial Coin Offering, Block chain Cloud Offerings, Block chain and its Future Potential.

Textbooks:

- M. Antonopoulos, —Mastering Bitcoin: Programming the Open Blockchain, O'Reilly, Ambadas, Arshad Sarfarz Ariff, Sham —Block chain for Enterprise Application Developers, Wiley, 2020
- Andreas 2017

Reference Books:

- Blockchain: A Practical Guide to Developing Business, Law, and Technology Solutions, Joseph Bambara, Paul R. Allen, Mc Graw Hill.
- Blockchain: Blueprint for a New Economy, Melanie Swan, O'Reilly

Online Learning Resources:

<https://github.com/blockchainedindia/resources>



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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

IV B.Tech – VII Semester

23CSE471A	AUGMENTED REALITY AND VIRTUAL REALITY	L	T	P	C
		3	0	0	3

Course Objective:

The primary objective of this course is to introduce students to the foundational principles and technologies of Virtual Reality (VR) and Augmented Reality (AR), along with the key devices, modeling techniques, and interaction mechanisms involved in creating immersive environments. The course will cover the essentials of VR and AR, including hardware, software, and human perception, as well as advanced concepts such as 3D modeling, interaction design, and audio rendering. Students will gain hands-on experience in the use of VR/AR systems and explore the challenges and methodologies for building interactive virtual environments.

Course Outcomes:

At the end of the Course the student will be able to:

1. Understand the core concepts of Virtual Reality and Augmented Reality, and their differences.
2. Learn about the hardware and software components required for VR and AR systems, as well as the impact of human physiology and perception on the virtual experience.
3. Gain knowledge of input devices (trackers, navigation, and gesture interfaces) and output devices (graphics, sound displays, and haptic feedback).
4. Develop skills in modeling techniques, including geometric, kinematics, physical, and behavior modeling for VR and AR environments.

Explore the technologies and methodologies used to create Augmented Reality systems, including marker-based AR and AR software development

UNIT – I

(10 Lectures)

INTRODUCTION TO VIRTUAL REALITY (VR): Defining Virtual Reality, Key elements of virtual reality experience, Virtual Reality, Telepresence, Augmented Reality and Cyberspace.
Bird's-Eye View: Hardware, Software, Human Physiology and Perception.

UNIT-II

(10 Lectures)

Input Devices: (Trackers, Navigation, and Gesture Interfaces): Three-dimensional position trackers, navigation and manipulation, interfaces and gesture interfaces.

Output Devices: Graphics displays, sound displays & haptic feedback.



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UNIT-III

(10 Lectures)

Modeling: Geometric modeling, Kinematics modeling, Physical modeling, Behaviour modeling, Model management.

UNIT-IV

(10 Lectures)

Augmented Reality (AR): Taxonomy, Technology and Features of Augmented Reality, AR Vs VR, Challenges with AR, AR systems and functionality, Augmented Reality Methods, Visualization Techniques for Augmented Reality, Enhancing interactivity in AR Environments, Evaluating AR systems

AR software development : AR software, Camera parameters and camera calibration, Marker-based augmented reality, AR Toolkit.

UNIT-V

(10 Lectures)

Interaction & Audio:

Interaction - Motor Programs and Remapping, Locomotion, Manipulation, Social Interaction. Audio - The Physics of Sound, The Physiology of Human Hearing, Auditory Perception, Auditory Rendering. Interaction - Motor Programs and Remapping, Locomotion, Manipulation, Social Interaction.

Audio -The Physics of Sound, The Physiology of Human Hearing, Auditory Perception, Auditory Rendering. (from Text Book2)

TEXT BOOKS:

1. Virtual Reality Technology, Second Edition, Gregory C. Burdea & Philippe Coiffet, John Wiley & Sons, Inc, 2017.
2. Virtual Reality, Steven M. LaValle, Cambridge University Press, 2016.

REFERENCES:

1. RajeshK.Maurya,*Computer Graphics with Virtual Reality System*, 3rd Edition, Wiley Publication, 2018.
2. William R. Sherman and Alan B. Craig, *Understanding Virtual Reality Interface, Application, and Design*, 2nd Edition, Morgan Kaufmann Publishers, Elsevier, 2019.
3. GrigoreC.Burdea,PhilippeCoiffet,*Virtual Reality Technology*, 2nd Edition, Wiley,2017.
4. K.S. Hale and K. M. Stanney, *Handbook on Virtual Environments*, 2nd Edition, CRC Press, 2015.

WEB REFERENCES:

1. <http://vr.cs.uiuc.edu/vrbook.pdf>
<https://nptel.ac.in/courses/106/106/106106138/>



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

23CSE354C

IV B.Tech – VII Semester
INTERNET OF THINGS

L	T	P	C
3	0	0	3

Course Objectives:

- Understand the basics of Internet of Things and protocols.
- Discuss the requirement of IoT technology
- Introduce some of the application areas where IoT can be applied.
- Understand the vision of IoT from a global perspective, understand its applications, determine its market perspective using gateways, devices and data management

Course Outcomes:

After completion of the course, students will be able to

- Understand general concepts of Internet of Things.
- Apply design concept to IoT solutions
- Analyze various M2M and IoT architectures
- Evaluate design issues in IoT applications
- Create IoT solutions using sensors, actuators and Devices

UNIT- I Introduction to IoT

Definition and Characteristics of IoT, physical design of IoT, IoT protocols, IoT communication models, IoT Communication APIs, Communication protocols, Embedded Systems, IoT Levels and Templates

UNIT- II Prototyping IoT Objects using Microprocessor/Microcontroller

Working principles of sensors and actuators, setting up the board – Programming for IoT, Reading from Sensors, Communication: communication through Bluetooth, Wi-Fi.

UNIT-III IoT Architecture and Protocols

Architecture Reference Model- Introduction, Reference Model and architecture, IoT reference Model, Protocols- 6LowPAN, RPL, CoAP, MQTT, IoT frameworks- Thing Speak.

UNIT- IV Device Discovery and Cloud Services for IoT

Device discovery capabilities- Registering a device, Deregister a device, Introduction to Cloud Storage models and communication APIs Web-Server, Web server for IoT.

UNIT- V UAV IoT

Introduction to Unmanned Aerial Vehicles/Drones, Drone Types, Applications: Defense, Civil, Environmental Monitoring; UAV elements and sensors- Arms, motors, Electronic Speed Controller(ESC), GPS, IMU, Ultra sonic sensors; UAV Software –Arudpilot, Mission Planner, Internet of Drones(IoD)- Case study FlytBase.

Text books:

1. Vijay Madiseti and Arshdeep Bahga, — Internet of Things (A Hands-on-Approach)ll, 1st Edition, VPT, 2014.
2. Handbook of unmanned aerial vehicles, K Valavanis;George J Vachtsevanos, New York, Springer, Boston, Massachusetts : Credo Reference, 2014. 2016.



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Reference Books:

1. Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, — From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence, 1st Edition, Academic Press, 2014.
2. Arshdeep Bahga, Vijay Madiseti - Internet of Things: A Hands-On Approach, Universities Press, 2014.
3. The Internet of Things, Enabling technologies and use cases – Pethuru Raj, Anupama C. Raman, CRC Press.
4. Francis daCosta, —Rethinking the Internet of Things: A Scalable Approach to Connecting Everything, 1st Edition, Apress Publications, 2013
5. Cuno Pfister, Getting Started with the Internet of Things, O'Reilly Media, 2011, ISBN: 9781- 4493-9357-1
6. DGCA RPAS Guidance Manual, Revision 3 – 2020
7. Building Your Own Drones: A Beginners' Guide to Drones, UAVs, and ROVs, John Baichtal

Online Learning Resources:

1. <https://www.arduino.cc/>
2. <https://www.raspberrypi.org/>
3. <https://nptel.ac.in/courses/106105166/5>
4. <https://nptel.ac.in/courses/108108098/4>



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23CSE472A

**IV B.Tech – VII Semester
AGILE METHODOLOGIES**

**L T P C
3 0 0 3**

Course Objectives:

After completing this course, the student should be able to:

- To understand the concept of patterns and the Catalog.
- To discuss the Presentation tier design patterns and their affect on: sessions, client access, validation and consistency.
- To understand the variety of implemented bad practices related to the Business and Integration tiers.

Course Out comes:

- To highlight the evolution of patterns.
- To learn how to add functionality to designs while minimizing complexity
- To learn what design patterns really are, and are not
- To know about specific design patterns.
- To learn how to use design patterns to keep code quality high without over design.

UNIT I AGILE METHODOLOGY

Lecture 9 Hrs

Theories for Agile Management – Agile Software Development – Traditional Model vs. Agile Model - Classification of Agile Methods – Agile Manifesto and Principles – Agile Project Management – Agile Team Interactions – Ethics in Agile Teams - Agility in Design, Testing – Agile Documentations – Agile Drivers, Capabilities and Values

UNIT II AGILE PROCESSES

Lecture 8Hrs

Lean Production - SCRUM, Crystal, Feature Driven Development- Adaptive Software Development - Extreme Programming: Method Overview – Lifecycle – Work Products, Roles and Practices.

UNIT III AGILITY AND KNOWLEDGE MANAGEMENT

Lecture 8 Hrs

Agile Information Systems – Agile Decision Making - Earl_S Schools of KM – Institutional Knowledge Evolution Cycle – Development, Acquisition, Refinement, Distribution, Deployment, Leveraging – KM in Software Engineering – Managing Software Knowledge – Challenges of Migrating to Agile Methodologies – Agile Knowledge Sharing – Role of Story-Cards – Story-Card Maturity Model (SMM).



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UNIT IV AGILITY AND REQUIREMENTS ENGINEERING

Lecture 9 Hrs

Impact of Agile Processes in RE–Current Agile Practices – Variance – Overview of RE Using Agile Managing Unstable Requirements – Requirements Elicitation – Agile Requirements Abstraction Model – Requirements Management in Agile Environment, Agile Requirements Prioritization – Agile Requirements Modeling and Generation – Concurrency in Agile Requirements Generation.

UNIT V AGILITY AND QUALITY ASSURANCE

Lecture 9 Hrs

Agile Product Development – Agile Metrics – Feature Driven Development (FDD) – Financial and Production Metrics in FDD – Agile Approach to Quality Assurance - Test Driven Development – Agile Approach in Global Software Development.

Text books:

1. David J. Anderson and Eli Schragenheim, —Agile Management for Software Engineering: Applying the Theory of Constraints for Business Results, Prentice Hall, 2003.
2. Hazza and Dubinsky, —Agile Software Engineering, Series: Undergraduate Topics in Computer Science, Springer, 2009.

Reference Books:

1. Craig Larman, —Agile and Iterative Development: A Manager's Guide, Addison-Wesley, 2004.
2. Kevin C. Desouza, —Agile Information Systems: Conceptualization, Construction, and Management, Butterworth-Heinemann, 2007.

Online Learning Resources:

<https://www.nptelvideos.com/video.php?id=904>



**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

23CSE472D

METAVERSE

**L T P C
3 0 0 3**

Course Objectives:

- Understand how block chain systems (mainly Bit coin and Ethereum) work and to securely interact with them.
- Design, build, and deploy smart contracts and distributed applications.
- Integrate ideas from block chain technology into their own projects.

Course Outcomes (CO):

After completion of the course, students will be able to

1. Demonstrate the foundation of the Block chain technology and understand the processes in payment and funding.
2. Identify the risks involved in building Block chain applications.
3. Review of legal implications using smart contracts.
4. Choose the present landscape of Blockchain implementations and Understand Crypto currency markets
5. Examine how to profit from trading crypto currencies.

Unit-1

Metaverse fundamentals: Metaverse evolution, Metaverse importance and characteristics, the interdisciplinary nature of the Metaverse, Metaverse opportunities and risks, Computer-mediated communication (social presence theory, social information processing theory, media richness theory, cyborg theory), Avatar-mediated communication.

Unit-2

The seven layers of Metaverse: Experience Discovery, Creator economy, Spatial computing, Decentralization, Human interface, Infrastructure Metaverse Technologies part I: AR/VR/MR/XR, 3D reconstruction, Game engines, Smart glasses, wearables, haptic devices, headsets and headwear.

Unit-3

Metaverse technologies part II: Blockchain, smart contracts, tokens, NFTs, Cryptography, Artificial Intelligence (AI), Internet of Things (IoT), Edge computing and 5G, 6G. Design theories and practices: Social presence and co-presence, Motion sickness and cybersickness, Uncanny valley, Sense of self-location, sense of agency and sense of body ownership, Universal simulation principle, Prototyping, Evaluation techniques (qualitative and quantitative).

Unit-4

Tools and technologies for Metaverse UX and UI: Tools and services for avatar systems, Spatial user interface design, Cross-platform user experience design, Multimodal user interface, Technologies and devices for human computer interaction in Metaverse, Metaverse platforms: Decentraland, SANDBOX, Roblox, Axie Infinity, uHive, Hyper Nation, Nakamoto (NAKA), Metahero (HERO), Star Atlas (ATLAS), Bloktopia (BLOK), Stageverse, Spatial, PalkaCity, Viverse, Sorare, Illuvium, Upland, Second Life, Sansar, Sensorium Galaxy



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Unit-5

Metaverse applications - part I: Gaming and entertainment, Travel and tourism, Education and learning, Remote working, Commerce and business, Metaverse applications - part II: Real estate, Banking and Finance, Healthcare, Social media, Fashion, Metaverse and cyber security: Cyber security concerns in Metaverse: Social engineering attacks, Data theft, Decentralization vs vulnerabilities, Cyber security risks in Metaverse: process, people, technology, Metaverse and cybercrime: Scam and theft, Rug pull, Money manipulation and wash trading, Money laundering, Metaverse challenges and open issues: Persistency, Interoperability and scalability, Maturity, Regulation, Usefulness and ease-of-use, Privacy and data security, Content creation, NFTs and creator economy, Social, legal and ethical issues in the Metaverse

Text books

The Metaverse, Terry Winters, Independently published, 2021, ISBN: 979-8450959283

Reference Books:

- Ball, M., 2022, —The Metaverse and How It Will Revolutionize Everything—, Liveright, ISBN: 978-1324092032
- Damar, M. (2021). Metaverse shape of your life for future: A bibliometric snapshot. *Journal of Metaverse*, 1(1), 1–8.
- Day, J. (2022) Metaverse will see cyber warfare attacks unlike anything before: ‘Massively elevated’,
February 28.
<https://www.express.co.uk/news/science/1570844/metaverse-news-cyber-warfare-attacks-virtual-worlds-russia-china-spt>.
- Polyviou, A., Sharma K., Pappas, I.O.(2023). Training in the metaverse: Employing physiological data to improve how we build metaverses for businesses. *The next generation internet: The role of metaverses, AR, VR, MR, and digital twins*, Temple University Institute for Business and Information Technology Link: <https://ibit.temple.edu/nextgenerationinternet>
- QuHarrison T. , Keeney, S., 2022, —The Metaverse Handbook: Innovating for the Internet's NextTectonic Shiftl, Wiley, ISBN: 978-1119892526
- The mistocleous, M., Christodoulou, K., & Katelaris, L. (2023). An Educational Metaverse Experiment: The first on-chain and in- Metaverse academic course. *Information Systems. EMCIS2022. Lecture Notes in Business Information Processing*, Springer, Cham.
- Stephenson, N., 1992, —Snow Crashl, ISBN: 978-055338



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

23CSE364A

IV B.Tech – VII Semester
COMPUTER VISION

L T P C
3 0 0 3

Objectives:

The objective of this course is to understand the basic issues in computer vision and major approaches to address the methods to learn the Linear Filters, segmentation by clustering, Edge detection, Texture.

Course Outcomes:

After completing the course, you will be able to:

- Identify basic concepts, terminology, theories, models and methods in the field of computer vision,
- Describe known principles of human visual system,
- Describe basic methods of computer vision related to multi-scale representation, edge detection and detection of other primitives, stereo, motion and object recognition,
- Suggest a design of a computer vision system for a specific problem.

UNIT-I LINEAR FILTERS

Lecture 8Hrs

Introduction to Computer Vision, Linear Filters and Convolution, Shift Invariant Linear Systems, Spatial Frequency and Fourier Transforms, Sampling and Aliasing Filters as Templates, Technique: Normalized Correlation and Finding Patterns, Technique: Scale and Image Pyramids

UNIT-II EDGE DETECTION

Lecture 9Hrs

Noise- Additive Stationary Gaussian Noise, Why Finite Differences Respond to Noise, Estimating Derivatives - Derivative of Gaussian Filters, Why Smoothing Helps, Choosing a Smoothing Filter, Why Smooth with a Gaussian? Detecting Edges-Using the Laplacian to Detect Edges, Gradient-Based Edge Detectors, Technique: Orientation Representations and Corners.

UNIT-III TEXTURE

Lecture 9Hrs

Representing Texture –Extracting Image Structure with Filter Banks, Representing Texture using the Statistics of Filter Outputs, Analysis (and Synthesis) Using Oriented Pyramids –The Laplacian Pyramid, Filters in the Spatial Frequency Domain, Oriented Pyramids, Application: Synthesizing Textures for Rendering, Homogeneity, Synthesis by Sampling Local Models, Shape from Texture, Shape from Texture for Planes..

UNIT-IV SEGMENTATION BY CLUSTERING

Lecture 8Hrs

What is Segmentation, Human Vision: Grouping and Gestalt, Applications: Shot Boundary Detection and Background Subtraction. Image Segmentation by Clustering Pixels, Segmentation by Graph-Theoretic Clustering. The Hough Transform, Fitting Lines, Fitting Curves

UNIT-V RECOGNIZATION BY RELATIONS BETWEEN TEMPLATES

Lecture 8Hrs

Finding Objects by Voting on Relations between Templates, Relational Reasoning Using Probabilistic Models and Search, Using Classifiers to Prune Search, Hidden Markov Models, Application: HMM and Sign Language Understanding, Finding People with HMM.

Audio -The Physics of Sound, The Physiology of Human Hearing, Auditory Perception, Auditory Rendering. (from Text Book2)

Text books:

1. David A. Forsyth, Jean Ponce, Computer Vision – A modern Approach, PHI, 2003.

Reference Books:

1. Geometric Computing with Clifford Algebras: Theoretical Foundations and Applications in Computer Vision and Robotics, Springer;1 edition,2001by Sommer.



**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)**

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

23CSE472B

CYBER PHYSICAL SYSTEMS

**L T P C
3 0 0 3**

Course Objective:

The objective of this course is to provide students with a comprehensive understanding of the various techniques and methodologies used to design, secure, synchronize, and schedule operations within

Course Out comes: Upon the Successful Completion of the Course, the Students would be able to:

- Understand the core principles behind CPS
- Identify Security mechanisms of Cyber physical systems
- Under stand Synchronization in Distributed Cyber-Physical Systems
- To Understand the Scheduling for Cyber-Physical Systems
- To understand the various Cyber-Physical System models

UNIT - I

Symbolic Synthesis for Cyber-Physical Systems

Introduction and Motivation, Basic Techniques - Preliminaries, Problem Definition, Solving the Synthesis Problem, Construction of Symbolic Models, Advanced Techniques: Construction of Symbolic Models, Continuous-Time Controllers, Software Tool

UNIT - II

Security of Cyber-Physical Systems

Introduction and Motivation, Basic Techniques - Cyber Security Requirements, Attack Model, Countermeasures, Advanced Techniques: System Theoretic Approaches

UNIT - III

Synchronization in Distributed Cyber-Physical Systems: Challenges in Cyber-Physical Systems, A Complexity-Reducing Technique for Synchronization, Formal Software Engineering, Distributed Consensus Algorithms, Synchronous Lockstep Executions, Time-Triggered Architecture, Related Technology, Advanced Techniques

UNIT - IV

Real-Time Scheduling for Cyber-Physical Systems

Introduction and Motivation, Basic Techniques - Scheduling with Fixed Timing Parameters, Memory Effects, Multiprocessor/Multicore Scheduling, Accommodating Variability and Uncertainty

UNIT - V

Model Integration in Cyber-Physical Systems

Introduction and Motivation, Causality, Semantic Domains for Time, Interaction Models for Computational Processes, Semantics of CPS DSMLs, Advanced Techniques, For Spec, The Syntax of CyPhyML, Formalization of Semantics, Formalization of Language Integration.

TEXT BOOKS:

1. Raj Raj kumar, Dion is io De Niz, and Mark Klein, Cyber-Physical Systems, Addison- Wesley Professional.
2. Rajeev Alur, Principles of Cyber-Physical Systems, MIT Press, 2015

IV B.Tech–VII Semester

23OCE471A	BUILDING MATERIALS AND SERVICES	L	T	P	C
	(OE – III)	3	0	0	3

Course Objectives:

The objectives of this course are to make the student :

1. To understand the properties, classifications, and applications of building materials like stones, bricks, tiles, wood, aluminum, glass, paints, and plastics.
2. To analyze the composition, manufacturing process, and properties of cement and admixtures.
3. To apply knowledge of building components such as lintels, arches, walls, stairs, floors, roofs, foundations, and joinery.
4. To evaluate masonry, mortars, finishing techniques, and formwork systems.
5. To assess various building services including plumbing, ventilation, air conditioning, acoustics, and fire protection.

Course Outcomes:

Upon successful completion of the course, students will be able to:

1. Understand the properties, classifications, and applications of building materials like stones, bricks, tiles, wood, aluminum, glass, paints, and plastics.
2. Analyze the composition, manufacturing process, and properties of cement and admixtures.
3. Apply knowledge of building components such as lintels, arches, walls, stairs, floors, roofs, foundations, and joinery.
4. Evaluate masonry, mortars, finishing techniques, and formwork systems.
5. Assess various building services including plumbing, ventilation, air conditioning, acoustics, and fire protection.

CO–POArticulation Matrix

Course	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	P O 10	P O 11	P O 12	PS O1	PS O2
CO-1	3	-	-	-	2	-	-	-	-	-	-	-	3	3
CO-2	3	3	-	-	2	-	-	-	-	-	-	2	3	3
CO-3	3	-	3	2	3	-	-	-	-	-	-	-	3	3
CO-4	-	-	3	3	3	-	2	-	-	-	-	-	3	3
CO-5	-	-	-	-	-	3	3	2	-	-	-	-	-	3

UNIT– I

Stones and Bricks, Tiles: Building Stones – Classifications and Quarrying – Properties – Structural Requirements – Dressing. Bricks – Composition of Brick Earth – Manufacture and Structural Requirements, Fly Ash, Ceramics. Timber, Aluminum, Glass, Paints and Plastics: Wood - Structure – Types and Properties – Seasoning – Defects; Alternate Materials for Timber – GI / Fibre – Reinforced Glass Bricks, Steel & Aluminum, Plastics.

UNIT– II

Cement & Admixtures: Types of Cement - Ingredients of Cement – Manufacture – Chemical Composition – Hydration - Field & Lab Tests – Fineness – Consistency – Initial & Final Setting – Soundness. Admixtures – Mineral & Chemical Admixtures – Uses

UNIT– III

Building Components: Lintels, Arches, Walls, Vaults – Stair Cases – Types of Floors, Types of Roofs – Flat, Curved, Trussed; Foundations – Types; Damp Proof Course; Joinery – Doors – Windows – Materials – Types.

UNIT– IV

Mortars, Masonry and Finishing's Mortars: Lime and Cement Mortars Brick Masonry – Types – Bonds; Stone Masonry – Types; Composite Masonry – Brick-Stone Composite; Concrete, Reinforced Brick. Finishers: Plastering, Pointing, Painting, Claddings – Types – Tiles – ACP. Form Work: Types: Requirements – Standards – Scaffolding – Design; Shoring, Underpinning.

UNIT– V

Building Services: Plumbing Services: Water Distribution, Sanitary – Lines & Fittings; Ventilations: Functional Requirements Systems of Ventilations. Air-Conditioning - Essentials and Types; Acoustics – Characteristic – Absorption – Acoustic Design; Fire Protection – Fire Hazards – Classification of Fire Resistant Materials and Constructions.

TEXT BOOKS:

1. Building Materials and Construction – Arora & Bindra, Dhanpat Roy Publications.
2. Building Materials and Construction by G C Sahu, Joygopal Jena McGraw hill Pvt Ltd 2015.

REFERENCE BOOKS:

1. Building Construction by B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain - Laxmi Publications (P) Ltd., New Delh
2. P. C. Varghese, Building Materials, Prentice Hall of India, 2015.
3. N. Subramanian, Building Materials Testing and Sustainability, Oxford Higher Education, 2019.
4. R. Chudley, Construction Technology, Longman Publishing Group, 1973.
5. S. K. Duggal, Building Materials, Oxford & IBH Publishing Co. Ltd., New Delhi, 2019

Online Learning Resources:

<https://archive.nptel.ac.in/courses/105/102/105102088/>

23OCE471B	ENVIRONMENTAL IMPACT ASSESSMENT	L	T	P	C
	(OE-III)	3	0	0	3

Course Objectives:

The objectives of this course are to make the student to:

1. Understand the principles, methodologies, and significance of Environmental Impact Assessment (EIA).
2. Analyze the impact of developmental activities on land use, soil, and water resources.
3. Evaluate the impact of development on vegetation, wildlife, and assess environmental risks.
4. Develop environmental audit procedures and assess compliance with environmental regulations.
5. Understand and apply environmental acts, notifications, and legal frameworks in EIA studies.

Course Outcomes (COs):

Upon successful completion of the course, students will be able to:

1. Apply various methodologies for conducting Environmental Impact Assessments.
2. Analyze the impact of land-use changes on soil, water, and air quality.
3. Evaluate the environmental impact on vegetation, wildlife, and conduct risk assessments.
4. Develop environmental audit reports and assess compliance with environmental policies.
5. Interpret and apply environmental acts and regulations related to EIA.

CO-PO Articulation Matrix

Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
CO-1	3	2	2	2	2	3	-	-	-	-	-	1	2	2
CO-2	3	3	3	2	2	3	-	-	-	-	-	1	3	2
CO-3	3	3	3	2	2	3	3	-	-	-	-	1	3	3
CO-4	3	3	3	3	2	3	3	-	-	-	-	1	3	3
CO-5	2	2	2	2	2	3	3	3	-	-	-	1	2	2

UNIT- I

Concepts and methodologies of EIA

Initial Environmental Examination, Elements of EIA, - Factors Affecting E-I-A Impact

Evaluation and Analysis, Preparation of Environmental Base Map, Classification of Environmental Parameters- Criteria for The Selection of EIA Methodology, E I A Methods, Ad-Hoc Methods, Matrix Methods, Network Method Environmental Media Quality Index Method, Overlay Methods and Cost/Benefit Analysis.

UNIT– II

Impact of Developmental Activities and Land Use

Introduction and Methodology for The Assessment of Soil and Ground Water, Delineation of Study Area, Identification of Actives. Procurement of Relevant Soil Quality, Impact Prediction, Assessment of Impact Significance, Identification and Incorporation of Mitigation Measures. E I A in Surface Water, Air and Biological Environment: Methodology for The Assessment of Impacts on Surface Water Environment, Air Pollution Sources, Generalized Approach for Assessment of Air Pollution Impact.

UNIT– III

Assessment of Impact on Vegetation, Wildlife and Risk Assessment

Introduction - Assessment of Impact of Development Activities on Vegetation and Wildlife, Environmental Impact of Deforestation – Causes and Effects of Deforestation - Risk Assessment and Treatment of Uncertainty-Key Stages in Performing an Environmental Risk Assessment- Advantages of Environmental Risk Assessment.

UNIT– IV

Environmental Audit

Introduction - Environmental Audit & Environmental Legislation Objectives of Environmental Audit, Types of Environmental Audit, Audit Protocol, Stages of Environmental Audit, Onsite Activities, Evaluation of Audit Data and Preparation of Audit Report Report

UNIT– V

Environmental Acts and Notifications

The Environmental Protection Act, The Water Preservation Act, The Air (Prevention & Control of Pollution Act), Wild Life Act - Provisions in The EIA Notification, Procedure for Environmental Clearance, Procedure for Conducting Environmental Impact Assessment Report- Evaluation of EIA Report. Environmental Legislation Objectives, Evaluation of Audit Data and Preparation of Audit Report. Post Audit Activities, Concept of ISO and ISO 14000.

TEXT BOOKS:

1. Environmental Impact Assessment Methodologies, by Y. Anjaneyulu, B. S. Publication, Hyderabad 2nd edition 2011
2. Environmental Impact Assessment, by Canter Larry W., McGraw-Hill education Edi (1996)

REFERENCE BOOKS:

1. Environmental Engineering, by Peavy, H. S, Rowe, D. R, Tchobanoglous, G. Mc-Graw Hill International Editions, New York 1985.
2. Environmental Science and Engineering, by Suresh K. Dhaneja, S.K., Katania & Sons Publication, New Delhi
3. Environmental Science and Engineering, by J. Glynn and Gary W. Hein Ke, Prentice Hall Publishers.
4. Environmental Pollution and Control, by H. S. Bhatia, Galgotia Publication (P) Ltd, Delhi

Online Learning Resources:

<https://archive.nptel.ac.in/courses/124/107/124107160/>

**SREENIVASAINSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)**

230EE471A	SMART GRID TECHNOLOGIES	L	T	P	C
		3	0	0	3

PRE-REQUISITES: NIL

COURSE EDUCATIONAL OBJECTIVES:

1. To introduce the evolution, need, architecture, and enabling technologies of Smart Grids with a focus on Indian and international perspectives.
2. To provide fundamental knowledge of synchro-phasor technology and Wide Area Monitoring Systems using PMUs and PDCs.
3. To familiarize students with smart meters, AMR/AMI systems, and their role in demand-side integration and power quality management.
4. To impart understanding of communication technologies and protocols used in Smart Grid information and communication infrastructure.
5. To expose students to Smart Grid applications, renewable and distributed generation integration, advanced energy storage, and cyber security requirements

UNIT –1: Introduction to Smart Grid: (9)

Evolution of Electric Grid – Need for Smart Grid – Difference between conventional & smart grid – Overview of enabling technologies – International experience in Smart Grid deployment efforts – Smart Grid road map for India – Smart Grid Architecture.

UNIT –2: Wide Area Monitoring System: (9)

Fundamentals of Synchro phasor Technology – concept and benefits of Wide Area Monitoring System – Structure and functions of Phasor Measuring Unit (PMU) and Phasor Data Concentrator (PDC) – Road Map for Synchro phasor applications (NAPSI) – Operational experience and Blackout analysis using PMU - Case study on PMU.

UNIT –3: Smart Meters: (9)

Features and functions of Smart Meters – Functional specification – category of Smart Meters – Automatic Meter Reading (AMR) and Advanced Metering Infrastructure (AMI) drivers and benefits – AMI protocol – Demand Side Integration: Peak load, Outage and Power Quality management.

UNIT –4: Information and Communication Technology: (9)

Overview of Smart Grid Communication system – Modulation and Demodulation Techniques: Radio Communication – Mobile Communication – Power Line Communication – Optical Fibre Communication – Communication Protocol for Smart Grid.

UNIT –5: Smart Grid Applications and Cyber Security: (9)

Applications: Overview and concept of Renewable Integration – Introduction to distributed generation - Role of Protective Relaying in Smart Grid – House Area Network – Advanced Energy Storage Technology: Flow battery – Fuel cell – SMES – Super capacitors – Plug – in Hybrid electric Vehicles - Cyber Security: Security issues in DG, Distribution Automation, AMI, Electric Vehicle Management Systems – Approach to assessment of smart grid cyber security risks – Methodologies. Cyber Security requirements – Smart Grid Information Model.

Total Hours: 45



IV B.Tech. - VII Semester

23OECE471A

**FUNDAMENTALS OF MICROPROCESSORS AND
MICROCONTROLLERS**

L T P C

3 0 0 3

PRE-REQUISITES: -

COURSE EDUCATIONAL OBJECTIVES:

1. To comprehend the architecture, operation, and configurations of the 8086 microprocessors.
2. To get familiar with 8086 programming concepts, instruction set, and assembly language development tools.
3. To study the interfacing of 8086 with memory, peripherals, and controllers for various applications.
4. To learn the architecture, instruction set, and programming of the 8051 microcontrollers.
5. To understand microcontroller interfacing techniques, peripheral programming, and processor comparisons.

UNIT I – 8085 AND 8086 ARCHITECTURE (9)

8085 Architecture, Pin diagram, Addressing modes, Instruction set, 8086 Architecture: Introduction, Main features, pin diagram/description, 8086 microprocessor family, internal architecture, bus interfacing unit, execution unit, interrupts and interrupt response.

UNIT II - 8086 PROGRAMMING (9)

8086 Programming: 8086 system timing, minimum mode and maximum mode configuration, Program development steps, instructions, addressing modes, assembler directives, writing simple programs with an assembler, assembly language program development tools.

UNIT III - 8086 INTERFACING (9)

Introduction: Intel 8255 programmable peripheral interface, Interfacing with LEDs, Interfacing seven segment displays, software and hardware interrupt applications, Intel 8251 USART architecture and interfacing, Intel 8237a DMA controller, stepper motor, A/D and D/A converters, Need for 8259 programmable interrupt controllers.

UNIT IV - MICROCONTROLLER (9)

Microcontroller: Architecture of 8051 – Special Function Registers (SFRs) - I/O Pins Ports and Circuits - Instruction set - Addressing modes - Assembly language programming, Comparison of Microprocessor, Microcontroller, PIC and ARM processors

UNIT V - INTERFACING MICROCONTROLLER (9)

Interfacing Microcontroller: Programming 8051 Timers - Serial Port Programming - Interrupts Programming – LCD & Keyboard Interfacing - ADC, DAC & Sensor Interfacing - External Memory Interface- Stepper Motor and Waveform generation.

Total Hours: 45

SREENIVASAINSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF MECHANICAL ENGINEERING

IV B.Tech. - VII Semester

23OME471A

3D PRINTING TECHNOLOGIES
(Mechanical Branch)

L T P C
3 0 0 3

PRE-REQUISITES: The objectives of the course are to

COURSE EDUCATIONAL OBJECTIVES:

1. Understand the fundamental concepts of prototyping and distinguish between traditional and rapid prototyping methods.
2. Demonstrate the working principles, materials, and applications of solid-, liquid-, and powder-based RP systems.
3. Define the processes and classifications of rapid tooling and reverse engineering techniques.
4. Identify common errors in 3D printing and evaluate pre-processing, processing, and post-processing issues.
5. Familiarize RP-related software and its role in applications such as design, manufacturing, and medical fields.

UNIT –1: INTRODUCTION TO 3D PRINTING:

Introduction to 3D Printing Introduction to Prototyping, Traditional Prototyping Vs. Rapid Prototyping (RP), Need for time compression in product development, Usage of RP parts, Generic RP process, Distinction between RP and CNC, other related technologies, Classification of RP.

UNIT –2: SOLID AND LIQUID BASED RP SYSTEM:

(9)

Working Principle, Materials, Advantages, Limitations and Applications of Fusion Deposition Modelling (FDM), Laminated Object Manufacturing (LOM), Stereo lithography (SLA), Direct Light Projection System (DLP) and Solid Ground Curing (SGC).

UNIT –3: POWDER BASED & OTHER RP SYSTEMS:

(9)

Powder Based RP Systems: Working Principle, Materials, Advantages, Limitations and Applications of Selective Laser Sintering (SLS), Direct Metal Laser Sintering (DMLS), Laser Engineered Net Shaping (LENS) and Electron Beam Melting (EBM).

Other RP Systems: Working Principle, Materials, Advantages, Limitations and Applications of Three Dimensional Printing (3DP), Ballistic Particle Manufacturing (BPM) and Shape Deposition Manufacturing (SDM)

UNIT –4: RAPID TOOLING & REVERSE ENGINEERING RAPID TOOLING:

(9)

Rapid Tooling & Reverse Engineering Rapid Tooling: Conventional Tooling Vs. Rapid Tooling, Classification of Rapid Tooling, Direct and Indirect Tooling Methods, Soft and Hard Tooling methods. Reverse Engineering (RE): Meaning, Use, RE – The Generic Process, Phases of RE Scanning, Contact Scanners and Noncontact Scanners, Point Processing, Application Geometric Model, Development.

UNIT –5: ERRORS IN 3D PRINTING AND APPLICATIONS:

(9)

Pre-processing, processing and post-processing errors, Part building errors in SLA, SLS, etc. Software: Need for software, MIMICS, Magics, SurgiGuide, 3-matic, 3D-Doctor, Simplant, Velocity2, VoXim, Solid View, 3DView, etc., software, Preparation of CAD models, Problems with STL files, STL file manipulation, RP data formats: SLC, CLI, RPI, LEAF, IGES, HP/GL, CT, STEP. Applications: Design, Engineering Analysis and planning applications, Rapid Tooling, Reverse Engineering, Medical Applications of RP.

Total Hours: 45

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES::CHITTOOR

Department of Science & Humanities IV B Tech- VII Semester

23OSH471A	WAVELET TRANSFORMS AND ITS APPLICATIONS	L	T	P	C
	OPEN ELECTIVE-III(COMMON TO ALL)	3	-	-	3

UNIT-I: Wavelets **(09)**

Wavelets and Wavelet Expansion Systems - Wavelet Expansion-Wavelet Transform-Wavelet System - More Specific Characteristics of Wavelet Systems - Haar Scaling Functions and Wavelets - effectiveness of Wavelet Analysis -The Discrete Wavelet Transform - The Discrete-Time and Continuous Wavelet Transforms.

UNIT-II: A Multi resolution Formulation of Wavelet Systems **(09)**

Signal Spaces -The ScalingFunction -Multiresolution Analysis -The Wavelet Functions - The Discrete Wavelet Transform- A Parseval's Theorem - Display of the Discrete Wavelet Transform and the Wavelet Expansion.

UNIT-III: Filter Banks and the Discrete Wavelet Transform **(09)**

Analysis - From Fine Scale to Coarse Scale- Filtering and Down-Sampling or Decimating -Synthesis - From Coarse Scale to Fine Scale -Filtering and Up-Sampling or Stretching - Input Coefficients -Lattices and Lifting - -Different Points of View.

UNIT-IV: Time – Frequency and Complexity **(09)**

Multi resolution versus Time - Frequency Analysis- Periodic versus Non periodic Discrete Wavelet Transforms -The Discrete Wavelet Transform versus the Discrete-Time Wavelet Transform- Numerical Complexity of the Discrete Wavelet Transform.

UNIT-V: Bases and Matrix Examples **(09)**

Bases, Orthogonal Bases, and Bi orthogonal Bases -Matrix Examples - Fourier Series Example - Sine Expansion Example - Frames and Tight Frames - Matrix Examples -Sine Expansion as a Tight Frame Example.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Understand wavelets and wavelet basis and characterize continuous and discrete wavelet transforms	PO1,PO2,PO3,PO4,PO12
CO2	Illustrate the multi resolution analysis adscaling functions	PO1,PO2,PO3,PO4,PO12
CO3	Implement discrete wavelet transforms with multi rate digital filters	PO1,PO2,PO3,PO4,PO12
CO4	Understand multi resolution analysis and identify various wavelets and evaluate their time-frequency resolution properties.	PO1,PO2,PO3,PO4,PO12
CO5	Design certain classes of wavelets to specification and justify the basis of the application of Wavelet transforms to different fields	PO1,PO2,PO3,PO4,PO12

TEXT BOOKS:

1. C. Sidney Burrus, Ramesh A. Gopinath, — Introduction to Wavelets and Wavelets Transforms II, Prentice Hall, (1997).
2. James S.Walker, — A Primer on Wavelets and their Scientific Applications II,CRC Press, (1999).

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES::CHITTOOR

REFERENCE BOOKS:

1. Raghuvver Rao,—Wavelet Transforms II,Pearson Education, Asia
2. C.S.Burrus,Ramose and A.Gopinath, Introduction to Wavelets and Wavelet Transform, Prentice Hall Inc.

REFERENCE WEBSITE:

1. <http://users.rowan.edu/~polikar/WAVELETS/WTtutorial.html>
2. <http://www.wavelet.org/>
3. <http://www.math.hawaii.edu/~dave/Web/Amara's%20Wavelet%20Page.htm>
4. <https://jqichina.wordpress.com/wp-content/uploads/2012/02/ten-lectures-of-waveletsefbc88e5b08fe6b3a2e58d81e8aeb2efbc891.pdf>

COURSE ARTICULATION MATRIX:

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

1-Slightly, 2-Moderately,3-Substantially.

**SREENIVASAINSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)**

Department of Science and Humanities

IV B.Tech. - VII Semester

23OSH471B	SMART MATERIALS AND DEVICES (OPEN ELECTIVE-III)	L	T	P	C
	(Common to all branches)	3	0	0	3

PRE-REQUISITES: Nil

COURSE EDUCATIONAL OBJECTIVES:

To understand the principles and applications of smart materials in engineering.

To understand the science behind smart materials and their behavior.

To elucidate the responsive characteristics of smart materials

To explore synthesis and characterization techniques for smart materials

To determine the appropriate smart material for a given application.

UNIT I Introduction to Smart Materials (9)

Historical account of the discovery and development of smart materials, Shape memory materials, chromoactive materials, magneto rheological materials, photoactive materials, Polymers and polymer composites (Basics).

UNIT II Properties of Smart Materials (9)

Optical, Electrical, Dielectric, Piezoelectric, Ferroelectric, Pyroelectric and Magnetic properties of smart materials.

UNIT III Synthesis of Smart Materials (9)

Chemical route: Chemical vapour deposition, Sol-gel technique, hydrothermal method, Mechanical alloying and thin film deposition techniques: Chemical etching, Spray pyrolysis.

UNIT IV Characterization Techniques (9)

Powder X-ray diffraction, Raman spectroscopy (RS), UV-Visible spectroscopy, Scanning electron microscopy (SEM), Transmission electron microscopy (TEM), Atomic force microscopy (AFM).

UNIT V Smart Materials based Devices (9)

Devices based on smart materials: Shape memory alloys in robotic hands, piezoelectric based devices, MEMS and intelligent devices.

**SREENIVASAINSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)**

	Course Out comes	POs
CO1	Describe the breakthroughs that transformed shape memory materials into practical applications. Describe the two phases in shape memory alloys.	PO1, PO2,PO3,PO4,PO5
CO2	Investigate how smart materials react to external influences like light, electricity, and heat.	PO1, PO2,PO3,PO4,PO5
CO3	Describe synthesis approaches for smart materials.	PO1, PO2,PO3,PO4,PO5
CO4	Overview of characterization techniques for understanding smart material behavior.	PO1, PO2,PO3,PO4, PO5
CO5	Highlight the advantages of using smart materials in device applications.	PO1, PO2,PO3,PO4

Course Articulation Matrix:

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

Text books:

1. Yaser Dahman, Nanotechnology and Functional Materials for Engineers-, Elsevier, 2017
2. E. Zschech, C. Whelan, T. Mikolajick, Materials for Information Technology: Devices, Interconnects and Packaging Springer-Verlag London Limited 2005.

REFERENCE BOOKS:

1. Gauenzi, P., Smart Structures, Wiley, 2009.
2. Mahmood Aliofkhazraei, Handbook of functional nanomaterials, Vol(1&2), Nova Publishers, 2014
3. Hand book of Smart Materials, Technologies, and Devices: Applications of Industry, 4.0, Chaudhery Mustansar Hussain, Paolo DiSia, Springer, 2022.
4. Fundamentals of Smart Materials, Mohsen Shahinpoor, Royal Society of Chemistry, 2020.

NPTEL COURSELINK:

https://onlinecourses.nptel.ac.in/noc22_me17/preview

Department of Science and Humanities

IV B.Tech VII-Semester

23OSH471C	INTRODUCTON TO QUANTUM MECHANICS (OPEN ELECTIVE III) Common to all ECE,CSE ,AIML, AI, Civil	L	T	P	C
		3	0	0	3

PRE-REQUISITES: Nil

COURSE EDUCATIONAL OBJECTIVES:

1. To comprehend the fundamental distinctions between classical and quantum mechanics.
2. To analyze the concepts of wave-particle duality and the uncertainty principle, along with their physical implications.
3. To acquire knowledge and solve the Schrödinger equation for simple quantum systems.
4. To apply operator formalism and relevant mathematical techniques in the study of quantum mechanics.
5. To investigate the quantum mechanical representations of angular momentum and spin.

UNIT- I: PRINCIPLES OF QUANTUM MECHANICS (9)

Introduction: Limitations of classical Mechanics, Difficulties with classical theories of black body radiation and origin of quantum theory of radiation. Wave-particle duality: de Broglie wavelength, Heisenberg uncertainty principle. Schrödinger time independent and time dependent wave equation, Solution of the time dependent Schrödinger equation, Concept of stationary states, Physical significance of wave function (ψ), Orthogonal, Normalized and Orthonormal functions

UNIT- II: ONE DIMENSIONAL PROBLEMS AND SOLUTIONS (9)

Potential step – Reflection and Transmission at the interface. Potential well: Square well potential with rigid walls, Square well potential with finite walls. Potential barrier: Penetration of a potential barrier (tunneling effect). Periodic potential and Harmonic oscillator, Energy eigen functions and eigen values.

UNIT-III: OPERATOR FORMALISM (9)

Operators, Operator Algebra, Eigen values and Eigen vectors, Postulates of quantum mechanics, Matrix representation of wave functions and linear operators.

UNIT- IV: MATHEMATICAL TOOLS FOR QUANTUM MECHANICS (9)

The concept of row and column matrices, Matrix algebra, Hermitian operators – definition. Dirac's bra and ket notation, Expectation values, Heisenberg (operator) representation of harmonic oscillator, Ladder operators and their significance.

UNIT- V : ANGULAR MOMENTUM AND SPIN (9)

Angular momentum operators: Definition. Eigen functions and Eigen values of AM operators. Matrix representation of angular momentum operators, System with spin

**SREENIVASAINSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)**

half(1/2), Spin angular momentum, Pauli's spin matrices. Clebsch-Gordon coefficients.
Rigid Rotator: Eigen functions and Eigen values.

	Course Outcomes	Pos
	After completing this course, students will be able to:	
CO1	Explain the foundational principles of quantum mechanics	PO1,PO2,PO3,PO4,PO5
CO2	Apply Schrödinger equations to solve one-dimensional quantum problems	PO1,PO2,PO3,PO4,PO5
CO3	Solve quantum mechanical problems using operator and matrix formulations,	PO1,PO2,PO3,PO4,PO5
CO4	Evaluate quantum states using Dirac notation and expectation values.	PO1,PO2,PO3,PO4,PO5
CO5	Analyze angular momentum and spin systems using Pauli matrices and operators.	PO1,PO2,PO3,PO4,PO5

Course Articulation Matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	2							
CO2	3	2	2	1	1							
CO3	3	3	2	1	1							
CO4	3	3	3	2	3							
CO5	3	3	1	1	1							

BOOKS FOR STUDY:

1. Quantum Mechanics. Vol 1, A. MessiaiaNoth-Holland Pub. Co., Amsterdam,(1961).
2. A Text Book of Quantum Mechanics. P.M.Mathews and K.Venkatesam, Tata McGraw Hill, New Delhi,(1976).
3. Introduction to Quantum Mechanics. R.H.Dicke and J.P.Witke, Addison-Wisley Pub.Co.Inc., London, (1960).
4. Quantum Mechanics. S.L.Gupta, V.Kumar, H.V.Sarama and R.C.Sharma, Jai PrakashNath& Co, Meerut, (1996).

REFERENCE BOOKS:

1. Quantum Mechanics. L.I. Schiff, McGraw Hill Book Co., Tokyo, (1968).
2. Introduction to Quantum Mechanics. Richard L. Liboff, Pearson Education Ltd (Fourth Edn.) 2003.

NPTEL courses link :

1. <https://archive.nptel.ac.in/courses/115/101/115101107/>
2. <https://archive.nptel.ac.in/courses/122/106/122106034/>
3. <https://nptel.ac.in/courses/115106066>

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES: CHITTOOR

Department of Science & Humanities

IV B Tech- I Semester

230SH471D	Green chemistry and Catalysis for Sustainable Environment	L	T	P	C
	OPEN ELECTIVE-III(COMMON TO ALL)	3	-	-	3

COURSE EDUCATIONAL OBJECTIVES:

1. To Understand Principle and Concepts of Green Chemistry.
2. To Understand the Types of Catalysis and Industrial Applications.
3. To Apply Green Solvents in Chemical Synthesis.
4. To Enumerate Different Sourced of Green Energy.
5. To Apply Alternative Greener Methods For Chemical Reactions

UNIT I: PRINCIPLES AND CONCEPTS OF GREEN CHEMISTRY

[09]

Introduction, Green chemistry Principles, sustainable development and green chemistry, E factor, atom economy, atom economic Reactions: Rearrangement and addition reactions and atom un-economic reactions: Substitution, elimination and Wittig reactions, Reducing Toxicity. Waste - problems and Prevention: Design for degradation, Polymer recycling

UNIT 2: CATALYSIS AND GREEN CHEMISTRY

[09]

Introduction, Types of catalysis, Heterogeneous catalysis: Basics of Heterogeneous Catalysis, Zeolite and the Bulk Chemical Industry, Heterogeneous Catalysis in the Fine Chemical and Pharmaceutical Industries, Catalytic Converters, Homogeneous catalysis: Transition Metal Catalysts with Phosphine Ligands, Greener Lewis Acids, and Phase transfer catalysis, Bio-catalysis and Photo-catalysis with examples.

UNIT 3: GREEN SOLVENTS IN CHEMICAL SYNTHESIS

[09]

Green Solvents: Concept, Tools and techniques for solvent selection, supercritical fluids: Super critical carbon dioxide, super critical water, Polyethylene glycol (PEG), Ionic liquids, Recycling of green solvents.

UNIT 4: EMERGING GREENER TECHNOLOGIES

[09]

Biomass as renewable resource, Energy: Energy from Biomass, Solar Power, Chemicals from Renewable Feedstock's, Chemicals from Fatty Acids, Polymers from Renewable Resources, Alternative Economies: The Syngas Economy, The Biorefinery, Design for energy efficiency, Mechanochemical synthesis.

UNIT 5: ALTERNATIVE GREENER METHODS

[09]

Photochemical Reactions - Examples, Advantages and Challenges, Photo redox catalysis, single electron transfer reactions (SET), Examples of Photochemical Reactions, Microwave-assisted Reactions and Sono chemical reactions, examples and applications.

Total Hours: 45

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES: CHITTOOR

COURSE OUTCOMES:

On successful completion of the course, students will be able to		POS
CO1	Apply the Green chemistry Principles for day-to-day life as well as synthesis, describe the sustainable development and green chemistry, explain economic and un-economic reactions, Demonstrate Polymer recycling.	PO1, PO2, PO3, PO4, PO5, PO7
CO2	Explain Heterogeneous catalyst and its applications in Chemical and Pharmaceutical Industries, Differentiate Homogeneous and Heterogeneous catalysis, Identify the importance of Bio and Photo Catalysis, Discuss Transition metal and Phase transfer Catalysis	PO1, PO2, PO3, PO4, PO5, PO7
CO3	Demonstrate Green solvents and importance, Discuss Supercritical carbon dioxide, Explain Supercritical water, recycling of green solvents.	PO1, PO2, PO3, PO4, PO5, PO7
CO4	Describe importance of Biomass and Solar Power, Illustrate Sonochemistry, Apply Green Chemistry for Sustainable Development; discuss the importance of Renewable resources, mechanochemical synthesis.	PO1, PO2, PO3, PO4, PO5, PO7
CO5	Discuss Alternative green methods like Photo redox catalysis, single electron transfer reactions (SET), Photochemical Reactions, Microwave-assisted Reactions and Sono chemical reactions, examples and applications.	PO1, PO2, PO3, PO4, PO5, PO7

TEXT BOOKS:

1. M. Lancaster, Green Chemistry an Introductory Text, Royal Society of Chemistry, 2002.
2. Paul T. Anastas and John C. Warner, Green Chemistry Theory and Practice, 4th Edition, Oxford University Press, Usa

REFERENCE BOOKS:

1. Green Chemistry for Environmental Sustainability, First Edition, Sanjay K. Sharma and AckmezMudhoo, CRC Press, 2010.
2. Edited by AlvisePerosa and Maurizio Selva, Hand Book of Green chemistry Volume 8: Green Nanoscience, wiley-VCH, 2013.

Mapping between Course Outcomes and Programme Outcomes

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

• **3** = Strong Mapping, **2** = Moderate Mapping, **1** = Slight Mapping, **-** = No Mapping

SREENIVASAINSTITUTE OF TECHNOLOGY AND MANAGEMENT
STUDIES: CHITTOOR
(AUTONOMOUS)

Department of Science & Humanities
IV B Tech- VII Semester

23OSH471E	EMPLOYABILITY SKILLS	L	T	P	C
	(Open Elective-III) (Common to All Branches)	3	0	0	3

Course Objectives:

1. To encourage all round development of the students by focusing on productive skills
2. To make the students aware of Goal setting and writing skills
3. To enable them to know the importance of presentations skills in achieving desired goals.
4. To help them develop organizational skills group activities.
5. To function effectively with heterogeneous teams

UNIT-I Goal Setting and Self-Management LectureHrs-9

Definition, importance, types of Goal Setting – SMART Goal Setting – Advantages – Motivation – Intrinsic and Extrinsic Motivation – Self-Management – Knowing about self – SWOC Analysis

UNIT-II Writing Skills LectureHrs-9

Definition, significance, types of writing skills – Resume writing Vs CV Writing – E-Mail writing, Cover Letters – E-Mail Etiquette – So P (Statement of Purpose)

UNIT-III Technical Presentation Skills LectureHrs-9

Nature, meaning & significance of Presentation Skills – Planning, Preparation, Presentation, Stage Dynamics – Anxiety in Public speaking (Glossophobia) – PPT & Poster Presentation

UNIT-IV Group Presentation Skills LectureHrs-9

Body Language – Group Behavior – Team Dynamics – Leadership Skills – Personality Manifestation – Group Discussion – Debate – Corporate Etiquette

UNIT-V Job Cracking Skills LectureHrs-9

Nature, characteristics, importance & types of Interviews – Job Interviews – Skills for success – Job Searching skills – STAR method – FAQs – Answering Strategies – Mock Interviews

	Course Outcomes(CO):	Blooms Level
	By the end of the program students will be able to	
1	Understand the importance of goals and try to achieve them	PO2
2	Explain the significance of self-management	PO6, PO10
3	Apply the knowledge of writing skills in preparing eye-catching resumes	PO10
4	Analyze various forms of Presentation skills	PO12
5	Judge the group behavior appropriately	PO4
6	Develop skills required for employability.	PO12, PO10

SREENIVASAINSTITUTE OF TECHNOLOGY AND MANAGEMENT
STUDIES: CHITTOOR
(AUTONOMOUS)

Text Books:

1. Sabina Pillai, Agna Fernandez. Soft Skills & Employability Skills, 2014. Cambridge Publisher.
2. Alka Wadkar. Life Skills for Success, Sage Publications, 2016.

Reference Books:

1. Gangadhar Joshi. Campus to Corporate Paperback, Sage Publications. 2015
2. Sherfield Montgomery Moody, Cornerstone Developing Soft Skills, Pearson Publications. 4Ed. 2008
3. Shikha Kapoor. Personality Development and Soft Skills-Preparing for Tomorrow. 1 Edition, Wiley, 2017.
4. M. Sen Gupta, Skills for Employability, Innovative Publication, 2019.
5. Steve Duck and David T. McMahan, The Basics of Communication Skills A Relational Perspective, Sage press, 2012.

Online Services:

<https://youtu.be/gkLsn4ddmTs>
<https://youtu.be/2bf9K2rRWwo>
<https://youtu.be/FchfE3c2jzc>
<https://youtu.be/xBaLgJZ0t6A?list=PLzf4HHlsQFwJZel j2PUy0pwjVUgj7KIJ>
<https://www.youtube.com/c/skillopedia/videos>
<https://onlinecourses.nptel.ac.in/noc25 hs96/preview>
<https://onlinecourses.nptel.ac.in/noc21 hs76/preview>
<https://archive.nptel.ac.in/courses/109/107/109107172/#>
<https://archive.nptel.ac.in/courses/109/104/109104107/>

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

Course Objectives:

The objectives of this course are to make the student:

1. To understand raster-based spatial analysis techniques, including query, overlay, and cost-distance analysis.
2. To analyze vector-based spatial analysis techniques such as topology, overlay, and proximity analysis.
3. To apply network analysis techniques for geocoding, shortest path analysis, and location-allocation problems.
4. To evaluate surface and geostatistical analysis methods, including terrain modeling, watershed analysis, and spatial interpolation.
5. To assess GIS customization, Web GIS, and mobile mapping techniques for real world applications.

Course Outcomes:

Upon successful completion of the course, students will be able to:

1. Understand raster-based spatial analysis techniques, including query, overlay, and cost-distance analysis.
2. Analyze vector-based spatial analysis techniques such as topology, overlay, and proximity analysis.
3. Apply network analysis techniques for geocoding, shortest path analysis, and location-allocation problems.
4. Evaluate surface and geostatistical analysis methods, including terrain modeling, watershed analysis, and spatial interpolation.
5. Assess GIS customization, Web GIS, and mobile mapping techniques for real-world applications.

CO–PO Articulation Matrix

Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
CO-1	3	-	-	-	2	-	-	-	-	-	-	-	3	3
CO-2	3	3	-	-	2	-	-	-	-	-	-	2	3	3
CO-4	-	-	3	3	3	-	2	-	-	-	-	-	3	3
CO-5	-	-	-	-	3	3	3	2	-	-	-	-	3	3

UNIT– I

RASTER ANALYSIS

Raster Data Exploration: Query Analysis - Local Operations: Map Algebra, Reclassification, Logical and Arithmetic Overlay Operations—Neighborhood - Operations: Aggregation, Filtering – Extended Neighborhood-Operations- Zonal Operations - Statistical Analysis – Cost-Distance Analysis-Least Cost Path.

UNIT– II

VECTOR ANALYSIS

Non-Topological Analysis: Attribute Database Query, Structured Query Language, Co Ordinate Transformation, Summary Statistics, Calculation of Area, Perimeter and Distance – topological Analysis: Reclassification, Aggregation, Overlay Analysis: Point-In-Polygon, Line-In-Polygon, Polygon-On-Polygon: Clip, Erase, Identity, Union, Intersection – Proximity Analysis: Buffering

UNIT– III

NETWORK ANALYSIS

Network – Introduction - Network Data Model – Elements of Network - Building A Network Database - Geocoding – Address Matching - Shortest Path in A Network – Time and Distance Based Shortest Path Analysis – Driving Directions – Closest Facility Analysis – Catchment / Service Area Analysis-Location-Allocation Analysis

UNIT– IV

SURFACE and GEOSTATISTICAL ANALYSIS

Surface Data – Sources of X,Y, Z Data – DEM, TIN – Terrain Analysis – Slope, Aspect, Viewshed, Watershed Analysis: Watershed Boundary, Flow Direction, Flow Accumulation, Drainage Network, Spatial Interpolation: IDW, Spline, Kriging, Variogram.

UNIT– V

CUSTOMISATION, WEBGIS, MOBILE MAPPING

Customisation of GIS: Need, Uses, Scripting Languages –Embedded Scripts – Use of Python Script - Web GIS: Web GIS Architecture, Advantages of Web GIS, Web Applications- Location Based Services: Emergency and Business Solutions - Big Data Analytics.

TEXT BOOKS:

1. Kang – Tsung Chang, Introduction to Geographical Information System, 4th Ed., Tata McGraw Hill Edition, 2008.
2. Lo, C.P. and Yeung, Albert K.W., Concepts and Techniques of Geographic Information Systems Prentice Hall, 2002.

REFERENCE BOOKS:

1. Michael N. Demers, Fundamentals of Geographic Information Systems, Wiley, 2009
2. Ian Heywood, Sarah Cornelius, Steve Carver, Srinivasaraju, —An Introduction to Geographical Information Systems, Pearson Education, 2nd Edition, 2007.
3. John Peter Wilson, The Handbook of Geographic Information Science, Blackwell Pub., 2008

Online Learning Resources:

<https://archive.nptel.ac.in/courses/105/105/105105202/>
https://onlinecourses.nptel.ac.in/noc19_cs76/preview

23OCE472B	SOLID WASTE MANAGEMENT (OE – IV)	L	T	P	C
		3	0	0	3

Course Objectives:

The objectives of this course are to make the student :

1. To understand the types, sources, and characteristics of solid waste, along with regulatory frameworks.
2. To analyze engineering systems for solid waste collection, storage, and transportation.
3. To apply resource and energy recovery techniques for sustainable solid waste management.
4. To evaluate landfill design, construction, and environmental impact mitigation strategies.
5. To assess hazardous waste management techniques, including biomedical and e-waste disposal.

Course Outcomes:

1. Understand the types, sources, and characteristics of solid waste, along with regulatory frameworks.
2. Analyze engineering systems for solid waste collection, storage, and transportation.
3. Apply resource and energy recovery techniques for sustainable solid waste management.
4. Evaluate landfill design, construction, and environmental impact mitigation strategies.
5. Assess hazardous waste management techniques, including biomedical and e-waste

CO–PO Articulation Matrix

Course Outcomes	PO	P	P	P	PS	PS								
	1	2	3	4	5	6	7	8	9	10	11	12	O1	O2
CO-1	3	-	-	-	2	-	2	-	-	-	-	-	3	3
CO-2	3	3	-	-	2	-	3	-	-	-	-	2	3	3
CO-3	3	-	3	2	3	-	3	-	-	-	-	-	3	3
CO-4	-	-	3	3	3	-	3	2	-	-	-	-	3	3
CO-5	-	-	-	-	3	3	3	3	-	-	-	-	3	3

UNIT– I

Solid Waste: Definitions, Types of Solid Wastes, Sources of Solid Wastes, Characteristics, and Perspectives; Properties of Solid Wastes, Sampling of Solid Wastes, Elements of Solid Waste Management - Integrated Solid Waste Management, Solid Waste Management Rules 2016.

UNIT– II

Engineering Systems for Solid Waste Management: Solid Waste Generation; On-Site Handling, Storage and Processing; Collection of Solid Wastes; Stationary Container System and Hauled Container Systems – Route Planning - Transfer and Transport; Processing Techniques;

UNIT– III

Engineering Systems for Resource and Energy Recovery: Processing Techniques; Materials Recovery Systems; Recovery of Biological Conversion Products – Composting, Pre and Post Processing, Types of Composting, Critical Parameters, Problems with Composting - Recovery of Thermal Conversion Products; Pyrolysis, Gasification, RDF - Recovery of Energy from Conversion Products; Materials and Energy Recovery Systems.

UNIT– IV

Landfills: Evolution of Landfills – Types and Construction of Landfills – Design Considerations – Life of Landfills- Landfill Problems – Lining of Landfills – Types of Liners – Leachate Pollution and Control – Monitoring Landfills – Landfills Reclamation.

UNIT– V

Hazardous Waste Management: – Sources and Characteristics, Effects on Environment, Risk Assessment–Disposal of Hazardous Wastes–Secured Landfills, Incineration -Monitoring–Biomedical Waste Disposal, E-Waste Management, Nuclear Wastes, Industrial Waste Management

TEXT BOOKS:

1. Tchobanoglous G, Theisen H and Vigil SA _Integrated Solid Waste Management, Engineering Principles and Management Issues ‘McGraw-Hill, 1993.
2. Vesilind PA, Worrell W and Reinhart D, _Solid Waste Engineering ‘Brooks/Cole Thomson Learning Inc., 2002.

REFERENCE BOOKS:

1. Peavy, H.S, Rowe, D.R., and G. Tchobanoglous, _Environmental Engineering ‘, McGraw Hill Inc., New York, 1985.
2. Qian X, Koerner RM and Gray DH, _Geotechnical Aspects of Landfill Design and Construction ‘Prentice Hall, 2002.

Online Learning Resources:

<https://archive.nptel.ac.in/courses/105/103/105103205/>
<https://archive.nptel.ac.in/courses/120/108/120108005/>

**SREENIVASAINSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)**

230EE472A	ELECTRIC VEHICLES	L	T	P	C
		3	0	0	3

PRE-REQUISITES: NIL

COURSE EDUCATIONAL OBJECTIVES: To make the student

1. Remember and understand the differences between conventional Vehicle and Electric Vehicles, electro mobility and environmental issues of EVs.
2. Analyze various EV configurations, parameters of EV systems and Electric vehicle Dynamics.
3. Analyze the basic construction, operation and characteristics of fuel cells and battery charging techniques in HEV systems
4. Design and analyze the various control structures for Electric vehicle

UNIT –1: Introduction to EV Systems and Energy Sources: (9)

Past, Present and Future of EV - EV Concept- EV Technology- State-of-the Art of EVs- EV configuration- EV system- Fixed and Variable gearing- Single and multiple motor drive- In-wheel drives- EV parameters: Weight, size, force and energy, performance parameters. Electro mobility and the environment- History of Electric power trains- Carbon emissions from fuels- Green houses and pollutants- Comparison of conventional, battery, hybrid and fuel cell electric systems.

UNIT –2: EV Propulsion and Dynamics: (9)

Choice of electric propulsion system- Block diagram- Concept of EV Motors- Single and multi- motor configurations- Fixed and variable geared transmission- In-wheel motor configuration- Classification - Electric motors used in current vehicle applications - Recent EV Motors- Vehicle load factors- Vehicle acceleration.

UNIT –3: Fuel Cells: (9)

Introduction of fuel cells- Basic operation- Model - Voltage, power and efficiency- Power plant system – Characteristics- Sizing - Example of fuel cell electric vehicle - Introduction to HEV- Brake specific fuel consumption - Comparison of Series-Parallel hybrid systems- Examples.

UNIT –4: Battery Charging and Control: (9)

Battery charging: Basic requirements- Charger architecture- Charger functions- Wireless charging- Power factor correction.

Control: Introduction- Modelling of electro mechanical system- Feedback controller design approach-

PI controller's designing- Torque-loop, Speed control loop compensation- Acceleration of battery electric vehicle

UNIT –5: Energy Storage Technologies: (9)

Role of Energy Storage Systems- Thermal- Mechanical-Chemical- Electrochemical- Electrical - Efficiency of energy storage systems- Super Capacitors-Superconducting Magnetic Energy Storage (SMES)- SOC- SoH -fuel cells - G2V- V2G- Energy storage in Micro-grid and Smart grid- Energy Management with storage systems- Battery SCADA

Total Hours: 45



OPEN ELECTIVE- IV

IV B.Tech. - VII Semester

23OECE472A

TRANSDUCERS AND SENSORS

L T P C
3 0 0 3

PRE-REQUISITES: -

COURSE EDUCATIONAL OBJECTIVES:

1. To understand characteristics of Instrumentation System and the operating principle of motion transducers.
2. To explore working principles, and applications of different temperature transducers and Piezo-electric sensors.
3. To provide knowledge on flow transducers and their applications.
4. To study the working principles of pressure transducers.
5. To introduce working principle and applications of force and sound transducers.

UNIT I -INTRODUCTION

(9)

Introduction: General Configuration and Functional Description of measuring instruments, Static and Dynamic Characteristics of Instrumentation System, Errors in Instrumentation System, Active and Passive Transducers and their Classification.

Motion Transducers: Resistive strain gauge, LVDT, RVDT, Capacitive transducers, Piezo-electric transducers, seismic displacement pick-ups, vibrometers and accelerometers.

UNIT II - TEMPERATURE TRANSDUCERS

(9)

Temperature Transducers: Standards and calibration, fluid expansion and metal expansion type transducers - bimetallic strip, Thermometer, Thermistor, RTD, Thermocouple and their characteristics.

Hall effect transducers, Digital transducers, Proximity devices, Bio-sensors, Smart sensors, Piezo-electric sensors.

UNIT III - FLOW TRANSDUCERS

(9)

Flow Transducers: Bernoulli's principle and continuity, Orifice plate, Nozzle plate, Venture tube, Rotameter, Anemometers, Electromagnetic flow meter, Impeller meter and Turbid flow meter.

UNIT IV - PRESSURE TRANSDUCERS

(9)

Pressure Transducers: Standards and calibration, different types of manometers, elastic transducers, diaphragm bellows, bourdon tube, capacitive and resistive pressure transducers, high and low pressure measurement.

UNIT V - FORCE AND SOUND TRANSDUCERS

(9)

Force and Sound Transducers: Proving ring, hydraulic and pneumatic load cell, dynamometer and gyroscopes. Sound level meter, sound characteristics, Microphone.

Total Hours: 45

**SREENIVASAINSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)**

DEPARTMENT OF MECHANICAL ENGINEERING

IV B.Tech. - VII Semester

23OME472A

**FUNDAMENTALS OF QUALITY MANAGEMENT
(Mechanical Branch)**

**L T P C
3 0 0 3**

PRE-REQUISITES: The objectives of the course are to

COURSE EDUCATIONAL OBJECTIVES:

1. To introduce the fundamental concepts, definitions, and dimensions of quality and Total Quality Management (TQM).
2. To explore the evolution of quality management through historical perspectives and contributions of quality gurus.
3. To explain the core principles of TQM including customer satisfaction, employee involvement, and continuous improvement.
4. To analyze the various TQM tools such as Benchmarking, QFD, FMEA, Six Sigma, and their role in quality enhancement.
5. To provide an understanding of quality systems like ISO 9000, ISO 14000, QS 9000, and the processes for their implementation.

UNIT –1: INTRODUCTION TO QUALITY MANAGEMENT: (9)

Introduction: Definition of Quality, Dimensions of Quality, Definition of Total quality management, Quality Planning, Quality costs – Analysis, Techniques for Quality costs, Basic concepts of Total Quality Management.

UNIT –2: HISTORICAL REVIEW: (9)

Historical Review: Quality council, Quality statements, Strategic Planning, Deming Philosophy, Barriers of TQM Implementation, Benefits of TQM, Characteristics of successful quality leader, Contributions of Gurus of TQM, Case studies.

UNIT –3: PRINCIPLES OF QUALITY MANAGEMENT: (9)

TQM Principles: Customer Satisfaction – Customer Perception of Quality, Customer Complaints, Service Quality, Customer Retention, Employee Involvement – Motivation, Empowerment teams, Continuous Process Improvement – Juran Trilogy, PDSA Cycle, Kaizen, Supplier Partnership – Partnering, sourcing, Supplier Selection, Supplier Rating, Relationship Development, Performance Measures – Basic Concepts, Strategy, Performance Measure Case studies.

UNIT –4: TQM TOOLS: (9)

TQM Tools: Benchmarking – Reasons to Benchmark, Benchmarking Process, Quality Function Deployment (QFD) – House of Quality, QFD Process, Benefits, Taguchi Quality Loss Function, Total Productive Maintenance (TPM) – Concept, Improvement Needs, FMEA – Stages of FMEA, The seven tools of quality, Process capability, Concept of Six Sigma, New Seven management tools, Case studies.

UNIT –5: QUALITY SYSTEMS: (9)

Need for ISO 9000 – ISO 9001-2008 Quality System – Benefits of ISO registration – ISO 9000 series of standards – AS 9100, TS16949 and TL 9000 – ISO 9001 Requirements – Implementation – Documentation – Internal and external audits – Registration – TQM implementation in manufacturing and service sectors. Environmental Management System: Introduction – ISO 14000 Series Standards – Concepts of ISO 14001—Requirements of ISO 14001 – Benefits of EMS.

Total Hours: 45

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES::CHITTOOR

**Department of Science & Humanities
III B Tech - VII Semester**

23OSH472A	FINANCIAL MATHEMATICS	L	T	P	C
	OPEN ELECTIVE - IV(COMMON TO ALL)	3	-	-	3

COURSE EDUCATIONAL OBJECTIVES:

1. To provide mathematical foundations for financial modelling, risk assessment and asset pricing.
2. To introduce stochastic models and their applications in pricing derivatives and interest rate modelling.
3. To develop analytical skills for fixed-income securities, credit risk, and investment strategies.
4. To equip students with computational techniques for pricing financial derivatives.

UNIT-I: Asset Pricing and Risk Management (09)

Fundamental financial concepts: Returns, arbitrage, valuation, and pricing. Asset/Liability management, investment income, capital budgeting, and contingent cash flows. One-period model: Securities, payoffs, and the no-arbitrage principle. Option contracts: Speculation and hedging strategies, CAP Model, Efficient market hypothesis.

UNIT-II: Stochastic Models in Finance (09)

Random Walks and Brownian Motion. Introduction to Stochastic Differential Equations (SDEs): Drift and diffusion. Ito calculus: Ito's Lemma, Ito Integral, and Ito Isometry.

UNIT-III: Interest Rate and Credit Modelling (09)

Interest rate models and bond markets. Short-rate models: Vasicek, Cox-Ingersoll-Ross (CIR), Hull & White models, Credit risk modelling: Hazard function and hazard rate.

UNIT-IV: Fixed-Income Securities and Bond Pricing (09)

Characteristics of fixed-income products: Yield, duration, and convexity. Yield curves, forward rates, and zero-coupon bonds. Stochastic interest rate models and bond pricing PDE. Yield curve fitting and calibration techniques, Mortgage Backed Securities.

UNIT-V: Exotic Options and Computational Finance (09)

Stochastic volatility models and the Feynman-Kac theorem. Exotic options: Barriers, Asians, and Look backs. Monte Carlo methods for derivative pricing, Black-Scholes-Merton model: Derivation and applications.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Explain fundamental financial concepts, including arbitrage, valuation, and risk.	PO1,PO2,PO5,PO11,PO12
CO2	Apply stochastic models, including Brownian motion and Stochastic Differential Equations (SDEs), in financial contexts.	PO1,PO2,PO3,PO4,PO5,PO11,PO12
CO3	Analyze mathematical techniques for pricing options and financial derivatives.	PO1,PO2,PO3,PO4,PO5,PO6,PO11,PO12
CO4	Evaluate interest rate models and bond pricing methodologies.	PO1,PO2,PO3,PO4,PO5,PO11,PO12
CO5	Utilize computational techniques such as Monte Carlo simulations for financial modeling.	PO1,PO2,PO3,PO4,PO5,PO11,PO12

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES::CHITTOOR

TEXT BOOKS:

1. Ales Cerny, *Mathematical Techniques in Finance: Tools for Incomplete Markets*, Princeton University Press.
2. S.R.Pliska, *Introduction to Mathematical Finance: Discrete-Time Models*, Cambridge University Press.

REFERENCE BOOKS:

1. Ioannis Karatzas & Steven E. Shreve, *Methods of Mathematical Finance*, Springer, New York.
2. John C. Hull, *Options, Futures, and Other Derivatives*, Pearson.

REFERENCE WEBSITE:

- MIT–Mathematics for Machine Learning <https://ocw.mit.edu>
- Coursera – Financial Engineering and Risk Management (Columbia University) <https://www.coursera.org/>
- National Stock Exchange (NSE) India-Financial Derivatives <https://www.nseindia.com/>

COURSE ARTICULATION MATRIX:

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

• 3=Strong Mapping, 2=Moderate Mapping, 1=Slight Mapping, -=No Mapping

DEPARTMENT OF SCIENCE AND HUMANITIES
IV B.Tech -VII Semester

23OSH472B	SENSORS AND ACTUATORS FOR ENGINEERING APPLICATIONS (Open Elective-IV)	L	T	P	C
	(Common to all branches)	3	0	0	3

PRE-REQUISITES: Nil

COURSE EDUCATIONAL OBJECTIVES:

1. To provide comprehensive exposure to various types of sensors and actuators, along with their engineering applications.
2. To impart fundamental knowledge of the laws and phenomena governing the operation of sensors and actuators.
3. To explain the working principles and functionality of different sensors and actuators.
4. To educate students on the fabrication techniques and processes involved in sensor development.
5. To identify and explain the appropriate sensors and actuators required for interdisciplinary applications.

UNIT-I -INTRODUCTION TO SENSORS AND ACTUATORS (9)

Sensors: Types of sensors: temperature, pressure, strain, active and passive sensors, General characteristics of sensors (Principles only), Deposition: Chemical Vapor Deposition, Pattern: photolithography and Etching: Dry and Wet Etching.
Actuators: Functional diagram of actuators, Types of actuators and their basic principle of working: Pneumatic, Electromagnetic, Piezo-electric and Piezo-resistive actuators, Applications of Actuators.

UNIT-II- TEMPERATURE AND MECHANICAL SENSORS (9)

Temperature Sensors: Types of temperature sensors and their basic principle of working: Thermo-resistive sensors: Thermistors, Thermo-electric sensors: Thermocouples, PN junction temperature sensors
Mechanical Sensors: Types of Mechanical sensors and their basic principle of working: Force sensors: Strain gauges, Tactile sensors, Pressure sensors: Piezoresistive, Variable Reluctance Sensor (VRP).

UNIT-III OPTICAL AND ACOUSTIC SENSORS (9)

Optical Sensors: Basic principle and working of: Photodiodes, Phototransistors and Photoresistors based sensors, Photomultipliers, Infrared sensors: thermal, Passive Infra-Red, Fiber based sensors and Thermopiles
Acoustic Sensors: Principle and working of Ultrasonic sensors, Piezo-electric resonators, Microphones

UNIT-IV- Magnetic and Electromagnetic Sensors (9)

Motors as actuators (linear, rotational, stepping motors), magnetic valves, inductive sensors (LVDT, RVDT, and Proximity), Hall Effect sensors, Magneto-resistive sensors, Magneto strictive sensors and actuators.

UNIT-V-Chemical and Radiation Sensors (9)

Chemical Sensors: Principle and working of Electro-chemical, Thermo-chemical, Gas, pH, Humidity and moisture sensors.

**SREENIVASAINSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)**

Radiation Sensors: Principle and working of Ionization detectors, Scintillation detectors, Semiconductor radiation detectors and Microwave sensors (resonant, reflection, transmission)

	Course Outcomes On successful completion of the course, students will be able to	POs
CO1	Classify various types of sensors and actuators along with their key characteristics.	PO1,PO2,PO3, PO4,PO5
CO2	Review the working principles and applications of temperature and mechanical sensors.	PO1,PO2,PO3, PO4,PO5
CO3	Explain the construction and functionality of different optical and mechanical sensors.	PO1,PO2,PO3, PO4,PO5
CO4	Analyze the operational principles and applications of optical and acoustic sensors.	PO1,PO2,PO3, PO4
CO5	Interpret the significance of smart materials in the design and development of advanced devices.	PO1,PO2,PO3, PO4

Course Articulation Matrix:

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

Textbooks:

1. Sensors and Actuators – Clarence W. de Silva, CRC Press, 2nd Edition, 2015
2. Sensors and Actuators, D.A.Hall and C.E.Millar, CRC Press, 1999

Reference Books:

1. Sensors and Transducers- D.Patranabis, Prentice Hall of India (Pvt) Ltd. 2003
2. Measurement, Instrumentation, and Sensors Handbook-John G.Webster, CRC press 1999
3. Sensors – A Comprehensive Sensors- Henry Bolte, John Wiley.
4. Handbook of modern sensors, Springer, Stefan Johann Rupitsch.

NPTEL course link: https://onlinecourses.nptel.ac.in/noc21_ee32/preview

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES: CHITTOOR

Department of Science & Humanities

IV B Tech- I Semester

23OSH472C	CHEMISTRY OF NANOMATERIALS AND APPLICATIONS	L	T	P	C
	OPEN ELECTIVE-IV(COMMON TO ALL)	3	-	-	3

COURSE EDUCATIONAL OBJECTIVES:

1. To understand basics and characterization of nanomaterials.
2. To understand synthetic methods of nanomaterials.
3. To apply various techniques for characterization of nanomaterials.
4. To understand Studies of Nano-structured Materials
5. To enumerate the applications of advanced nanomaterials in engineering

Unit – I Basics and Characterization of Nanomaterials: [09]

Introduction, Scope of nanoscience and nanotechnology, nanoscience in nature, classification of nanostructured materials, importance of nanomaterials.

Unit – II Synthesis of nanomaterials: [09]

Top-Down approach, Inert gas condensation, arc discharge method, aerosol synthesis, plasma arc technique, ion sputtering, laser ablation, laser pyrolysis, and chemical vapour deposition method, electrodeposition method, high energy ball milling method.

Synthetic Methods: Bottom-Up approach, Sol-gel synthesis, microemulsions or reverse micelles, co-precipitation method, solvothermal synthesis, hydrothermal synthesis, microwave heating synthesis and son chemical synthesis.

UNIT-III Techniques for characterization: [09]

Diffraction technique, spectroscopy techniques, electron microscopy techniques for the characterization of nanomaterials, BET method for surface area analysis, dynamic light scattering for particle size determination.

UNIT-IV Studies of Nano-structured Materials: [09]

Synthesis, properties and applications of the following nanomaterials -fullerenes, carbon nanotubes, 2D-nanomaterial (Graphene), core-shell, magnetic nanoparticles, thermoelectric materials, non-linear optical materials.

UNIT-V Advanced Engineering Applications of Nanomaterials: [09]

Applications of Nano Particle, nanorods, nano wires, Water treatment, sensors, electronic devices, medical domain, civil engineering, chemical engineering, metallurgy and mechanical engineering, food science, agriculture, pollutants degradation.

Total Hours: 45

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES: CHITTOOR

COURSE OUTCOMES:

On successful completion of the course, students will be able to		POS
CO1	Classify the nanostructure materials; describe scope of nanoscience and importance technology.	PO1, PO2, PO3, PO4, PO5, PO7
CO2	Describe the top-down approach, explain aerosol synthesis and plasma arc technique, differentiate chemical vapor deposition method and electrode position method, Discuss about high energy ball milling.	PO1, PO2, PO3, PO4, PO5, PO7
CO3	Discuss different technique for characterization of nanomaterial, explain electron microscopy techniques for characterization of nanomaterial, Describe BET method for surface area analysis.	PO1, PO2, PO3, PO4, PO5, PO7
CO4	Explain synthesis and properties and applications of nanomaterials, discuss about fullerenes and carbon nanotubes, Differentiate nanomagnetic materials and thermoelectric materials, nonlinear optical materials.	PO1, PO2, PO3, PO4, PO5, PO7
CO5	Illustrate advance engineering applications of Water treatment, sensors, electronic devices, medical domain, civil engineering, chemical engineering, metallurgy and mechanical engineering, food science, agriculture, pollutants degradation.	PO1, PO2, PO3, PO4, PO5, PO7

TEXT BOOKS:

- 1. NANO: The Essentials:** T Pradeep, MaGraw-Hill, 2007.
- 2. Textbook of Nanoscience and nanotechnology:** B S Murty, P Shankar, Baldev Rai, BB Rath and James Murday, Univ. Press, 2012.

REFERENCES:

1. Concepts of Nano chemistry; Ludovico Cademrtiri and Geoffrey A. Ozin & Geoffrey A. Ozin, Wiley-VCH, 2011.
2. **Nanostructures & Nanomaterials; Synthesis, Properties & Applications:** Guozhong Cao, Imperial College Press, 2007.

Mapping between Course Outcomes and Programme Outcomes

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

• **3** = Strong Mapping, **2** = Moderate Mapping, **1** = Slight Mapping, **-** = No Mapping

SREENIVASAINSTITUTE OF TECHNOLOGY AND MANAGEMENT
STUDIES: CHITTOOR
(AUTONOMOUS)

Department of Science & Humanities
IV B Tech- VII Semester

23OSH472D	LITERARY VIBES (Open Elective -IV) (Common to all branches)	L	T	P	C
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Course Objectives:

1. To inculcate passion for an esthetic sense and reading skills
2. To encourage respecting others' experiences and creative writing
3. To explore emotions, communication skills and critical thinking
4. To educate how books serve as the reflection of history and society
5. To provide practical wisdom and duty of responding to events of the times

UNIT I: Poetry

1. Ulysses-Alfred Lord Tennyson
2. Night of the Scorpion – Nissim Ezekiel
3. The Second Coming-W.B. Yeats
4. Where the Mind is Without Fear-Rabindranath Tagore

UNIT II :Drama: *Twelfth Night*-William Shakespeare

1. Shakespeare-life and works
1. Plot & sub-plot and Historical background of the play
2. Themes and Criticism
3. Style and literary elements
4. Characters and characterization

UNIT III: Short Story

1. The Luncheon-Somerset Maugham
2. The Happy Prince-Oscar Wilde
3. Three Questions–Leo Tolstoy
4. Grief–Antony Chekov

UNIT IV: Prose: Essay and Autobiography

1. My Early Days – Dr. A.P.J. Abdul Kalam
2. The English Teacher – R.K. Narayan
3. The story of My Life-Helen Keller
4. Student Mobs-JB Priestly

UNIT V :Novel : *A Tale of Two Cities*-Charles Dickens

1. Charles Dickens-Life and works
2. Plot and Historical background of the novel
3. Themes and criticism
4. Style and literary elements
5. Characters and characterization

SREENIVASAINSTITUTE OF TECHNOLOGY AND MANAGEMENT
STUDIES: CHITTOOR
(AUTONOMOUS)

Course Outcomes		PO
CO1	Identify genres, literary techniques and creative uses of language in literary texts.	PO1,
CO2	Explain the relevance of themes found in literary texts to contemporary, Personal and cultural values and to historical forces.	PO4
CO3	Apply knowledge and understanding of literary texts when Responding to others' problems and their own and make evidence– based arguments.	PO6,PO10
CO4	Analyze the under lying meanings of the text by using the elements of literary texts	PO5
CO5	Evaluate their own work and that of others critically	PO12
CO6	Develop as creative, effective, independent and reflective students who are able to make informed choices in process and performance	PO10

Text Books:

1. Charles Dickens. *Hard Times*. (Sangam Abridged Texts) Vantage Press, 1983
2. DENT JC. *William Shakespeare. Twelfth Night*. Oxford University Press, 2016.

References:

1. W Jong. *History of English Literature*, Rupa Publications India; First Edition (4 October 2015)
2. R K Kaushik And S C Bhatia. *Essays, Short Stories and One Act Plays*, Oxford University Press .2018.
3. Dhanvel, SP. *English and Soft Skills*, Orient Blackswan, 2017.
4. *New Horizon*, Pearson publications, New Delhi 2014
5. Vimala Ramarao, *Explorations Volume-II*, Prasaranga Bangalore University, 2014.
6. Dev Neira, Anjana & Co. *Creative Writing: A Beginner's Manual*. Pearson India, 2008.

Online Resources

<https://www.litcharts.com/poetry/alfred-lord-tennyson/ulysses>
<https://www.litcharts.com/lit/ain-t-i-a-woman/summary-and-analysis>
https://englishliterature.education/articles/poetry-analysis/the-second-coming-by-w-b-yeats-critical-analysis-summary-and-line-by-line-explanation/#google_vignette
<https://sirjutorials.com/where-the-mind-is-without-fear-poem-notes-explanation/>
<https://www.litcharts.com/lit/twelfth-night/themes>
<https://smartenglishnotes.com/2021/11/28/the-luncheon-summary-characters-themes-and-irony/>
https://onlinecourses.nptel.ac.in/noc21_hs76/preview
<https://archive.nptel.ac.in/courses/109/107/109107172/#>
<https://archive.nptel.ac.in/courses/109/104/109104107/>

Course Articulation Matrix:

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

3=Strong Mapping, 2=Moderate Mapping, 1=Slight Mapping, -No Mapping



DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

**IV B.Tech. - VII Semester
SKILL ENHANCEMENT COURSE**

23CAI474L

PROMPT ENGINEERING

**L T P C
0 1 2 2**

PRE-REQUISITES: NIL

COURSE EDUCATIONAL OBJECTIVES:

1. This course delves into prompt engineering principles, strategies, and best practices, a crucial aspect in shaping AI models' behavior and performance.
2. Understanding Prompt Engineering is a comprehensive course designed to equip learners with the knowledge and skills to effectively generate and utilize prompts in natural language processing (NLP) and machine learning (ML) applications.
3. This course delves into prompt engineering principles, strategies, and best practices, a crucial aspect in shaping AI models' behaviour and performance.

MODULE 1: INTRODUCTION TO PROMPT ENGINEERING

Lesson 1: Foundations of Prompt Engineering

- Overview of prompt engineering and its significance in NLP and ML.
- Historical context and evolution of prompt-based approaches.

MODULE 2: TYPES OF PROMPTS AND THEIR APPLICATIONS

Lesson 2: Closed-Ended Prompts

- Understanding and creating prompts for specific answers.
- Applications in question- answering systems.

Lesson 3: Open-Ended Prompts

- Crafting prompts for creative responses.
- Applications in language generation models.

MODULE 3: STRATEGIES FOR EFFECTIVE PROMPTING

Lesson 4: Probing Prompts

- Designing prompts to reveal model biases.
- Ethical considerations in using probing prompts.

Lesson 5: Adversarial Prompts

- Creating prompts to stress-test models.
- Enhancing robustness through adversarial prompting.

MODULE 4: FINE-TUNING AND OPTIMIZING WITH PROMPTS

Lesson 6: Fine-Tuning Models with Prompts

- Techniques for incorporating prompts during model training.
- Balancing prompt influence and generalization.

Lesson 7: Optimizing Prompt Selection

- Methods for selecting optimal prompts for specific tasks.
- Customizing prompts based on model behavior.

MODULE 5: EVALUATION AND BIAS MITIGATION

Lesson 8: Evaluating Prompt Performance

- Metrics and methodologies for assessing model performance with prompts.
- Interpreting and analyzing results.

Lesson 9: Bias Mitigation in Prompt Engineering

- Strategies to identify and address biases introduced by prompts.
- Ensuring fairness and inclusivity in prompt-based models.



MODULE 6: REAL-WORLD APPLICATIONS AND CASE STUDIES

Lesson 10: Case Studies in Prompt Engineering

- Exploration of successful implementations and challenges in real-world scenarios.
- Guest lectures from industry experts sharing their experiences

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Understanding the fundamentals and evolution of prompt engineering.	PO1, PO2
CO2	Gaining the ability to craft effective closed-ended, open-ended, and role-based prompts.	PO1, PO3
CO3	Learning to probe and stress-test AI models for bias and robustness.	PO1, PO2, PO4
CO4	Applying prompt optimization techniques and performance evaluation methods.	PO1, PO2, PO3, PO4
CO5	Mitigating bias and promoting ethical prompting practices in NLP/ML systems.	PO1, PO2, PO4, PO5

TEXT BOOKS:

1. "Prompt Engineering in Action" — Danny D. Sullivan
2. "The Art of Prompt Engineering with Chat GPT: A Hands-On Guide" — Nathan Hunter.

REFERENCE BOOKS:

- 1."Prompt Engineering in Practice" — Michael F. Lewis
2. "Mastering AI Prompt Engineering: The Ultimate Guide for Chat GPT Users" — Adriano Damiao
3. "Writing AI Prompts For Dummies" — Stephanie Diamond and Jeffrey Allan
4. "Prompt Engineering Guide" (Online Resource) —promptingguide.ai

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	2	-	2	-	-	-	-	-	-	-	-
CO.4	3	3	3	2	-	-	-	-	-	-	-	-
CO.5	3	3	-	3	2	-	-	-	-	-	-	-
CO*	3	2.8	1.2	1.4	2	-	-	-	-	-	-	-



[Document title]

Course Code	GENDER SENSITIZATION	L	T	P	C
23MAC471U		0	0	2	0

Course Objectives:

- To enable students to understand the gender related issues, vulnerability of women and men
- To familiarize them about constitutional safeguard for gender equality
- To expose the students to debates on the politics and economics of work
- To help students reflect critically on gender violence
- To make them understand that gender identities and gender relations are part of culture as they shape the way daily life is lived in the family as well as wider community and the workplace.

Course Outcomes (CO):

COs	Statements	Blooms level
CO1	Understand the basic concepts of gender and its related terminology	L1, L2,
CO2	Identify the biological, sociological, psychological and legal aspects of gender.	L1, L2
CO3	Use the knowledge in understanding how gender discrimination works in our society and how to counter it.	L3
CO4	Analyzethe gendered division of labour and its relation to politics and economics.	L4
CO5	Appraise how gender-role beliefs and sharing behaviour are associated with more well-being in all culture and gender groups	L5
CO6	Develop students' sensibility with regard to issues of gender in contemporary India	L3

Unit-1UNDERSTANDING GENDE

Introduction: Definition of Gender-Basic Gender Concepts and Terminology-Exploring Attitudes towards Gender-Construction of Gender-Socialization: Making Women, Making Men - Preparing for Womanhood. Growing up Male. First lessons in Caste.

Unit-2GENDER ROLES AND RELATIONS

Two or Many? -Struggles with Discrimination-Gender Roles and Relations-Types of Gender Roles- Gender Roles and Relationships Matrix-Missing Women-Sex Selection and its Consequences- Declining Sex Ratio- Demographic Consequences-Gender Spectrum -

Unit-3GENDER AND LABOUR

Division and Valuation of Labour-Housework: The Invisible Labor- —My Mother doesn't Work.|| —Share the Load.||-Work: Its Politics and Economics -Fact and Fiction- Unrecognized



[Document title]

and Unaccounted work -Gender Development Issues-Gender, Governance and Sustainable Development-Gender and Human Rights-Gender and Mainstreaming

Unit-4 GENDER-BASED VIOLENCE

The Concept of Violence- Types of Gender-based Violence-Gender-based Violence from a Human Rights Perspective-Sexual Harassment - Domestic Violence - Different forms of violence against women - Causes of violence, impact of violence against women - Consequences of gender-based violence

Unit-5 GENDER AND CULTURE

Gender and Film-Gender and Electronic Media-Gender and Advertisement-Gender and Popular Literature- Gender Development Issues-Gender Issues-Gender Sensitive Language-Just Relationships

Prescribed Books

1. A.Suneetha, Uma Bhrugubanda, et al. *Towards a World of Equals: A Bilingual Textbook on Gender*, Telugu Akademi, Telangana, 2015.
2. Butler, Judith. *Gender Trouble: Feminism and the Subversion of Identity*. UK Paperback Edn. March 1990

Reference Books

1. Wtatt, Robin and Massood, Nazia, *Broken Mirrors: The dowry Problems in India*, London : Sage Publications, 2011
2. Datt, R. and Kornberg, J.(eds), *Women in Developing Countries, Assessing Strategies for Empowerment*, London: Lynne Rienner Publishers, 2002
3. Brush, Lisa D., *Gender and Governance*, New Delhi, Rawat Publication, 2007
4. Singh, Directi, *Women and Politics World Wide*, New Delhi, Axis Publications, 2010
5. Raj Pal Singh, Anupama Sihag, *Gender Sensitization: Issues and Challenges* (English, Hardcover), Raj Publications, 2019
6. A.Revathy& Murali, Nandini, *A Life in Trans Activism*(Lakshmi Narayan Tripathi). The University of Chicago Press, 2016

Online Resources:

1. Understanding

Genderextension://kdpelmjpfafjppnhbloffcjpeomlnpah/https://www.arvindguptatoys.com/arvindgupta/kamla-gender1.pdfhttps://onlinecourses.swayam2.ac.in/nou24_hs53/preview

2. Gender Roles and Relations



[Document title]

<https://www.plannedparenthood.org/learn/gender-identity/sex-gender-identity/what-are-gender-roles-and-stereotypes>

<https://www.verywellmind.com/understanding-gender-roles-and-their-effect-on-our-relationships-7499408>

https://onlinecourses.swayam2.ac.in/cec23_hs29/preview

3. Gender and Labour

<https://www.economicsobservatory.com/what-explains-the-gender-division-of-labour-and-how-can-it-be-redressed>

https://onlinecourses.nptel.ac.in/noc23_mg67/preview

4. GENDER-BASED VIOLENCE

https://eige.europa.eu/gender-based-violence/what-is-gender-based-violence?language_content_entity=en

<https://www.worldbank.org/en/topic/socialsustainability/brief/violence-against-women-and-girls>

https://onlinecourses.swayam2.ac.in/nou25_ge38/preview

5. GENDER AND CULTURE

<https://gender.study/psychology-of-gender/culture-impact-gender-roles-identities/>

<https://sociology.iresearchnet.com/sociology-of-culture/gender-and-culture/>

<https://archive.nptel.ac.in/courses/109/106/109106136/>



23CSE481P

EVALUATION INDUSTRY INTERNSHIP

L T P C
0 0 0 3

PRE-REQUISITES: Nil

COURSE EDUCATIONAL OBJECTIVES:

1. Objective is to give an opportunity to the student to get hands on training from industry / research and development center.
2. The course is designed so as to expose the students to industry environment / research environment and to take up on-site assignment as trainees or interns.

INTERNSHIP SCHEME:

1. At the end of the Industrial Internship, the candidate shall submit a certificate from the organization where he/she has undergone industrial training and also a brief report.
2. An industry internship report to be submitted by the individual and along with the internship certificate provided by the organization, which will be reviewed and evaluated by a Committee constituted by the Head of the Department.
3. The evaluation for 100 marks will be carried out internally based on this internship report and a Viva-Voce Examination will be conducted by a Departmental Committee constituted by the Head of the Department/Institution.

COURSE OUTCOMES:

On successful completion of the course, students will be able to		POs
CO1	Demonstrate in-depth knowledge on the project topic	PO1
CO2	Identify, analyze and formulate complex problem chosen for project work to attain substantiated conclusions.	PO2
CO3	Design solutions to the chosen project problem.	PO3
CO4	Undertake investigation of project problem to provide valid conclusions	PO4
CO5	Use the appropriate techniques, resources and modern engineering tools necessary for project work	PO5
CO6	Apply project results for sustainable development of the society.	PO6
CO7	Understand the impact of project results in the context of environmental sustainability.	PO7
CO8	Understand professional and ethical responsibilities while executing the project work.	PO8
CO9	Function effectively as individual and a member in the project team	PO9
CO10	Develop communication skills, both oral and written for preparing and presenting project report.	PO10
CO11	Demonstrate knowledge and understanding of cost and time analysis required for carrying out the project.	PO11
CO12	Engage in lifelong learning to improve knowledge and competence in the chosen area of the project.	PO12



23CSE481P

INDUSTRIAL / RESEARCH INTERNSHIP

L T P C
0 0 0 3

PRE-REQUISITES: Nil

COURSE EDUCATIONAL OBJECTIVES:

1. Objective is to give an opportunity to the student to get hands on training from industry / research and development center.
2. The course is designed so as to expose the students to industry environment / research environment and to take up on-site assignment as trainees or interns.

INTERNSHIP SCHEME:

1. At the end of the Industrial Internship, the candidate shall submit a certificate from the organization where he/she has undergone industrial training and also a brief report.
2. An industry internship report to be submitted by the individual and along with the internship certificate provided by the organization, which will be reviewed and evaluated by a Committee constituted by the Head of the Department.
3. The evaluation for 100 marks will be carried out internally based on this internship report and a Viva-Voce Examination will be conducted by a Departmental Committee constituted by the Head of the Department/Institution.

COURSE OUTCOMES:

On successful completion of the course, students will be able to		POs
CO1	Demonstrate in-depth knowledge on the project topic	PO1
CO2	Identify, analyze and formulate complex problem chosen for project work to attain substantiated conclusions.	PO2
CO3	Design solutions to the chosen project problem.	PO3
CO4	Undertake investigation of project problem to provide valid conclusions	PO4
CO5	Use the appropriate techniques, resources and modern engineering tools necessary for project work	PO5
CO6	Apply project results for sustainable development of the society.	PO6
CO7	Understand the impact of project results in the context of environmental sustainability.	PO7
CO8	Understand professional and ethical responsibilities while executing the project work.	PO8
CO9	Function effectively as individual and a member in the project team	PO9
CO10	Develop communication skills, both oral and written for preparing and presenting project report.	PO10
CO11	Demonstrate knowledge and understanding of cost and time analysis required for carrying out the project.	PO11
CO12	Engage in lifelong learning to improve knowledge and competence in the chosen area of the project.	PO12



IV B.Tech - VIII Semester

23CSE482P

PROJECT WORK

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PRE-REQUISITES: Project Skills Lab

COURSE EDUCATIONAL OBJECTIVES:

1. Discovering potential research areas in the field of Mechanical Engineering.
2. Comparing and contrast the several existing solutions for the problem identified.
3. Formulating and propose a plan for creating a solution for the research plan identified.
4. Conducting the experiments as a team and interpret the results.
5. Reporting and presenting the findings of the work conducted.

PROJECT WORK SCHEME:

1. 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.
2. A candidate may, however, in certain cases, be permitted to work on projects in an Industrial / Research Organization, on the recommendations of the Head of the Department Concerned. In such cases, the Project work shall be jointly supervised by a supervisor of the department and an expert, as a joint supervisor from the organization and the student shall be instructed to meet the supervisor periodically and to attend the review committee meetings for evaluating the progress.
3. 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.
4. As per the guidelines given the project report must be prepared and submitted to the Head of the department before the Viva-Voce Examination.
5. The student shall make presentation on the progress made before the Committee.
6. 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.

