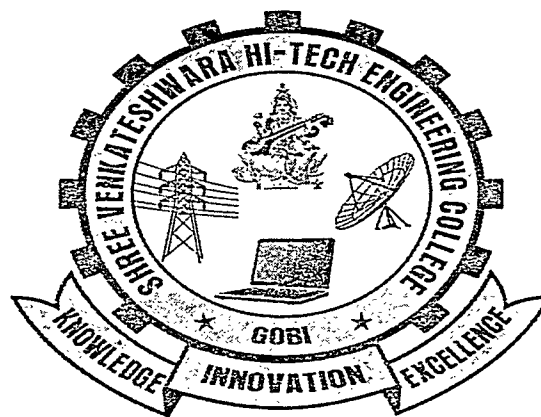


SHREE VENKATESHWARA HI-TECH ENGINEERING COLLEGE
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Regulation 2025 (Autonomous)

Curriculum and Syllabus

Choice Based Credit System (CBCS)

B.E. Computer Science and Engineering



SHREE VENKATESHWARA HI-TECH ENGINEERING COLLEGE

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Gobichettipalayam, Erode -638455

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Students Admitted AY 2025-26

Curriculum and Syllabus

B.E.-Computer Science and Engineering

I. Program Educational Objective (PEO)

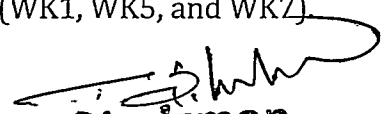
PEO1 : Technical Skills: Apply their technical competence in computer science to solve real world problems, with technical and people leadership

PEO2 : Problem Solving Skills: Conduct cutting edge study and develop solutions on problems of social relevance.

PEO3 : Professional Skills: Work in a business environment, exhibiting team skills, work ethics, adaptability and life long learning

II. Program Outcomes (POs)

1. **Engineering knowledge:** Apply knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to develop to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions with consideration for sustainable development. (WK1 to WK4)
3. **Design/development of solutions:** Design creative solutions for complex engineering problems and design/develop systems/components/processes to meet identified needs with consideration for the public health and safety, whole-life cost, net-zero carbon, culture, society and environment as required. (WK5)
4. **Conduct investigations of complex problems:** Conduct investigations of complex engineering problems using research-based knowledge including design of experiments, modeling, analysis & interpretation of data to provide valid conclusions. (WK8).
5. **Engineering tool usage:** Create, select and apply appropriate techniques, resources and modern engineering & IT tools, including prediction and modelling recognizing their limitations to solve complex engineering problems. (WK2 and WK6)
6. **The Engineer and The World:** Analyze and evaluate societal and environmental aspects while solving complex engineering problems for its impact on sustainability with reference to economy, health, safety, legal framework, culture and environment. (WK1, WK5, and WK7)


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B.E.-Computer Science and Engineering

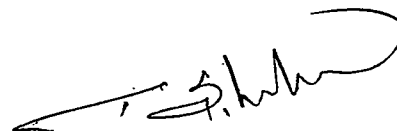
7. **Ethics:** Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws. (WK9)
8. **Individual and Collaborative team work:** Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams.
9. **Communication:** Communicate effectively and inclusively within the engineering community and society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations considering cultural, language, and learning differences
10. **Project management and finance:** Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multidisciplinary environments.
11. **Life-long learning:** Recognize the need for, and have the preparation and ability for (i) Independent and life-long learning (ii) adaptability to new and emerging technologies and (iii) Critical thinking in the broadest context of technological change. (WK8)

III. Program Specific Outcomes (PSOs)

PSO 1 : Technological Ability: Exhibit design and programming skills to build and automate business solutions using cutting edge technologies.

PSO 2 : Problem Solving Skill: Strong theoretical and practical foundation leading to excellence and excitement towards problem solving, to provide elegant solutions to complex problems.

PSO 3 : Application Development: Ability to work effectively with various engineering fields as a team to design, build and develop system applications.


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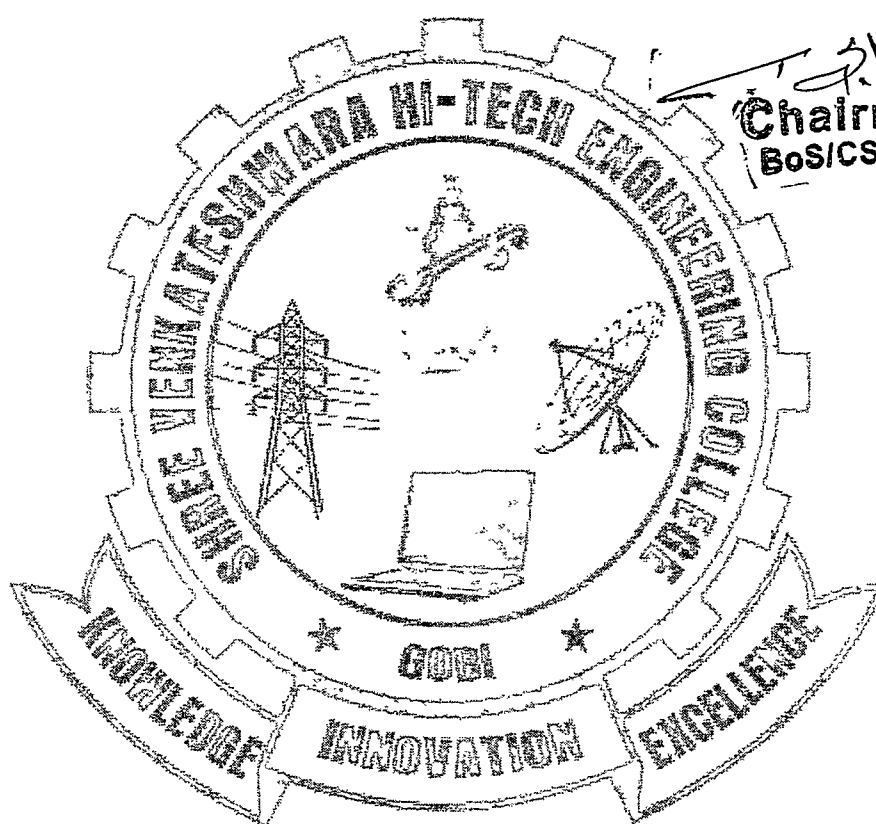
Mapping of Course Outcome and Programme Outcome

Year	Sem	Course name	PO											PSO		
			1	2	3	4	5	6	7	8	9	10	11	1	2	3
I	I	Induction Programme	-	-	-	-	-	-	1	2.6	3	-	2.4	-	-	-
		Communicative English - I	-	-	-	1	-	-	-	2.4	3	-	2.6	-	-	-
		Matrices and Calculus	3	2.8	2	1.4	-	-	-	2.4	-	2	3	-	-	-
		Engineering Physics	3	2.6	1.8	1	1.6	-	-	-	-	-	-	-	-	-
		Engineering Chemistry	3	2	2	2	2	2	-	-	-	-	2	-	-	-
		Problem Solving Using C Programming	2.2	2.4	2.4	1.2	2	1.3	1	2	1	2.8	2.4	1.8	2.2	2
		Heritage of Tamils	-	-	-	-	-	-	-	-	1	-	-	-	-	-
		Idea Lab	3	2	3	2	2	2	-	-	2	2	2	-	-	-
		Yoga for Human Excellence	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	II	Communicative English - II	-	-	-	-	-	-	-	3	3	2.4	-	-	-	-
		Numerical Methods and Differential Equations	3	2.8	2	1	1	-	-	2	-	2.2	2.8	-	-	-
		Physics for Information Science	3	1.3	1.7	1.3	2.3	1.3	1	-	-	-	-	-	-	-
		Basic Electrical and Electronics Engineering	3	2.8	2.4	2.2	-	-	-	-	-	1	-	3	2.8	2.4
		Python Programming	1.8	2.4	3	2.8	1.8	2	2	2	2	1.4	2	2.6	3	3
		Engineering Graphics	3	1	2	-	2	-	-	-	3	-	2	2	2	-
		Tamils and Technology	-	-	-	-	-	2	2	2	2	2	2	-	-	-
		Design Thinking Lab	3	2.6	2.4	3	3	2	2	2.2	2.4	2	1.2	3	2	2
II	III	Discrete Mathematics and Computational Structures	3	3	2	2	-	-	-	2	-	-	-	2	-	-
		Operating Systems	2.2	2.2	1.8	2.2	1.3	-	-	-	2.2	1.6	1.6	1.4	1.4	1.6
		Foundations of Data Science	2	2	1	2	2	1	1	1	1	1	2	2	2	2
		Data Structures	1.6	2.2	1	1.8	2	1	-	1.2	1.4	1	2.4	2	1.8	2.2
		Java Programming	2	1.4	2.2	2	2	-	-	2.4	1.8	1.2	2.4	3	1.8	2.2
		Digital Principles and Computer Organization	3	3	3	3	1.8	1.6	1	1	1	1	1.6	1.4	2.6	1.6
		Mandatory Courses – II &	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	IV	Probability and Statistics	3	3	1	1	-	-	-	2	-	-	-	-	-	-
		Design and Analysis of Algorithms	1.4	1.8	2.4	2.2	1.7	-	-	1.8	2	2.4	2.4	-	-	-

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BASICSE & I

Theory of Computation	1.8	2.2	2.4	1.8	1	-	-	1.4	2.2	2.2	2.4	1.8	2	2.2
Standards in Computer Science	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Object Oriented Software Engineering	2	2.8	1.6	2	2	-	-	2	1.8	2.5	1.8	2.4	2.4	1.2
Database Management Systems	2	1.6	2.6	2	1.3	-	-	2	2	2.2	2	2	1.8	2.6
Artificial Intelligence and Machine Learning	2.4	1.2	2	2	1.3	-	-	1.8	1.6	1.8	2.6	1.6	1.8	1.8
Soft and Analytical Skills -I	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mandatory Courses – III &	-	-	-	-	-	-	-	-	-	-	-	-	-	-

1 - low, 2 - medium, 3 - high, '-' - no correlation



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Students Admitted AY 2025-26

Curriculum and Syllabus

B.E.-Computer Science and Engineering

SUMMARY OF CREDITS

S.No	Course Category	Credits per Semester								Total Credits	Credits in %	Credits as per AU Curriculum R-2025	Credits as per AICTE Model Curriculum R-2022
		I	II	III	IV	V	VI	VII	VIII				
1	BS	11	6	4	3					24	14.46	24	23
2	HUM	5	4				2	6		17	10.24	18	16
3	ES(G)		8							8	4.82	03	29
4	ES(PC)	4	4	20	18	16	8	14		74	44.58	80	59
5	ES(PE)					3	6	6		15	9.04	15	12
6	OE							3		3	1.81	03	9
7	SL						1			1	0.60	01	15
8	SD	2	2		1	3	14	2	10	24	14.46	21	-
9	MC	✓		✓	✓	✓	✓						
Total Credits / Semester		22	24	24	22	22	21	21	10	166	100	165	163

CATEGORIZATION OF COURSES

1. Basic Science (BS)
2. Humanities (HUM)
3. Engineering Science (ES)
 - i. General (G)
 - ii. Program Core (PC)
 - iii. Programme Elective (PE)
 - iv. Emerging Technology (ET)
4. Open Elective (OE)
5. Self Learning (SL)
6. Skill Development (SD)
7. Value Added Course (VA)
8. Off Campus (OC)
9. Mandatory Course (MC)

ENROLLMENT FOR B.E. / B. TECH. (HONOURS) / MINOR DEGREE (OPTIONAL)

A student can also optionally register for additional courses (18 credits) and become eligible for the award of B.E. / B. Tech. (Honours) or Minor Degree.

For B.E. / B. Tech. (Honours), a student shall register for the additional courses (18 credits) from semester V onwards. These courses shall be from the same stream or a combination of different streams of the same programme of study only.

For minor degree, a student shall register for the additional courses (18 credits) from semester V onwards. All these courses have to be in a particular stream from any one of the other programmes,



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B.E.-Computer Science and Engineering

SEMESTER I

S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	SDG Mapping	Max.Marks		
				L	T	P				CA	ES	TM
Induction Program												
1.	25IPA11	Induction Programme	-	-	-	-	-	0		-	-	-
Theory												
2.	25ENI11	Communicative English - I	HUM	3	0	2	5	4	4,5,8,9,16	50	50	100
3.	25MAT11	Matrices and Calculus	BS	3	0	0	3	3	4, 8, 9, 11	40	60	100
4.	25PHI11	Engineering Physics	BS	3	0	2	5	4	3,4,9,11,12	50	50	100
5.	25CYI11	Engineering Chemistry	BS	3	0	2	5	4	4, 6, 7	50	50	100
6.	25CSI11	Problem Solving using C Programming	ES(PC)	3	0	2	5	4	4, 8, 9, 10,17	50	50	100
7.	25TAT11	Heritage of Tamils	HUM	1	0	0	1	1	3,4,8,11,16	40	60	100
Practicals												
8.	25MEL11	Idea Lab	SD	0	0	4	4	2	4,8,9,11,12	60	40	100
Mandatory Course												
9.	25MDC11	Yoga for Human Excellence	MC	0	0	1	1	0	3, 4, 5, 10, 16	100	-	100
Total				16	0	13	29	22				

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B.E.-Computer Science and Engineering

SEMESTER II

S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	SDG Mapping	Max.Marks		
				L	T	P				CA	ES	TM
1.	25ENI21	Communicative English - II	HUM	2	0	2	4	3	4, 5, 8, 9, 16	50	50	100
2.	25MAT21	Linear Algebra	BS	3	0	0	3	3	4, 8, 9, 11	40	60	100
3.	25PHT21	Physics for Information Science	BS	3	0	0	3	3	3, 4, 7, 8, 9, 11, 12, 16	40	60	100
4.	25EEI22	Basic Electrical and Electronics Engineering	ES(G)	3	0	2	5	4	4, 7, 8, 9	50	50	100
5.	25CSI21	Python Programming	ES(PC)	3	0	2	5	4	4, 8, 9, 10, 17	50	50	100
6.	25MEI21	Engineering Graphics	ES(G)	3	0	2	5	4	4, 8, 9, 11	50	50	100
7.	25TAT21	Tamils and Technology	HUM	1	0	0	1	1	2, 4, 6, 9, 11	40	60	100
Practicals												
8.	25CSL21	Design Thinking Practices	SD	0	0	4	4	2	4, 8, 9, 10, 12, 13, 17	60	40	100
Total				18	0	12	30	24				

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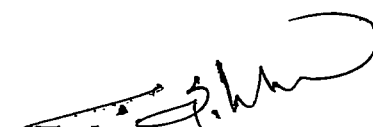
Curriculum and Syllabus

B.E.-Computer Science and Engineering

SEMESTER III

S. No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	SDG Mapping	Max.Marks		
				L	T	P				CA	ES	TM
1.	25MAT31	Discrete Mathematics and Computational Structures	BS	3	1	0	4	4	4,8,9,17	40	60	100
2.	25CSI31	Operating Systems	ES(PC)	3	0	2	5	4	4, 8, 9, 12,17	50	50	100
3.	25ADI31	Foundations of Data Science	ES(PC)	3	0	2	5	4	4,8,9, 11,17	50	50	100
4.	25CSI32	Data Structures	ES(PC)	3	0	2	5	4	4, 8, 9, 12,17	50	50	100
5.	25CSI33	Java Programming	ES(PC)	3	0	2	5	4	4, 8, 9, 12,17	50	50	100
6.	25ECI31	Digital Principles and Computer Organization	ES(PC)	3	0	2	5	4	4,8,9,10,16	50	50	100
Mandatory Course												
7.		Mandatory Courses - II &	MC	3	0	0	3	0		100	-	100
Total				21	1	10	32	24				

& Mandatory Course-II is a Non-credit Course (Student shall select one course from the list given under Mandatory Course-II)


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B.E.-Computer Science and Engineering

SEMESTER IV

S. No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	SDG Mapping	Max.Marks		
				L	T	P				CA	ES	TM
1.	25MAT41	Probability Theory and Statistical Methods	BS	3	0	0	3	3	2,4,8,9,12	40	60	100
2.	25CST41	Design and Analysis of Algorithms	ES(PC)	3	0	0	3	3	4,8,9,11,12	40	60	100
3.	25CST42	Theory of Computation	ES(PC)	3	0	0	3	3	4,8,9,12,17	40	60	100
4.	25CST43	Standards in Computer Science	ES(PC)	1	0	0	1	1	8,9,12,16,17	100	-	100
5.	25CST44	Object Oriented Software Engineering	ES(PC)	3	0	0	3	3	4,8,9,12,16	40	60	100
6.	25CSI41	Database Management Systems	ES(PC)	3	0	2	5	4	4,8,9,11,16	50	50	100
7.	25CSI42	Artificial Intelligence and Machine Learning	ES(PC)	3	0	2	5	4	4,8,9,11,12	50	50	100
8.	25SDC41	Soft and Analytical Skills-I	SD	1	0	0	1	1	4,8,10	100	-	100
Mandatory Course												
9.		Mandatory Courses -III &	MC	3	0	0	3	0		100	-	100
Total				23	0	4	27	22				

& Mandatory Course-III is a Non-credit Course (Student shall select one course from the list given under Mandatory Course-III)

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SEMESTER V

S. No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	SDG Mapping	Max.Marks		
				L	T	P				CA	ES	TM
1.	25CST51	Principles of Compiler Design	ES(PC)	3	0	0	3	3	4,8,9	40	60	100
2.	25CST52	Mobile and Edge Computing	ES(PC)	3	0	0	3	3	4,9,11,13	40	60	100
3.	25CSI51	Computer Networks	ES(PC)	3	0	2	5	4	4,9,11,16	50	50	100
4.	25CSI52	Cloud Computing	ES(PC)	3	0	2	5	4	4,9,12,13	50	50	100
5.		Programme Elective - I *	ES(PE)	3	0	0	3	3		40	60	100
6.	25SDC51	Soft and Analytical Skills-II	SD	1	0	0	1	1	4,8	100	-	100
7.	25CSI53	Industry Oriented Course I	SD	1	0	2	3	2		50	50	100
Practicals												
8.	25CSL51	Mobile App Development Laboratory	ES(PC)	0	0	4	4	2	3,4,8,9	60	40	100
* Total				17	1	6	24	22				

* Programme Elective - I shall be chosen from the list of Programme electives (Streams) offered by same Programme.

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S. No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	SDG Mapping	Max.Marks		
				L	T	P				CA	ES	TM
1.	25CYT61	Climate Change and Sustainability	HUM	2	0	0	2	2	4, 7, 11, 12, 13	40	60	100
2.	25CSI61	Web Technologies and Full Stack Development	ES(PC)	3	0	2	5	4	4,8,9, 16	40	60	100
3.	25CSI62	Generative AI Application Development and Agent AI	ES(PC)	3	0	2	5	4	4,8,9, 12,13, 16	50	50	100
4.		Programme Elective - II *	ES(PE)	3	0	0	3	3		40	60	100
5.		Programme Elective - III *	ES(PE)	3	0	0	3	3		40	60	100
6.		Self Learning Course	SL	1	0	0	1	1		100	-	100
7.	25CSI63	Industry Oriented Course II	SD	1	0	2	3	2		50	50	100
Practicals												
8.	25CSL61	Mini Project	SD	0	0	4	4	2	4,8,9, 10,17	100	-	100
Total				16	0	12	28	21				

* Programme Elective - II & III shall be chosen from the list of Programme electives (Streams) offered by same Programme

@ The students individually undergo training in reputed Firms/Research Institutes/ Laboratories for the specified duration (04 weeks) during VI semester summer vacation. After completion of training, a detailed report should be submitted within ten days from the commencement of VII semester.

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SEMESTER VII

S. No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	SDG Mapping	Max.Marks		
				L	T	P				CA	ES	TM
1.	25UHV71	Universal Human Values-II	HUM	3	0	0	3	3	4, 10, 12, 13, 16	40	60	100
2.	25EST71	Engineering Entrepreneurship Development	HUM	3	0	0	3	3	4, 8, 9, 10, 17	40	60	100
3.	25CSI71	Security and Privacy in Cloud	ES(PC)	3	0	2	5	4	9, 12, 16	50	50	100
4.		Programme Elective - IV *	ES(PE)	3	0	0	3	3		40	60	100
5.		Programme Elective - V *	ES(PE)	3	0	0	3	3		40	60	100
6.		Open Elective **	OE	3	0	0	3	3		40	60	100
Practicals												
7.	25CSL71	Summer internship @	SD	0	0	0	0	2	4, 8, 9, 10, 17	100	-	100
★ Total				17	0	6	23	21				

* Programme Elective - IV & V shall be chosen from the list of Programme electives (Streams) offered by same Programme

@ The students undergone summer internship during VI semester summer vacation and same will be evaluated in VII semester.

** Open Elective shall be chosen from the list of open electives offered by other Programmes

[Signature]
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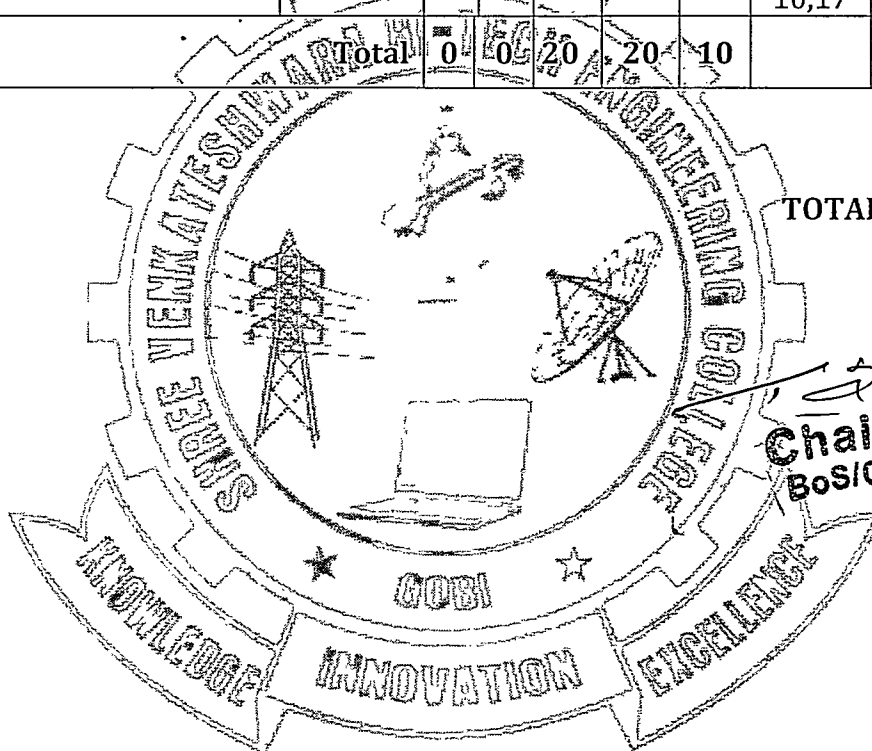
Curriculum and Syllabus

B.E.-Computer Science and Engineering

SEMESTER VIII

S. No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	SDG Mapping	Max.Marks		
				L	T	P				CA	ES	TM
Practicals												
1.	25CSL81	Project Work	SD	0	0	20	20	10	4, 8, 9, 10,17	60	40	100
Total				0	0	20	20	10				

TOTAL CREDITS: 166



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MANDATORY COURSES II

S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	Max.Marks		
				L	T	P			CA	ES	TM
1.	25MDC31	Introduction to Women and Gender Studies	MC	3	0	0	3	0	100	-	100
2.	25MDC32	Elements of Literature	MC	3	0	0	3	0	100	-	100
3.	25MDC33	Film Appreciation	MC	3	0	0	3	0	100	-	100
4.	25MDC34	Disaster Risk Reduction and Management	MC	3	0	0	3	0	100	-	100

MANDATORY COURSES III

S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	Max.Marks		
				L	T	P			CA	ES	TM
1.	25MDC41	Well Being with Traditional Practices -Yoga, Ayurveda and Siddha	MC	3	0	0	3	0	100	-	100
2.	25MDC42	History of Science and Technology in India	MC	3	0	0	3	0	100	-	100
3.	25MDC43	Political and Economic Thought for a Humane Society	MC	3	0	0	3	0	100	-	100
4.	25MDC44	State, Nation Building and Politics in India	MC	3	0	0	3	0	100	-	100
5.	25MDC45	Industrial Safety	MC	3	0	0	3	0	100	-	100


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PROGRAMME ELECTIVE COURSES: STREAMS

Artificial intelligence	Data Analytics	Product Development	Security	Computing	Internet of Things and Smart Applications
Computational Intelligent Techniques	Big Data Analytics	Design Thinking and Innovation	Information Security	Blockchain Technologies	Dynamic Paradigm for IoT
Intelligent Transportation Systems	Recommender Systems	UI and UX Design and Human-centered Design	Privacy in Communication Networks	Augmented Reality/ Virtual Reality	Smart IoT Architecture
Generative AI and Prompt Engineering	Image and Video Analytics	Java Spring Boot	Mobile Forensics	Edge and Fog Computing	Wearable Computing
Responsible and Equitable AI	Text and Speech Analytics	DevOps	Web and IoT Security	Granular Computing	IoT in 5G Networks
Reactive Machines and Self-aware AI	Bioinformatics	VibeCoding	Crypto-currency and Blockchain Technologies	Quantum Computing	IoT and Smart Cities
Edge AI	Information Retrieval Techniques	Game Development	Ethical Hacking and Penetration Testing	Drone Technologies	IoT in Health Care
Explainable AI	Business Intelligence	App Development	AI in Cyber Security	Reinforcement Learning	Web and IoT Security

Registration of Programme Elective Courses from Streams:

Professional Elective Courses will be registered in Semesters V and VI. These courses are listed in groups called streams that represent a particular area of specialization / diversified group. Students are permitted to choose all the Programme Electives from a particular stream or from different Streams. Further, only one Programme Elective course shall be chosen in a semester horizontally (row-wise). However, two courses are permitted from the same row, provided one course is enrolled in Semester V and another in semester VI.

The registration of courses for B.E./B.Tech (Honours) or Minor degree shall be done from Semester V to VIII. The procedure for registration of courses explained above shall be followed for the courses of B.E./B.Tech (Honours) or Minor degree also. For more details on B.E./B.Tech (Honours) or Minor degree refer to the Regulations 2025 (Clause 18 & 19).

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PROGRAMME ELECTIVE COURSES: STREAMS**STREAM 1: ARTIFICIAL INTELLIGENCE**

S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	Max.Marks		
				L	T	P			CA	ES	TM
1.	25CSE11	Computational Intelligent Techniques	PE	2	0	2	4	3	50	50	100
2.	25CSE12	Intelligent Transportation Systems	PE	2	0	2	4	3	50	50	100
3.	25CSE13	Generative AI and Prompt Engineering	PE	2	0	2	4	3	50	50	100
4.	25CSE14	Responsible and Equitable AI	PE	2	0	2	4	3	50	50	100
5.	25CSE15	Reactive Machines and Self-aware AI	PE	2	0	2	4	3	50	50	100
6.	25CSE16	Edge AI	PE	2	0	2	4	3	50	50	100
7.	25CSE17	Explainable AI	PE	2	0	2	4	3	50	50	100

STREAM 2: DATA ANALYTICS

S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	Max.Marks		
				L	T	P			CA	ES	TM
1.	25CSE21	Big Data Analytics	PE	2	0	2	4	3	50	50	100
2.	25CSE22	Recommender Systems	PE	2	0	2	4	3	50	50	100
3.	25CSE23	Image and Video Analytics	PE	2	0	2	4	3	50	50	100
4.	25CSE24	Text and Speech Analytics	PE	2	0	2	4	3	50	50	100
5.	25CSE25	Bioinformatics	PE	2	0	2	4	3	50	50	100
6.	25CSE26	Information Retrieval Techniques	PE	2	0	2	4	3	50	50	100
7.	25CSE27	Business Intelligence	PE	2	0	2	4	3	50	50	100

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STREAM 3: PRODUCT DEVELOPMENT

S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	Max.Marks		
				L	T	P			CA	ES	TM
1.	25CSE31	Design Thinking and Innovation	PE	2	0	2	4	3	50	50	100
2.	25CSE32	UI and UX Design and Human-centered Design	PE	2	0	2	4	3	50	50	100
3.	25CSE33	Java Spring Boot	PE	2	0	2	4	3	50	50	100
4.	25CSE34	DevOps	PE	2	0	2	4	3	50	50	100
5.	25CSE35	Vibe Coding	PE	3	0	0	3	3	40	60	100
6.	25CSE36	Game Development	PE	2	0	2	4	3	50	50	100
7.	25CSE37	App Development	PE	2	0	2	4	3	50	50	100

STREAM 4: SECURITY

S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	Max.Marks		
				L	T	P			CA	ES	TM
1.	25CSE41	Information Security	PE	2	0	2	4	3	50	50	100
2.	25CSE42	Privacy in Communication Networks	PE	2	0	2	4	3	50	50	100
3.	25CSE43	Mobile Forensics	PE	2	0	2	4	3	50	50	100
4.	25CSE44	Web and IoT Security	PE	2	0	2	4	3	50	50	100
5.	25CSE45	Cryptocurrency and Blockchain Technologies	PE	2	0	2	4	3	50	50	100
6.	25CSE46	Security and Privacy in Cloud	PE	2	0	2	4	3	50	50	100
7.	25CSE47	AI in Cyber Security	PE	2	0	2	4	3	50	50	100

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STREAM 5: COMPUTING

S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	Max.Marks		
				L	T	P			CA	ES	TM
1.	25CSE51	Blockchain Technologies	PE	2	0	2	4	3	50	50	100
2.	25CSE52	Augmented Reality/ Virtual Reality	PE	2	0	2	4	3	50	50	100
3.	25CSE53	Edge and Fog Computing	PE	2	0	2	4	3	50	50	100
4.	25CSE54	Granular Computing	PE	2	0	2	4	3	50	50	100
5.	25CSE55	Quantum Computing	PE	2	0	2	4	3	50	50	100
6.	25CSE56	Drone Technologies	PE	2	0	2	4	3	50	50	100
7.	25CSE57	Reinforcement Learning	PE	2	0	2	4	3	50	50	100

STREAM 6: INTERNET OF THINGS AND SMART APPLICATIONS

S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	Max.Marks		
				L	T	P			CA	ES	TM
1.	25CSE61	Dynamic Paradigm for IoT	PE	2	0	2	4	3	50	50	100
2.	25CSE62	Smart IoT Architecture	PE	2	0	2	4	3	50	50	100
3.	25CSE63	Wearable Computing	PE	2	0	2	4	3	50	50	100
4.	25CSE64	IoT in 5G Networks	PE	2	0	2	4	3	50	50	100
5.	25CSE65	IoT and Smart Cities	PE	2	0	2	4	3	50	50	100
6.	25CSE66	IoT in Health Care	PE	2	0	2	4	3	50	50	100
7.	25CSE67	Web and IoT Security	PE	2	0	2	4	3	50	50	100


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OPEN ELECTIVES

Sl. No	Course Code	Course Title	Category	Periods /Week			Total Contact Periods	Credits	Max. Marks		
				L	T	P			CA	ES	TM
OFFERED BY DEPARTMENT OF CIVIL ENGINEERING											
1	25CE011	Civil and Infrastructure Engineering	OE	3	0	0	3	3	40	60	100
2	25CE012	Environmental Pollution and waste management	OE	3	0	0	3	3	40	60	100
3	25CE013	Environmental Impact Assessment	OE	3	0	0	3	3	40	60	100
4	25CE014	Building Services	OE	3	0	0	3	3	40	60	100
5	25CE015	Water, Sanitation and Health	OE	3	0	0	3	3	40	60	100
OFFERED BY DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING											
1	25CS011	Foundation of AR/VR	OE	3	0	0	3	3	40	60	100
2	25CS012	Web Designing	OE	3	0	0	3	3	40	60	100
3	25CS013	Block Chain fundamentals	OE	3	0	0	3	3	40	60	100
4	25CS014	Knowledge Management	OE	3	0	0	3	3	40	60	100
5	25CS015	Cloud Computing Essentials	OE	3	0	0	3	3	40	60	100
OFFERED BY DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING											
1	25EC011	Basics of Electronics in Automation	OE	3	0	0	3	3	40	60	100
2	25EC012	Wireless Optical Communication	OE	3	0	0	3	3	40	60	100
3	25EC013	Soft Computing techniques	OE	3	0	0	3	3	40	60	100
4	25EC014	Consumer electronics	OE	3	0	0	3	3	40	60	100
5	25EC015	Principles of communication Engineering	OE	3	0	0	3	3	40	60	100
OFFERED BY DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING											
1	25EE011	Renewable Energy Sources	OE	3	0	0	3	3	40	60	100
2	25EE012	Electrical Vehicle	OE	3	0	0	3	3	40	60	100
3	25EE013	Energy Auditing and Conservation	OE	3	0	0	3	3	40	60	100
4	25EE014	Domestic and Industrial Electrical Installations	OE	3	0	0	3	3	40	60	100
5	25EE015	Microcontroller Based System Design	OE	3	0	0	3	3	40	60	100

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OFFERED BY DEPARTMENT OF MECHANICAL ENGINEERING

1.	23ME011	Industrial Instrumentation	OE	3	0	0	3	3	40	60	100
2.	23ME012	Energy Technology	OE	3	0	0	3	3	40	60	100
3.	23ME013	Reverse Engineering	OE	3	0	0	3	3	40	60	100
4.	23ME014	Fire Safety Engineering	OE	3	0	0	3	3	40	60	100
5.	23ME015	Entrepreneurship Development	OE	3	0	0	3	3	40	60	100

OFFERED BY DEPARTMENT ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

1	25AD011	Introduction to Big Data	OE	3	0	0	3	3	40	60	100
2	25AD012	Principles of Data Science	OE	3	0	0	3	3	40	60	100
3	25AD013	Data Visualization and its Applications	OE	3	0	0	3	3	40	60	100
4	25AD014	Data Warehousing and Mining	OE	3	0	0	3	3	40	60	100
5	25AD015	Principles of Cyber Security	OE	3	0	0	3	3	40	60	100

OFFERED BY DEPARTMENT INFORMATION TECHNOLOGY

1	25IT011	Basics of Java Programming	OE	3	0	0	3	3	40	60	100
2	25IT012	Ethical Hacking	OE	3	0	0	3	3	40	60	100
3	25IT013	E-Commerce and Applications	OE	3	0	0	3	3	40	60	100
4	25IT014	Basics of Android Application Development	OE	3	0	0	3	3	40	60	100
5	25IT015	Introduction to Web Design	OE	3	0	0	3	3	40	60	100

OFFERED BY DEPARTMENT OF PHARMACEUTICAL TECHNOLOGY

1	25PT011	Nutraceuticals	OE	3	0	0	3	3	40	60	100
2	25PT012	IPR for Pharma Industry	OE	3	0	0	3	3	40	60	100
3	25PT013	Pharmaceutical Nanotechnology	OE	3	0	0	3	3	40	60	100
4	25PT014	Basics of Human Anatomy and physiology	OE	3	0	0	3	3	40	60	100

OFFERED BY DEPARTMENT BIOMEDICAL ENGINEERING

1	25BM011	Biosensors and Instrumentation	OE	3	0	0	3	3	40	60	100
2	25BM012	Medical Robotics	OE	3	0	0	3	3	40	60	100
3	25BM013	Biometric systems and their applications	OE	3	0	0	3	3	40	60	100
4	25BM014	Healthcare Management systems	OE	3	0	0	3	3	40	60	100
5	25BM015	IoT in Healthcare	OE	3	0	0	3	3	40	60	100

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**OFFERED BY DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
(ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)**

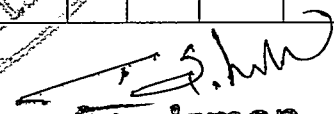
1	25AM011	Ai For Everyone	OE	3	0	0	3	3	40	60	100
2	25AM012	Machine Learning and its Applications	OE	3	0	0	3	3	40	60	100
3	25AM013	Quantum AI	OE	3	0	0	3	3	40	60	100
4	25AM014	Reinforcement Learning	OE	3	0	0	3	3	40	60	100
5	25AM015	Network Automation Using AIML	OE	3	0	0	3	3	40	60	100

OFFERED BY DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (CYBER SECURITY)

1	25CR011	Mobile Device Security	OE	3	0	0	3	3	40	60	100
2	25CR012	Malware Analysis	OE	3	0	0	3	3	40	60	100
3	25CR013	Hardware Security	OE	3	0	0	3	3	40	60	100
4	25CR014	Web and Mobile Application Security	OE	3	0	0	3	3	40	60	100
5	25CR015	Information Security	OE	3	0	0	3	3	40	60	100

OFFERED BY DEPARTMENT OF BIOTECHNOLOGY

1.	25BT011	Biofertilizer Technology	OE	3	0	0	3	3	40	60	100
2.	25BT012	Ecology	OE	3	0	0	3	3	40	60	100
3.	25BT013	Biotechnology for Forensics	OE	3	0	0	3	3	40	60	100
4.	25BT014	Microbiology and Macromolecule	OE	3	0	0	3	3	40	60	100
5.	25BT015	Biodiversity and Taxonomy	OE	3	0	0	3	3	40	60	100


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25IPA11
SDG No. 3,4,10,11,16

INDUCTION PROGRAMME
(Common to B.E./B.Tech. all Branches)

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This is a mandatory 2 week programme to be conducted as soon as the students enter the institution. Normal classes start only after the induction program is over.

The induction programme has been introduced by AICTE with the following objective:

"Engineering colleges were established to train graduates well in the branch/department of admission, have a holistic outlook, and have a desire to work for national needs and beyond. The graduating student must have knowledge and skills in the area of his/her study. However, he/she must also have broad understanding of society and relationships. Character needs to be nurtured as an essential quality by which he/she would understand and fulfill his/her responsibility as an engineer, a citizen and a human being. Besides the above, several meta-skills and underlying values are needed."

"One will have to work closely with the newly joined students in making them feel comfortable, allow them to explore their academic interests and activities, reduce competition and make them work for excellence, promote bonding within them, build relations between teachers and students, give a broader view of life, and build character."

Hence, the purpose of this programme is to make the students feel comfortable in their new environment, open them up, set a healthy daily routine, create bonding in the batch as well as between faculty and students, develop awareness, sensitivity and understanding of the self, people around them, society at large, and nature.

The following are the activities under the induction program in which the student would be fully engaged throughout the day for the entire duration of the program.

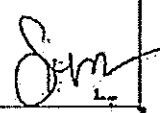
(i) Ice breaking :

Ice-breaking activities were conducted within the respective departments/branches to facilitate interaction among students. These sessions helped participants become acquainted with one another, fostered a sense of belonging, and encouraged teamwork and effective communication. The activities created a friendly and engaging learning environment.

(ii) Creative Arts and Physical Activities:

Every student would choose one skill related to the arts whether visual arts or performing arts. Examples are painting, sculpture, pottery, music, dance etc. The student would pursue it every day for the duration of the program. These would allow for creative expression and it would develop a sense of aesthetics and also enhance creativity which would, hopefully, grow into engineering design later. Physical Activities would involve a daily routine of physical activity with games and sports, gardening, etc.

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(iii) Universal Human Values:

This is the anchoring activity of the Induction Programme. It gets the student to explore oneself and allows one to experience the joy of learning, stand up to peer pressure, take decisions with courage, be aware of relationships with colleagues and supporting stay in the hostel and department, be sensitive to others, etc. A module in Universal Human Values provides the base. Methodology of teaching this content is extremely important. It must not be through do's and don'ts, but get students to explore and think by engaging them in a dialogue. It is best taught through group discussions and real life activities rather than lecturing.

Discussions would be conducted in small groups of about 20 students with a faculty mentor each. It would be effective that the faculty mentor assigned is also the faculty advisor for the student for the full duration of the UG programme.

(iv) Literary Activity:

Literary activity would encompass reading, writing and possibly, debating, enacting a play etc.

(v) Proficiency Modules:

This would address some lacunas that students might have, for example, English, computer familiarity etc.

(vi) Lectures by Eminent People:

Motivational lectures by eminent people from all walks of life should be arranged to give the students exposure to people who are socially active or in public life.

(vii) Visits to Local Area:

A couple of visits to the landmarks of the city, or a hospital or orphanage could be organized. This would familiarize them with the area as well as expose them to the under privileged.

(viii) Familiarization to Dept./Branch & Innovations:

They should be told about what getting into a branch or department means what role it plays in society, through its technology. They should also be shown the laboratories, workshops & other facilities.

(ix) Department Specific Activities:

About a week can be spent in introducing activities (games, quizzes, social interactions, small experiments, design thinking etc.) that are relevant to the particular branch of Engineering/Technology/Architecture that can serve as a motivation and kindle interest in building things (become a maker) in that particular field. This can be conducted in the form of a workshop.

For example, CSE and IT students may be introduced to activities that kindle computational thinking, and get them to build simple games. ECE students may be introduced to building simple

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circuits as an extension of their knowledge in Science, and so on. Students may be asked to build stuff using their knowledge of science.

(x) Life at SVHEC and its activities:

A campus tour was organized to familiarize students with the college infrastructure and facilities. During the tour, students visited various academic blocks, laboratories, library, seminar halls, sports facilities, administrative offices, and other important locations within the campus. The session helped students gain a better understanding of the resources available to support their academic and personal development while fostering a sense of comfort and belonging in the new environment.

A session on college activities was conducted to introduce students to the various academic, co-curricular, and extracurricular opportunities available on campus. Students were informed about clubs, professional societies, cultural events, sports activities, community service initiatives, and skill development programmes. The session encouraged active participation and highlighted the importance of holistic development alongside academic excellence.

Induction Programme is totally an activity based programme and therefore there shall be no tests / assessments during this programme.

REFERENCES:

1. Guide to Induction program from AICTE

COURSEOUTCOMES:

At the end of the course the students will be able

- CO1: To listen to and understand general and complex academic information
- CO2: To listen to and understand different points of view in a discussion
- CO3: To speak fluently and accurately informal and informal communicative contexts
- CO4: To describe products and processes and explain their uses clearly as well as accurately
- CO5: To express their opinions effectively in both formal and informal discussions

E.RESOURCES:

- <https://www.ted.com/about/programs-initiatives/ted-talks-education>
- <https://learnenglish.britishcouncil.org/>

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CO's - PO's & PSO's MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
C01	-	-	-	-	-	-	-	3	3	-	3	1	-	-
C02	-	-	-	-	-	-	-	3	3	-	3	1	-	-
C03	-	-	-	-	-	-	1	2	3	-	2	1	1	-
C04	-	-	-	-	-	-	-	2	3	-	2	1	1	-
C05	-	-	-	-	-	-	1	3	3	-	2	1	1	1
AVG	-	-	-	-	-	-	1.0	2.6	3.0	-	2.4	1.0	1.0	1.0

1 - Low, 2 - Medium, 3 - High, '-' - no correlation

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25ENI11	COMMUNICATIVE ENGLISH-I	L	T	P	C
SDG No. 4,5,8,9,16	{Common to B.E./B.Tech. All Branches}	3	0	2	4

COURSE OBJECTIVES:

- To build a strong foundation in basic grammar and communication skills through structured activities in listening, speaking, reading and writing.
- To develop the ability to express, describe and summarize ideas clearly using appropriate language structures and professional formats.
- To enhance technical communication by practicing structured descriptions, storytelling and data-based writing tasks.
- To enable clear and logical expression through organized speech, note-making and grammar-focused writing.
- To refine expressive and comparative communication skills using advanced vocabulary, professional formats and contextual grammar.

UNIT-I	BUILDING BLOCKS OF COMMUNICATION	6+6
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Grammar : Parts of Speech -Verbs - Word formation - Articles
Listening : Listening to Short Conversations & Descriptions
Speaking : Introducing oneself - Narrating Personal Experience
Reading : Reading Comprehension -Skimming - Scanning - Speed reading
Writing : Formal Letter Writing (Seeking Permission for Industrial Visit & In plant Training) - Instruction Writing

UNIT-II	PROFESSIONAL AND SOCIAL COMMUNICATION	6+6
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Grammar : Conjunction- Preposition- Cause And Effect Expression- Purpose and Means
Listening : Listening for Specific Information (Gap Filling); Listening the Announcement for Data
Speaking : Introducing the Peers- Describing about Person, Place, Things, Food, Culture, etc.
Reading : Reading Newspaper Articles & Technical Blogs
Writing : Professional Email Writing – Checklist

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UNIT-III	COMPREHENSION AND PRESENTATION SKILLS	6+6
Grammar	: Types of Sentence - Negatives -Types of Question (Y/N & WH) - Degrees of Comparison.	
Listening	: Listening to TED Talks and Short Technical Reels	
Speaking	: Story Telling & Role Play	
Reading	: Reading comprehension- Reading Print Interview and Answering to the Questions	
Writing	: Paragraph Writing- Data Interpretation & Transcoding (Bar, Pie & Flow Chart)	
UNIT-IV	ENGLISH FOR WORKPLACE READINESS	6+6
Grammar	: Tense (Simple, Continuous, Perfect & Perfect Continuous)	
Listening	: Listening to Inspirational Speech & Professional Interviews	
Speaking	: Extempore Speech- Asking for Information (Direction & General Enquiries)	
Reading	: Reading Engineering/ Technical Essays - Reading Brochures	
Writing	: Note Making & Note Taking - Recommendation Writing	
UNIT-V	ENGLISH FOR FORMAL AND FUNCTIONAL COMMUNICATION	6+6
Grammar	: Modal Auxiliaries - Homophones & Homonyms - Numerical Adjectives - Phrasal Verbs	
Listening	: Listening to Telephonic Conversation- Listening to Product Description	
Speaking	: Master of Ceremony(MoC): Welcome Address & Vote of Thanks	
Reading	: Reading Graphical Materials for Comparison - Reading Advertisement	
Writing	: Report Writing (Accident/ Survey) - Compare and Contrast Essay Writing	

TOTAL : 60 PERIODS

COURSE OUTCOMES:

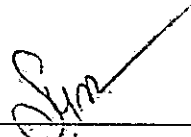
At the end of the course,

CO1: Learners will be able to apply basic grammar rules and effectively use LSRW skills for formal and informal communication.

CO2: Learners will be able to construct coherent descriptions and summaries using appropriate connectors, prepositions, and professional vocabulary.

CO3: Learners will be able to describe processes and products clearly in spoken and written formats using suitable sentence structures and data interpretation skills.

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CO4: Learners will be able to classify information, make recommendations, and present structured content through both oral and written communication.

CO5: Learners will be able to express opinions, compare information, and write detailed reports using advanced grammar, graphical references, and formal structures.

TEXT BOOKS:

1. Department of English, AnnaUniversity, "English for Engineers & Technologists" Orient Blackswan Private Ltd, 2020.
2. Dr.Veena Selvam, Dr.Sujatha Priyadarshini, & CO, Department of English, Anna University, "English for Science & Technology" Cambridge University Press, 2021.

REFERENCE BOOKS:

1. Meenakshi Raman & Sangeeta Sharma, "Technical Communication – Principles and Practices", Oxford Univ. Press, New Delhi, 2016.
2. Lakshminarayanan, "A Course Book on Technical English", Scitech Publications (India) Pvt.Ltd. 2012.
3. Aysha Viswamohan, "English For Technical Communication (With CD)", McGraw Hill Education, ISBN : 0070264244, 2008.
4. Effective Communication Skill, Kulbhushan Kumar, R S Salaria, Khanna Publishing House, 2016.

E. RESOURCES:

- <https://learnenglish.britishcouncil.org/>

COs-Pos MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	2	3	-	3	-	-	-
CO2	-	-	-	-	-	-	-	2	3	-	2	-	1	-
CO3	-	-	-	1	-	-	-	3	3	-	3	-	1	-
CO4	-	-	-	1	-	-	-	3	3	-	3	-	-	-
CO5	-	-	-	-	-	-	-	2	3	-	2	-	1	-
AVR	-	-	-	1.00	-	-	-	2.40	3.00	-	2.60		1.00	

1- Low, 2- Medium, 3-High, "-" No Correlation

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25MAT11
SDG NO.4,8,9,11

MATRICES AND CALCULUS
(Common to B.E./B.Tech. all Branches)

L T P C
3 0 0 3

COURSE OBJECTIVES :

- To understand the concepts of eigen values, eigen vectors and quadratic forms.
- To develop the skill on the geometric properties of curves using differential calculus.
- To equip students to analyze and optimize the functions of several variables.
- To make the students understand various techniques of integration.
- To apply vector calculus and its principles to evaluate vector fields.

UNIT-I MATRICES 9

Eigen values and Eigen vectors of a real matrix – Characteristic equation – Properties of Eigen values and Eigen vectors – Cayley - Hamilton theorem – Reduction of a quadratic form to canonical form by orthogonal transformation – Nature of quadratic forms.

UNIT-II DIFFERENTIAL CALCULUS 9

Curvature – Radius of curvature (Cartesian Co – ordinates only) – Centre of curvature and Circle of curvature – Involute and Evolute (Parabola, Ellipse).

UNIT-III FUNCTIONS OF SEVERAL VARIABLES 9

Euler's theorem for homogenous functions – Jacobians – Taylor's series expansion – Maxima and Minima for functions of two variables – Methods of Lagrangian multipliers.

UNIT-IV INTEGRAL CALCULUS 9

Definite and Indefinite integrals – Substitution rule – Techniques of Integration : Integration by parts, Trigonometric integrals, Trigonometric substitutions, Integration of rational functions by partial fraction, Improper integrals.

UNIT-V VECTOR CALCULUS 9

Irrotational and solenoidal vector fields – Green's theorem in plane, Gauss divergence theorem and Stoke's theorem (Cube, Cuboid and Rectangular parallelepiped only).

TOTAL: 45 PERIODS

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COURSE OUTCOMES :

At the end of the course the students will be able to :

- CO1: Assimilate the eigen values and eigen vectors in reduction of quadratic form into canonical form.
- CO2: Analyze the center of curvature, circle of curvature and develop the evolutes.
- CO3: Expand the Taylor series and calculate the extreme value for function of several variables.
- CO4: Apply different methods of integration in solving practical problems.
- CO5: Apply the divergence and curl in vector integral theorems of vector fields.

TEXTBOOKS :

- 1. James Stewart, "Calculus : Early Transcendental", Cengage Learning, 9th Edition, New Delhi, 2023. [For Units II & IV - Sections 1.1, 2.2, 2.3, 2.5, 2.7 (Tangents problems only), 2.8, 3.1 to 3.6, 3.11, 4.1, 4.3, 5.1 (Area problems only), 5.2, 5.3, 5.4 (excluding net change theorem), 5.5, 7.1 - 7.4 and 7.8].
- 2. Grewal. B. S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 45th Edition, 2020.

REFERENCE BOOKS :

- 1. Thomas. G. B., Hass. J, and Weir. M.D, "Thomas Calculus", 14th Edition, Pearson India, 2022.
- 2. Anton. H, Bivens. I and Davis. S, " Calculus ", Wiley, 10th Edition, 2021.
- 3. Jain. R.K. and Iyengar. S.R.K., "Advanced Engineering Mathematics", Narosa Publications, New Delhi, 5th Edition, 2019.
- 4. Ramana. B.V., "Higher Engineering Mathematics", McGraw Hill Education Pvt. Ltd, New Delhi, 2019.

E-Resources :

- 1. https://onlinecourses.nptel.ac.in/e-learning/preview/noc22_ma03
- 2. https://onlinecourses.nptel.ac.in/e-learning/preview/noc23_ma86

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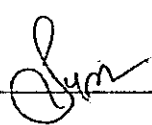
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CO's - PO's & PSO'S MAPPING :

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
C01	3	3	2	1	-	-	-	2	-	2	3	1	3	1
C02	3	3	2	2	-	-	-	3	-	2	3	1	3	1
C03	3	3	2	2	-	-	-	3	-	2	3	2	3	2
C04	3	3	2	1	-	-	-	2	-	2	3	2	3	2
C05	3	2	2	1	-	-	-	2	-	2	3	3	3	3
AVG	3.00	2.80	2.00	1.40	-	-	-	2.40	-	2.00	3.00	1.80	3.00	1.80

1- Low, 2- Medium, 3-High, "-" No Correlation

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25PHI11	ENGINEERING PHYSICS	L	T	P	C
SDG No. 3, 4, 9, 11, 12	(B.E./B. Tech. - Common to all branches)	3	0	2	4

COURSE OBJECTIVES:

- To make the students effectively achieve an understanding of mechanics.
- Provide knowledge of elastic property, thermal property of materials and its applications.
- Impart knowledge of laser and their applications.
- Introduce the essential principles of fiber optics and its applications.
- Equipping the students to successfully understand the importance of quantum physics.

UNIT-I **MECHANICS** **10**
 Multi-particle dynamics: Center of mass (CM) – CM of continuous bodies – Motion of the CM – Moment of inertia – Theorems of M.I. – M.I of a diatomic molecule – Torque – Rotational energy state of a rigid diatomic molecule – Torsional pendulum – double pendulum.

UNIT-II **PROPERTIES OF MATTER** **10**
 Elasticity- Hooke's law – stress – strain diagram – Poisson's ratio – Factors affecting elasticity – Bending of beams – Bending moment equation – Depression of a cantilever – Young's modulus by uniform bending – I-shaped girders.

UNIT-III **LASER** **9**
 Lasers: Stimulated absorption – Spontaneous emission – Stimulated emission – Population inversion-Einstein's coefficients derivation and their relations – Pumping methods – Types of lasers – CO₂ laser, Semiconductor lasers (Homojunction & Heterojunction) – Holography – Industrial and Medical Applications of lasers.

UNIT-IV **FIBER OPTICS** **8**
 Principle and propagation of light in optical fibres – Numerical aperture and Acceptance angle – Types of optical fibres (Material, Refractive Index, Mode) – Attenuation, Dispersion, Bending – Fiber optics communication system (qualitative) – Temperature and Displacement sensors – Fiber optic endoscope.

UNIT-V **QUANTUM PHYSICS** **8**
 Photons and light waves – Electrons and matter waves – The Schrodinger equation (Time dependent and time independent forms) – Particle in a one-dimensional rigid box for Eigen value and Eigen function – tunneling (qualitative) – Electron microscope – Scanning Tunneling microscope.

TOTAL: 45 PERIODS

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PRACTICAL EXERCISE:

1. Determination of rigidity modulus of wire and moment of inertia of regular objects – Torsion pendulum.
2. Determination of Young's modulus by Uniform bending method.
3. Determination of Simple harmonic oscillations of cantilever.
4. Determination of the wavelength of the laser using grating
5. Determination of width of the groove of CD using laser.
6. Determination of numerical aperture and acceptance angle in an optical fiber.
7. Determination particle size of Lycopodium powder using semiconductor laser.
8. Determination of thickness of a material by Air-wedge method.

COURSE OUTCOMES:

At the end of the course the students will be able to

- CO1: Demonstrate the foundational knowledge in Mechanics.
- CO2: Interpret the elastic properties of solid materials and their applications.
- CO3: Apply the comprehended knowledge about laser and its applications.
- CO4: Apply the comprehended knowledge about fibre optic communication system in various engineering applications.
- CO5: Understand the fundamental principles of quantum mechanics.

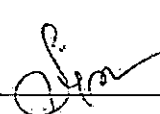
TEXT BOOKS:

1. D.Kleppner and R.Kolenkow, "An Introduction to Mechanics," McGraw Hill Education (Indian Edition), 2021.
2. Arthur Beiser, Shobhit Mahajan, S.Rai Choudhury, "Concepts of Modern Physics," McGraw-Hill (Indian Edition), 2024.

REFERENCE BOOKS:

1. K.Thyagarajan and A.Ghatak, "Lasers: Fundamentals and Applications," Laxmi Publications, (Indian Edition), 2023

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2. D.Halliday, R.Resnick and J.Walker, "Principles of Physics," Wiley (Indian Edition), 2021
3. N.Garcia, A.Damask and S.Schwarz, "Physics for Computer Science Students," Springer-Verlag, 2012

PRACTICAL REFERENCES:

1. A.K. Katiyar (Author), C.K. Pandey, Engineering Physics: Theory and Practical Paperback, 2015.

E- RESOURCES:

1. <https://archive.nptel.ac.in/courses/113/106/113106039/>
2. <https://vlab.amrita.edu/?sub=1>
3. https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_ph52
4. https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_ph36

CO's- PO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	2	1	1	-	-	-	-	-	-	3	3	3
CO2	3	3	2	1	1	-	-	-	-	-	-	2	3	2
CO3	3	2	2	1	2	-	-	-	-	-	-	3	2	3
CO4	3	2	2	1	2	-	-	-	-	-	-	3	2	3
CO5	3	3	1	1	2	-	-	-	-	-	-	3	3	2
AVG	3.00	2.60	1.80	1.00	1.60							2.80	2.60	2.60

1 - Low, 2 - Medium, 3 - High, '-' - no correlation

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25CY111	ENGINEERING CHEMISTRY	L	T	P	C
SDG No. 4,6,7	(Common to B.E. / B.Tech. all Branches)	3	0	2	4

COURSE OBJECTIVES:

- To provide foundational knowledge on water quality and water treatment processes.
- To introduce the principles of nanochemistry, methods of synthesizing nanomaterials, and their applications.
- To familiarize students with polymer chemistry, polymerization techniques, and the manufacturing methods of plastics.
- To impart knowledge on fuels and combustion, including manufacturing of fuels, fuel analysis, and alternative energy sources.
- To develop an understanding of electrochemistry and its applications in energy storage devices and electric vehicles.

UNIT-I	WATER AND ITS TREATMENT	9
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Water quality parameters - Estimation of hardness by EDTA method - Boiler troubles - Internal treatment and External treatment of boiler feed water - Ion exchange method and zeolite process - Desalination method: Reverse Osmosis.

UNIT-II	NANOCHEMISTRY	9
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Basics of Nanochemistry - Size-dependent properties - Types of nanomaterials: nanoparticle, nanowire, nanorod and nanotube - Preparation of nanomaterials: sol-gel, solvothermal, laser ablation, electrochemical deposition - Applications of nanomaterials.

UNIT-III	POLYMER CHEMISTRY	9
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Basics of polymer chemistry - Mechanism of polymerization: Addition (Free Radical); condensation and copolymerization - Thermoplastics & thermosetting plastics - Preparation, properties and uses of Nylon 6, 6 and Epoxy resin - Fabrication of plastics - (Compression, Injection & Extrusion moulding).

UNIT-IV	FUELS AND COMBUSTION	9
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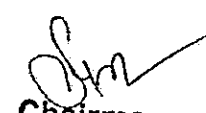
Classification of fuels - Carbonization, Manufacture of metallurgical coke (Otto Hoffmann method) - Manufacture of synthetic petrol (Bergius process) - Knocking - octane number, cetane number - Power alcohol and biodiesel - Flue gas analysis - ORSAT Method.

UNIT-V	ELECTROCHEMISTRY AND STORAGE DEVICES	9
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Types of cells - types of electrodes: calomel electrode, glass electrode - Nernst equation - EMF series - Batteries: Primary battery - Dry cell, Secondary battery - lead acid battery and lithium-ion-battery; H₂-O₂ fuel cell; Supercapacitors - Electric vehicles.

TOTAL: 45 HOURS

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PRACTICAL EXERCISES:

1. Determination of types and amount of alkalinity in a water sample.
2. Determination of total, temporary & permanent hardness of water sample by EDTA method.
3. Determination of chloride content of water sample by Argentometric method.
4. Determination of amount of given hydrochloric acid using pH meter.
5. Determination of amount of acids in a mixture of acids ($\text{HCl} + \text{CH}_3\text{COOH}$) using conductivity meter.
6. Conductometric titration of barium chloride against sodium sulphate (precipitation titration).
7. Estimation of iron content of the given solution using potentiometer.
8. Determination of molecular weight of polyvinyl alcohol using Ostwald viscometer.

TOTAL: 30 HOURS

GRAND TOTAL: 45 + 30 = 75 HOURS

COURSE OUTCOMES:

At the end of the course the students will be able to

- CO1: Assess the quality of water from water quality parameter and propose suitable treatment methodologies to treat water.
- CO2: Summarize the basic concepts of nanochemistry in designing the synthesis of nanomaterials for engineering and technology applications.
- CO3: Understand the basic knowledge of polymers to apply the futuristic material needs.
- CO4: Familiar with the concepts of fuels for engineering processes and applications.
- CO5: Apply the concept of electrochemistry in the fabrication of energy storage devices.

TEXT BOOKS:

1. Dr. A. Ravikrishnan, "Engineering Chemistry", Sri Krishna Hi-tech Publishing Company Pvt. Limited, 23rd Edition, 2023.
2. S. S. Dara, "A text book of Engineering Chemistry", S. Chand Publishing, 12th Edition, 2018.

REFERENCE BOOKS:

1. Shashi Chawla, "A Text Book of Engineering Chemistry", Dhanpat Rai & Co (Pvt.) Ltd, New Delhi, 2011.
2. O.G. Palanna, "Engineering Chemistry", McGraw Hill Education (India) Private Limited, 2nd Edition, 2017.
3. P. C. Jain and Monica Jain, "Engineering Chemistry", 17th Edition, Dhanpat Rai Publishing Company (P) Ltd, New Delhi, 2018.

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E-RESOURCES:

Unit1:

https://www.youtube.com/watch?v=4SRMmqH2s4&list=PLLy_2iUCG87AZvtaiuD3r4HATrBKhb90P (IIT ROORKEE NPTEL) & <https://www.youtube.com/watch?v=o6iur02Cwd0> (NPTEL-NOC IITM)

Unit 2:

<https://www.youtube.com/watch?v=0EWCqCIsFOA&list=PLyqSpQzTE6M8682dGkNTN8936vSY4CbqZ> (NPTEL-NOC IITM)

Unit 3:

<https://www.youtube.com/watch?v=jSNImOwpYg&list=PLbMVogVj5nJT0slH3tuas5BIp1DG8ZpMj> (NPTELHRD)

Unit 4:

<https://www.youtube.com/watch?v=1-EliKQ0erA> (AKTU DIGITAL EDUCATION)

Unit 5:

<https://www.youtube.com/watch?v=nh2xbyOaERw&>
<https://www.youtube.com/watch?v=iFVVv23ZzGE> (IIT ROORKEE NPTEL)

CO's- PO's MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PS01	PS02	PS03
C01	3	3	3	1	1	3	-	-	-	-	-	-	-	-
C02	3	2	1	1	2	2	-	-	-	-	1	-	-	1
C03	3	3	1	1	1	1	-	-	-	-	-	1	-	1
C04	3	2	1	1	1	1	-	-	-	-	-	-	-	-
C05	3	2	2	1	2	2	-	-	-	-	-	-	-	1
AVR	3.0	2.4	1.6	1.0	1.4	1.8	-	-	-	-	1.0	1.0	-	1.0

1- Low, 2- Medium, 3-High, "-" No Correlation

25CSI11	PROBLEM SOLVING USING C PROGRAMMING	L	T	P	C
SDG No: 4, 8, 9, 10,17	(Common to: B.E. / B.Tech. all Branches)	3	0	2	4

COURSE OBJECTIVES:

- To learn how to think algorithmically to solve a problem.
- To gain knowledge of fundamental programming concepts in C programming.
- To explore the basic concept of arrays and pointers.
- To learn concept of functions and structures.
- To gain proficiency in file handling techniques.

UNIT-I COMPUTATIONAL THINKING 9

Overview of Computational Thinking and Key Techniques – Overview of Software Development Life Cycle – Introduction to Algorithmic Thinking – Elements: Sequence, Selection and Repetition – Representation of Flow Chart – Overview of Flow algorithm Tool – Pseudo- code- Introduction to programming languages

UNIT-II BASICS OF C PROGRAMMING 9

Introduction to C - Structure of C Programming - Compiling - Executing and Debugging - Character Set – Tokens - Identifiers - Data Types – Variable – Constants - Evaluating Expression - Type Conversion - Input and Output - Decision control and looping statements

UNIT-III ARRAYS AND POINTERS 9

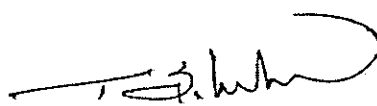
Introduction to Arrays - Declaration and Initialization of Single Dimensional Arrays - Array Operations - Declaration and Initialization of Two-Dimensional Arrays - Multidimensional Arrays - Declaring and Initializing Strings - Reading and Writing Strings - String Operations - Array of Strings. Introduction to Pointers - Pointer operators - Pointer arithmetic - Arrays and pointers - Array of pointers.

UNIT-IV FUNCTIONS AND STRUCTURES 9

Function - Types of Function – Elements - Pass by value - Pass by reference – Recursion - Storage Classes. Introduction to structures - Declaring and Defining Structure Variables - Accessing Structure Members - Structure Initialization - Nested structures - Array of structure – typedef - Union

UNIT-V FILE PROCESSING 9

Files: Introduction – Using files in C – Read data from files – Writing data to files – Error handling during File operation – Command line arguments.


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TOTAL : 45 PERIODS

PRACTICAL EXERCISES:

1. Implementation of algorithm, flowchart and pseudo code to solve electricity billing.
2. Implementation of algorithm, flowchart and pseudo code to solve retail shop billing.
3. Implementation of if, if-else, nested if and switch statements.
4. Implementation of while, do-while and for loops.
5. Implementation of sorting and searching algorithms.
6. Implementation of one-dimensional array, passing array to functions and array operations.
7. Implementation of programs for implementing various string operations like "copy", "finding length", "compare", "concatenate" with and without built-in library functions.
8. Implementation of pointer operators, call by reference, pointers with array.
9. Implementation of function calls, recursion, call by value.
10. Implementation of structure and nested structure.
11. Implementation of array of structures.
12. Implementation of file operations.
13. Implementation of file to read N character using file functions.

TOTAL: 30 PERIODS

TOTAL: 75 (45+30) PERIODS

COURSE OUTCOMES:

At the end of the course the students will be able to

- CO 1 :** Construct algorithmic solutions for a given computational problem.
- CO 2 :** Demonstrate the understanding of fundamental concepts of C programming.
- CO 3 :** Utilize appropriate concepts of arrays and pointers to solve the programming problems effectively.
- CO 4 :** Apply concepts of functions and structures in C programming
- CO 5 :** Implement file I/O operations to store and retrieve data from files.

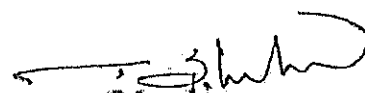
TEXT BOOKS:

1. GVenkatesh and Madhavan Mukund, "Computational Thinking: A Primer for Programmers and Data Scientists", 1st Edition, Notion Press, 2021.
2. Reema Thareja, "Programming in C", Oxford University Press, Second Edition, 2023.
3. Kernighan, B.W and Ritchie, D.M, "The C Programming language", Second Edition, Pearson Education, 2023.

REFERENCE BOOKS:

1. Yashwant Kanetkar, Let us C, 17th Edition, BPB Publications, 2023
2. Byron S. Gottfried, "Schaum's Outline of Theory and Problems of Programming with C",

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McGraw-Hill Education, 2024.

3. Pradip Dey, Manas Ghosh, "Computer Fundamentals and Programming in C", Second Edition, Oxford University Press, 2022.

4. Anita Goel and Ajay Mittal, "Computer Fundamentals and Programming in C", 1st Edition, Pearson Education, 2024.

E-RESOURCES:

1. Tutorial point - <https://www.tutorialspoint.com/c-programming/index.htm>
2. Greek for geeks - <https://www.geeksforgeeks.org/c-programming-language/>

CO's - PO's & PSO's MAPPING

CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	2	2	1	2	1	1	2	-	3	3	1	2	2
CO2	2	3	2	1	2	1	1	2	-	3	2	2	2	2
CO3	3	2	2	1	3	1	1	2	-	3	3	2	2	2
CO4	2	3	3	1	2	2	1	2	-	3	2	2	3	2
CO5	2	2	3	2	1	-	-	2	1	2	2	2	2	2
AVG	2.2	2.4	2.4	1.2	2	1.3	1	2	1	2.8	2.4	1.8	2.2	2

1 - low, 2 - medium, 3 - high, '-' - no correlation


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25STAT11	HERITAGE OF TAMILS	L	T	P	C
SDG No. 3, 4, 8, 11, 16	(B.E./B.Tech-Common to all branches)	1	0	0	1

COURSE OBJECTIVES:

- To understand the Sangam and modern literature of Tamil.
- To learn the heritage of Tamil culture.
- To recognize the various art forms of Tamils.
- To explain the Thinaï concept of Tamils.
- To realize the contribution of Tamils to Indian national movement and Indian culture.

UNIT-I LANGUAGE AND LITERATURE 3

Language Families in India - Dravidian Languages - Tamil as a Classical Language - Classical Literature in Tamil - Secular Nature of Sangam Literature - Distributive Justice in Sangam Literature - Management Principles in Thirukural - Tamil Epics and Impact of Buddhism & Jainism in Tamil Land - Bakthi Literature Azhwars and Nayanmars - Forms of minor Poetry - Development of Modern literature in Tamil - Contribution of Bharathiyar and Bharathidhasan.

UNIT-II HERITAGE - ROCK ART PAINTINGS TO MODERN ART - SCULPTURE 3

Hero stone to modern sculpture - Bronze icons - Tribes and their handicrafts - Art of temple car making - Massive Terracotta sculptures, Village deities, Thiruvalluvar Statue at Kanyakumari, Making of musical instruments - Mridhangam, Parai, Veenai, Yathi and Nadhaswaram - Role of Temples in Social and Economic Life of Tamils.

UNIT-III FOLK AND MARTIAL ARTS 3

Therukoothu, Karagattam, Villu Pattu, Kaniyan Koothu, Oyillattam, Leather puppetry, Silambattam, Valari, Tiger dance - Sports and Games of Tamils.

UNIT-IV THINAI CONCEPTS OF TAMILS 3

Flora and Fauna of Tamils & Aham and Puram Concept from Tholkappiyam and Sangam Literature - Aram Concept of Tamils - Education and Literacy during Sangam Age - Ancient Cities and Ports of Sangam Age - Export and Import during Sangam Age - Overseas Conquest of Cholas.

UNIT-V

CONTRIBUTION OF TAMILS TO INDIAN
NATIONAL MOVEMENT AND INDIAN CULTURE

3

Contribution of Tamils to Indian Freedom Struggle - The Cultural Influence of Tamils over the other parts of India - Self-Respect Movement - Role of Siddha Medicine in Indigenous Systems of Medicine - Inscriptions & Manuscripts - Print History of Tamil Books.

TOTAL: 15 PERIODS

COURSE OUTCOMES:

At the end of the course the student will be able to

- CO1: Gain knowledge about various literatures of Tamil.
- CO2: Learn the uniqueness of Tamil cultural heritage.
- CO3: Find various art forms of Tamil Nadu.
- CO4: Understand the Thinaï concepts in Tamil.
- CO5: Distinguish the contribution of Tamils to Indian national movement and Indian culture.

TEXT BOOK:

1. Heritage of Tamils, Dr. P. Inthirani, Jai Balaji Publications, Chennai.

REFERENCES:

1. Thamizhaga Varalarum Makkal Panpaadum, Dr. K. K. Pillai, Uлага Tamizharaichi Niruvanam, Chennai.

E- RESOURCES:

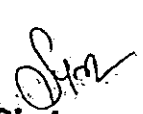
1. <https://www.tamilvu.org/>

CO's -PO's MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PS01	PS02	PS03
CO1	-	-	-	-	-	1	1	-	1	-	-	-	-	-
CO2	-	-	-	-	-	1	1	-	1	-	-	-	-	-
CO3	-	-	-	-	-	1	1	-	1	-	-	-	-	-
CO4	-	-	-	-	-	1	1	-	1	-	-	-	-	-
CO5	-	-	-	-	-	1	1	-	1	-	-	-	-	-
AVG	-	-	-	-	-	1	1	-	1	-	-	-	-	-

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

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25TAT11

தமிழர் மரபு

L T P C

SDG No. 3, 4, 8, 11, 16

(B.E./B.Tech- அனைத்து பாடப்பிரிவுகளுக்கும் பொதுவானது)

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பாடநெறி நோக்கங்கள்:

- தமிழின் இலக்கியங்கள் மற்றும் நவீன இலக்கியங்களைப் புரிந்துகொள்ளுதல்.
- தமிழ் கலாச்சார பாரம்பரியத்தைக் கற்றுக்கொள்ளுதல்.
- தமிழர்களின் பல்வேறு கலைவடிவங்களைக் கண்டறிதல்.
- தமிழர்களின் திணைக்கோட்பாடுகளை விளக்குதல்.
- இந்திய சுதந்திர போராட்ட இயக்கங்களுக்கும் இந்திய கலாச்சாரத்திற்குமான தமிழர்களின் பங்களிப்பை உணர்தல்.

அலகு - I

மொழி மற்றும் இலக்கியம்

3

இந்திய மொழிக் குடும்பங்கள் - திராவிட மொழிகள் - தமிழ் ஒரு செம்மொழி - தமிழ் செவ்விலக்கியங்கள் - சங்க இலக்கியத்தின் சமய சார்பற்ற தன்மை - சங்க இலக்கியத்தில் பகிர்தல் ஆறம் - திருக்குறளில் மேலாண்மைக் கருத்துக்கள் - தமிழ்க் காப்பியங்கள், தமிழகத்தில் சமணப் பெளத்த மதங்களின் தாக்கம் - பக்தி இலக்கியம், ஆழ்வார்கள் மற்றும் நாயன்மார்கள் - சிற்றிலக்கியங்கள் - தமிழில் நவீன இலக்கியத்தின் வளர்ச்சி - தமிழ் இலக்கிய வளர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசன் ஆகியோரின் பங்களிப்பு.

அலகு - II

மரபு - பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை - சிற்பக் கலை

3

நடுகல் முதல் நவீன சிற்பங்கள் வரை - ஐம்பொன் சிலைகள் - பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினைப்பொருட்கள், பொம்மைகள் - தேர் செய்யும் கலை - சுடுமண் சிற்பங்கள் - நாட்டுப்புறத் தெய்வங்கள் - குமரிமுனையில் திருவள்ளுவர் சிலை - இசைக்கருவிகள் - மிருதங்கம், பறை, வீணை, யாழ், நாதஸ்வரம் - தமிழர்களின் சமூக பொருளாதார வாழ்வில் கோவில்களின் பங்கு.

அலகு - III

நாட்டுப்புறக் கலைகள் மற்றும் வீரவிளையாட்டுகள்

3

தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான் கூத்து, ஓயிலாட்டம், தோல்பாவைக் கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் விளையாட்டுகள்.

அலகு - IV

தமிழர்களின் திணைக் கோட்பாடுகள்

3

தமிழகத்தின் தாவரங்களும், விலங்குகளும் - தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் SVHEC R-2025

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மற்றும் புறக் கோட்பாடுகள் - தமிழர்கள் போற்றிய அறக்கோட்பாடு : சங்ககாலத்தில் தமிழகத்தில் எழுத்தறிவு, கல்வியும் - சங்ககால நகரங்களும் துறைமுகங்களும் - சங்ககாலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி - கடல்கடந்த நாடுகளில் சோழர்களின் வெற்றி.

அலகு - V

இந்திய தேசிய இயக்கம் மற்றும்

3

இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு

இந்திய விடுதலைப்போரில் தமிழர்களின் பங்கு - இந்தியாவின் பிற்பகுதிகளில் தமிழ்ப் பண்பாட்டின் தாக்கம் - சுயமரியாதை இயக்கம் - இந்திய மருத்துவத்தில், சித்த மருத்துவத்தின் பங்கு - கல்வெட்டுகள், கையெழுத்துப்படிக்கல் - தமிழ்ப் புத்தகங்களின் அச்ச வரலாறு.

மொத்தம்: 15 பாடவேளைகள்

பாடநெறி முடிவுகள்:

இப்பாடத்தைப் படிப்பதின் முடிவில் மாணவர்கள்

- C01: தமிழின் பல்வேறு இலக்கியங்களைப் பற்றிய அறிவைப் பெறுவார்கள்.
- C02: தமிழ் கலாச்சார பாரம்பரியத்தின் தனித்தன்மையைக் கற்றுக்கொள்வார்கள்.
- C03: தமிழகத்தின் பல்வேறு கலைவடிவங்களைக் கண்டறிவார்கள்.
- C04: தமிழர்களின் திணைக்கோட்பாடுகளை அறிந்துகொள்வார்கள்.
- C05: தமிழ் சுதந்திரப்போராட்ட வீரர்கள் மற்றும் தமிழ் கலாச்சாரத்தை இந்தியாவின் மற்ற பகுதியுடன் ஒப்பிடும் திறனைப் பெறுவார்கள்.

பாடநூல்:

1. தமிழர் மரபு, முனைவர் ப. இந்திராணி, ஜெய் பாலாஜி பதிப்பகம், சென்னை.

பார்வை நூல்:

1. தமிழக வரலாறும் மக்கள் பண்பாடும், டாக்டர் கே. கே. பிள்ளை, உலகத் தமிழாராய்ச்சி நிறுவனம், சென்னை.

மின் - ஆதாரங்கள்:

1. <https://www.tamilvu.org/>

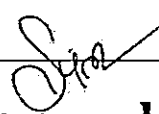
Shree Venkateshwara Hi-Tech Engineering College (Autonomous)

CO's-PO's விவரணையாக்கம்:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PS01	PS02	PS03
CO1	-	-	-	-	-	1	1	-	1	-	-	-	-	-
CO2	-	-	-	-	-	1	1	-	1	-	-	-	-	-
CO3	-	-	-	-	-	1	1	-	1	-	-	-	-	-
CO4	-	-	-	-	-	1	1	-	1	-	-	-	-	-
CO5	-	-	-	-	-	1	1	-	1	-	-	-	-	-
AVG	-	-	-	-	-	1	1	-	1	-	-	-	-	-

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

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25MEL11
SDG No.
4, 8, 9, 11, 12

IDEA LAB
(Common to B.E./B.Tech all branches)

L	T	P	C
0	0	4	2

Course Objectives:

The main learning objective of this course is to prepare the students to:

- Develop hands-on skills in schematic design and PCB layout for custom electronic circuits.
- Enable students to fabricate, assemble, and test PCBs using standard manufacturing practices.
- Impart practical knowledge in embedded system programming using Arduino and Raspberry Pi platforms.
- Provide exposure to workshop tools including welding, lathes, and plumping equipment for physical prototyping.
- Facilitate the design and fabrication of complete working prototypes through integration of embedded hardware and 3D-printed or machined enclosures.

LIST OF EXPERIMENTS:

1. Schematic and PCB layout design of a suitable circuit.
2. Fabrication and testing of the Printed Circuit Board (PCB).
3. Embedded programming using Arduino and/or Raspberry Pi.
4. Familiarity and use of welding equipment.
5. Familiarity and use of lathe operations.
6. Familiarity and use of plumping equipment.
7. 3D Printing practice using Fusion Deposit Modeling (FDM).
8. Design and implementation of a capstone project involving embedded hardware, software and machined or 3D printed enclosure.

TOTAL : 60 PERIODS

COURSE OUTCOMES:

At the end of the course the students will be able to

- C01:** Design and simulate electronic circuits and translate them into PCB layouts using industry-standard tools.
- C02:** Fabricate and test printed circuit boards ensuring reliability and functionality of electronic components.
- C03:** Write and debug embedded programs using Arduino/Raspberry Pi for real-world applications
- C04:** Operate welding, lathe, and plumping tools to build enclosures and mechanical fixtures for prototypes.
- C05:** Integrate embedded systems with 3D-printed/machined parts to develop and present a functional capstone project.

REFERENCE BOOKS:

1. AICTE's Prescribed Textbook: Workshop / Manufacturing Practices (with Lab Manual), ISBN: 978-9391505332
2. Make Your Own PCBs with EAGLE: From Schematic Designs to Finished Boards. Simon Monk and Duncan Amos. McGraw Hill Education. ISBN-13 : 978-1260019193.

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3. 3D Printing & Design, Dr. Sabrie Soloman, ISBN: 978-9386173768, Khanna Book Publishing Company, New Delhi.
4. Programming Arduino: Getting Started with Sketches. 2nd edition. Simon Monk. McGraw Hill. ISBN-13: 978-1259641633
5. The Big Book of Maker Skills: Tools & Techniques for Building Great Tech Projects. Chris Hackett. Weldon Owen; 2018. ISBN-13: 978-1681884325.

E-RESOURCES:

1. https://onlinecourses.nptel.ac.in/noc25_ee163/preview
2. https://onlinecourses-archive.nptel.ac.in/noc18_cs05/course
3. <https://www.autodesk.com/learn/ondemand/collection/fusion-360>

CO's – PO's & PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2	3	-	2	-	-	-	-	1	-
CO2	3	2	3	2	2	-	-	-	-	1	-
CO3	3	3	3	2	3	-	-	-	-	2	-
CO4	2	1	2	-	2	-	-	-	-	1	-
CO5	3	3	3	2	3	-	-	-	2	3	2
Avg	3	2	3	2	2	-	-	-	2	2	2

1 - low, 2 - medium, 3 - high, '-' - no correlation

g. Chari
Chairman
BoS / Mech

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25MDC11	YOGA FOR HUMAN EXCELLENCE	L	T	P	C
SDG No. 3,4,5,10,16	(Common to B.E./B.Tech. all Branches)	0	0	1	0

COURSE OBJECTIVES:

- To introduce students to simplified physical exercises, breathing techniques, relaxation practices and Yogasanas for maintaining physical health and well-being.
- To develop awareness of body-mind coordination through the practice of Kaya Kalpa exercises, meditation and self-regulation techniques.
- To enhance concentration, emotional balance and mental peace through systematic training in meditation and mindfulness practices.
- To inculcate ethical values, self-discipline, responsibility and healthy lifestyle habits for holistic personality development.
- To promote individual and social harmony by fostering positive thinking, self-awareness and the application of yogic principles in daily life.

UNIT-I	SIMPLIFIED PHYSICAL EXERCISES	3
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Physical exercises: Hand exercises – Leg exercises. Breathing exercises: Eye exercises – Kapalabathi. Makarasana. Body massages: Acupressure – Relaxation.

UNIT-II	KAYA KALPA	3
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Kaya Kalpa Exercise – Aswini Mudra – Moola-Bandha – Ojas Breath (Kayakalpa Exercise should be learnt directly from the World Community Service Centre.)

UNIT-III	MEDITATION	3
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Agna. Santhi : Clearence. Thuriya. Thuriyatheetham meditation

UNIT-IV	HUMAN RESOURCES DEVELOPMENT	3
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Roles and responsibilities of a human being (Due the Duty, 4 Ashramas) - Desire Alignment (Aasai seeramaithal) - Discipline (olukkam formula) - Diet/Food control (Organ Clock) - Five duties, Five limitations (Ivaghai kadamaighal, Indhil Alavu murai) - Bene its of Blessings (comparing to Law of attraction)- Individual peace leads to world peace.

UNIT-V	YOGASANAS	3
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Suriya Namaskar, Padmasana, Vajrasana, Sukasana, Trikonasana , Saral matsyasana, Gomugasana, Mandukasana, Arthamatsyendrasana, Ushtrasana, Siddhasana, Shavasana

TOTAL : 15 PERIODS

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COURSE OUTCOMES:

At the end of the course,

CO1: Demonstrate simplified physical exercises, breathing techniques, relaxation methods, and acupressure practices to promote physical fitness and health.

CO2: Practice Kaya Kalpa exercises and related techniques to improve vitality, self-control, and overall well-being.

CO3: Apply meditation techniques to enhance concentration, emotional stability, mental clarity, and inner peace.

CO4: Analyze and adopt ethical values, self-discipline, healthy lifestyle habits, and social responsibilities for holistic personality development.

CO5: Perform Yogasanas effectively and integrate yogic principles into daily life for achieving physical, mental, and social well-being.

TEXT BOOKS:

1. Yoga Practices – I: VISION, Vethathiri Publications.
2. Yogasana – Vethathiri Publications

REFERENCE BOOKS:

1. Simplified Physical Exercises – Vethathiri Publications.
2. Sound Health Through Yoga – Dr. K. Chandrasekaran.

E. RESOURCES:

- <https://www.vethathiri.edu.in/>
- <https://www.kundaliniyoga.edu.in/>

COs-POs-PSOs MAPPING :

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	1	-	-	-	-	-	1	2	-	-	-	-	-	-
CO2	1	-	-	-	-	-	-	2	-	-	-	-	-	-
CO3	1	-	-	-	-	-	-	3	-	-	-	-	-	-
CO4	-	1	-	-	-	2	1	3	1	1	-	-	-	-
CO5	1	-	-	-	-	1	1	3	-	-	-	-	-	-
1.2	1.00	1.00	-	-	-	1.50	1.00	2.60	1.00	1.00	-	-	-	-

Low, 2- Medium, 3-High, "-" No Correlation

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UNIT-III ADVANCED COMMUNICATION FOR PROFESSIONAL SUCCESS 6+3

- Grammar : If Clause -One Word Substitution
Listening : Listening to Interview Techniques and Etiquettes
Speaking : Participating in Group Discussion - Developing Persuasive Skills and Argument Construction (Debate)
Reading : Reading of Articles (Editorials)
Writing : Compose Emails for Internship Request, Placement Enquires and Industrial Visits

UNIT-IV DESCRIPTIVE AND INTERACTIVE COMMUNICATION 6+3

- Grammar : Reported Speech - Compound Words
Listening : Listening to Book and Movie Review
Speaking : Describing Working Mechanism
Reading : Reading for Improving Fluency and Intonation.
Writing : Writing letter of Invitation, Acceptance and Declination

UNIT-V CAREER-ORIENTED COMMUNICATION SKILLS 6+3

- Grammar : Content vs. Function Words – Fixed & Semi Fixed Expression - Relative Phrase
Listening : Listening to job Interviews and Answering to the Exercise
Speaking : Offline and Online Interviews.
Reading : Matching the Heading to the Paragraph.
Writing : Job Application & Internship Application with Resume.

TOTAL : 45 PERIODS

COURSE OUTCOMES:

At the end of the Course the students will able to

CO 1: Apply basic grammar, communicate daily situations, comprehend listening tasks, compare products and write short biographies.

CO 2: Correct grammar, present processes effectively, interpret technical texts and draft form.

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letters.

CO 3: Use conditional sentences, participate confidently in debates and discussions, follow interview protocols, analyze editorials and compose professional emails.

CO 4: Use reported speech, describe processes, listen and respond to reviews, read with fluency and draft formal invitation letters.

CO 5: Apply grammar structures, face interviews confidently, match texts with headings, and draft job applications with resumes.

TEXT BOOKS:

1. Department of English, Anna University, "English for Engineers & Technologists" Orient Blackswan Private Ltd, 2020.
2. Dr.Veena Selvam, Dr.Sujatha Priyadarshini, & CO, Department of English, Anna University, "English for Science & Technology" Cambridge University Press, 2021.

REFERENCE BOOKS:

1. Meenakshi Raman & Sangeeta Sharma, "Technical Communication-Principles and Practices", Oxford Univ. Press, New Delhi, 2016.
2. Lakshminarayanan, "A Course Book on Technical English", Scitech Publications (India) Pvt.Ltd. 2012.
3. Aysha Viswamohan, "English For Technical Communication (With CD)". McGraw Hill Education, ISBN : 0070264244, 2008.
4. Effective Communication Skill, Kulbhusan Kumar, R S Salaria, Khanna Publishing House, 2016.

E. RESOURCES:

- <https://learnenglish.britishcouncil.org/>

CO's-PO's MAPPING :

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	3	3	-	3	-	-	-
CO2	-	-	-	-	-	-	-	3	3	-	3	-	1	-
CO3	-	-	-	-	-	-	-	3	3	-	2	-	1	-
CO4	-	-	-	-	-	-	-	3	3	-	2	-	-	-
CO5	-	-	-	-	-	-	-	3	3	-	2	-	-	-
AVR	-	-	-	-	-	-	-	3.00	3.00	-	2.40	-	1.00	-

1- Low, 2- Medium, 3-High, "-" No Correlation

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25MAT21	NUMERICAL METHODS AND DIFFERENTIAL EQUATIONS	L T P C
SDG NO.4,8,9,11	(Common to B.E./B.Tech. all Branches)	3 0 0 3

COURSE OBJECTIVES :

- To introduce the basic concepts of solving algebraic and transcendental equations.
- To introduce the numerical techniques of interpolation in various intervals and differentiation and integration in engineering and technology.
- To acquaint the knowledge of various techniques and methods of solving ordinary differential equations.
- To familiarize students how to solve the higher-order linear differential equations.
- To enable students to understand the definition and properties of the Laplace transform apply it to solve differential and integral equations and analyze the behavior of systems in the frequency domain.

UNIT-I	SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS	9
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Newton Raphson method- Solution of linear system of equations - Gauss elimination method - Pivoting-Gauss Jordan method - Iterative methods of Gauss Jacobi and Gauss Seidel - Eigen values of a matrix by Power method.

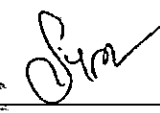
UNIT-II	INTERPOLATION, NUMERICAL DIFFERENTIATION AND NUMERICAL INTEGRATION	9
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Lagrange's and Newton's divided difference interpolations - Newton's forward and backward difference interpolation - Numerical single integrations using Trapezoidal and Simpson's 1/3 rules.

UNIT-III	NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS	9
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Single step methods: Taylor's series method - Euler's method - Modified Euler's method - Fourth order Runge-Kutta method for solving first order differential equations - Multi step methods: Milne's predictor corrector methods for solving first order differential equations.

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UNIT-IV ORDINARY DIFFERENTIAL EQUATIONS 9

Linear higher order differential equations with constant coefficients – Method of variation of parameters – Cauchy's and Legendre's linear differential equations.

UNIT-V LAPLACE TRANSFORMS 9

Laplace transform: Sufficient conditions – Transform of elementary functions – Basic Properties – Transform of periodic functions. Inverse Laplace transform: Standard results – statement of Convolution theorem and its applications – Solution of linear second order ODE with constant coefficients using Laplace transformation techniques.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

At the end of the Course the students will be able to

- CO1 : Apply the numerical techniques of interpolation in various intervals and differentiation and integration for engineering problems.
- CO2 : Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.
- CO3 : Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.
- CO4 : Apply various techniques in solving differential equations.
- CO5 : Understand Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.

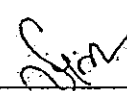
TEXT BOOKS:

1. Grewal, B.S., and Grewal, J.S., "Numerical Methods in Engineering and Science", Khanna Publishers, 10th Edition, New Delhi, 2019.
2. Kreyszig Erwin, "Advanced Engineering Mathematics", John Wiley and Sons, 10th Edition, New Delhi, 2016.

REFERENCE BOOKS:

1. Bali N., Goyal M. and Watkins C., "Advanced Engineering Mathematics", Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.), New Delhi, 7th Edition, 2015.

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2. Burden, R.L and Faires, J.D, "Numerical Analysis", 9th Edition, Cengage Learning, 2016.
3. T.K.V Iyengar, B.krishna Gandhi, S.Ranganatham, M.V.S.S.N Prasad, " Laplace Transforms, Numerical Methods and complex variables", S.Chand, 10th march 2025.

E-Resources :

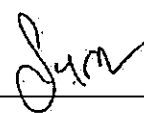
1. <https://www.scribd.com/document/854329544/Iterative-Methods>
2. https://www.youtube.com/watch?v=yPNSIhE_FZM

CO's - PO's & PSO'S MAPPING :

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	2	1	1	-	-	2	-	2	3	2	3	2
CO2	3	3	2	1	1	-	-	2	-	2	2	1	3	2
CO3	3	3	2	1	1	-	-	2	-	2	3	2	3	3
CO4	3	3	2	1	1	-	-	2	-	2	3	2	3	2
CO5	3	2	2	1	1	-	-	2	-	3	3	2	3	2
AVG	3.00	2.80	2.00	1.00	1.00	-	-	2.00	-	2.20	2.80	1.80	3.00	2.20

1-Low, 2- Medium , 3-High, "-" No Correlation

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25PHT21	PHYSICS FOR INFORMATION SCIENCE	L	T	P	C
SDG No. 3, 4, 7, 8, 9, 11, 12, 16	(Common to B.E. CSE, CS, AIML & B.TECH. IT, AIDS	3	0	0	3

COURSE OBJECTIVES:

- To make the students understand the importance in studying electrical properties of materials.
- To enable the students to gain knowledge in semiconductor physics.
- To instill knowledge on magnetic properties of materials.
- To establish a sound grasp of knowledge on different optical properties of materials, optical displays and applications.
- To inculcate an idea of significance of nano structures, quantum confinement; ensuing nano device applications and quantum computing.

UNIT-I ELECTRICAL PROPERTIES OF MATERIALS 9

Classical free electron theory - Expression for electrical conductivity - Thermal conductivity, expression - Wiedemann-Franz law - Success and failures - electrons in metals - Fermi-Dirac statistics - Density of energy states - Electron in periodic potential - Energy bands in solids.

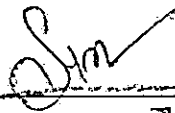
UNIT-II SEMICONDUCTOR PHYSICS 9

Intrinsic Semiconductors - Energy band diagram - direct and indirect band gap semiconductors - Carrier concentration in intrinsic semiconductors - extrinsic semiconductors - Carrier concentration in N-type & P-type semiconductors - Variation of Fermi level with temperature and impurity concentration - Hall effect and devices - Ohmic contacts - Schottky diode.

UNIT-III MAGNETIC PROPERTIES OF MATERIALS 9

Magnetic dipole moment - atomic magnetic moments- magnetic permeability and susceptibility - Magnetic material classification: diamagnetism - paramagnetism - ferromagnetism - antiferromagnetism - ferrimagnetism -Domain Theory of ferromagnetism - Hard and soft magnetic materials - examples and uses - Magnetic principle in computer data storage - Magnetic hard disc (Giant Magneto Resistive sensor).

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UNIT-IV

OPTICAL PROPERTIES OF MATERIALS

9

Classification of optical materials – carrier generation and recombination processes – Absorption emission and scattering of light in metals, insulators and semiconductors (concepts only) – photo current in a P-N diode – solar cell – LED – Organic LED – Laser diodes – Optical data storage techniques.

UNIT-V

NANODEVICES AND QUANTUM COMPUTING

9

Introduction – quantum confinement – quantum structures: quantum wells, wires and dots – band gap of nanomaterials. Single electron transistor – Quantum system for information processing – quantum states – classical bits – quantum bits – CNOT gate – quantum gates – advantage of quantum computing over classical computing.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

At the end of the course the students will be able to

- CO1:** Gain knowledge on classical and quantum electron theories, and energy band structures.
- CO2:** Acquire knowledge on basics of semiconductor physics and its applications in various devices.
- CO3:** Get knowledge on magnetic properties of materials and their applications in data storage.
- CO4:** Have the necessary understanding on the functioning of optical materials for optoelectronics.
- CO5:** Understand the basics of quantum structures and their applications and basics of quantum computing.

TEXT BOOKS:

1. S.O. Kasap, "Principles of Electronic Materials and Devices", McGraw-Hill Education (Indian Edition), 2020.
2. Jasprit Singh, "Semiconductor Devices: Basic Principles", Wiley (Indian Edition), 2017

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3. R.Murugesan, Kiruthiga Sivaprasath, "Modern Physics", S.Chand (Indian Edition), 2019.

REFERENCE BOOKS:

1. Charles Kittel, "Introduction to Solid State Physics", Wiley India Edition, 2022
2. R.Balasubramaniam, Callister's, "Materials Science and Engineering", Wiley (Indian Edition), 2020.
3. Parag K. Lala, "Quantum Computing: A Beginner's Introduction", McGraw-Hill Education (Indian Edition), 2020.
4. B.Rogers, J.Adams and S.Pennathur, "Nanotechnology: Understanding Small Systems", CRC Press, 2015.

E- RESOURCES:

1. https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_mm63
2. https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_mm67
3. https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_ph56

CO's- PO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	1	-	-	-	-	-	-	-	-	-	2	3	2
CO2	3	1	1	-	-	-	-	-	-	-	-	3	3	2
CO3	3	-	-	1	2	1	1	-	-	-	-	3	2	2
CO4	3	-	2	1	3	1	1	-	-	-	-	3	3	2
CO5	3	2	2	2	2	2	-	-	-	-	-	3	3	3
AVG	3.0	1.3	1.7	1.3	2.3	1.3	1.0	-	-	-	-	2.80	2.80	2.20

1 - Low, 2 - Medium, 3 - High, '-' - no correlation

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25EEI22 SDG NO:4,7,8,9	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING (For B.E./B.Tech- CIVIL, CSE, MECH, AI&DS, AI&ML, IT, Cyber Security, Pharm.Tech branches)	L 2	T 0	P 2	C 3
COURSE OBJECTIVES: ➤ To learn the basic concepts of electric circuits and analysis. ➤ To analyze the magnetic circuits and domestic wiring. ➤ To understand the basics of working principles and application of electrical machines. ➤ To impart knowledge about analog devices and their characteristics. ➤ To educate on the fundamental concepts of digital electronics.					
UNIT-I	ELECTRIC CIRCUITS				10
Basic components of electric circuits, Charge, Current, Voltage and Power, Voltage and current sources, Ohm's law, Kirchhoff's laws, Series and parallel connected independent sources, Resistors in series and parallel, Voltage division and current division rule, Mesh current and node voltage methods of analysis-DC Circuits.					
UNIT-II	MAGNETIC CIRCUITS AND ELECTRICAL INSTALLATIONS				10
Magnetic circuits-definitions-MMF, flux, reluctance, Magnetic field intensity, Flux density, Fringing, Self and Mutual inductances-simple problems. Domestic wiring, Wires and Cables - types, Earthing, Protective devices, Switch fuse unit, Safety precautions and First Aid.					
UNIT-III	ELECTRICAL MACHINES				9
Construction and working principle- DC generators, EMF equation, Types and applications. Working principle of DC motors, Types and applications. Construction, Working principle and applications of 1 ϕ Transformer, Three phase alternator, Three phase induction motor.					
UNIT-IV	ANALOG ELECTRONICS				9
Resistor, Inductor and Capacitor in electronic circuits, PN Junction diodes, Rectifier, Zener diode-Characteristics-Applications, Construction and characteristics of bipolar junction transistor (CC,CE & CB)-Applications.					
UNIT-V	DIGITAL ELECTRONICS				7
Review of number systems, Binary codes, Error detection and correction codes, Combinational logic Circuits, Representation of logic functions-SOP and POS forms, K-map representations, Minimization using K maps - Simple Problems.					
TOTAL: 45 PERIODS					

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LAB COMPONENT:

15 PERIODS

1. Verification of ohms and Kirchhoff's Laws.
2. Load test on Single phase Transformer.
3. Load Test on 1Ø Induction Motor.
4. Characteristics of PN and Zener Diodes.
5. Characteristics of BJT.
6. Study of Logic Gates.

COURSE OUTCOMES

At the end of this course the students will be able to:

- CO1 Explain circuit's behavior using circuit laws and analyze the mesh analysis and nodal analysis.
- CO2 Analyze the Magnetic circuits, earthing and wiring.
- CO3 Understand the working principle and applications of electrical machines.
- CO4 Analyze the characteristics of analog electronic devices.
- CO5 Explain the basic concepts of digital electronics.

TEXT BOOKS:

1. D P Kothari and I.J Nagarath, "Basic Electrical and Electronics Engineering", McGraw Hill Education (India) Private Limited, Second Edition, 2020.
2. S.K. Bhattacharya, Basic Electrical Engineering, Pearson Education, 2019.
3. James A Svoboda, Richard C. Dorf, Dorf's Introduction to Electric Circuits, Wiley, 2018.
4. A.K. Sawhney, Puneet Sawhney 'A Course in Electrical & Electronic Measurements & Instrumentation', Dhanpat Rai and Co, 2015.

REFERENCE BOOKS:

1. Muhammad H.Rashid, "Spice for Circuits and electronics", 4th Edition., Cengage India, 2019.
2. Thomas L. Floyd, 'Electronic Devices', 10th Edition, Pearson Education, 2018.
3. John Bird, "Electrical Circuit theory and technology", Routledge; 2017.
4. Albert Malvino, David Bates, 'Electronic Principles, McGraw Hill Education; 7th edition, 2017.
5. H.S. Kalsi, 'Electronic Instrumentation', Tata McGraw-Hill, New Delhi, 2010.

E-RESOURCES:

1. NPTEL-Online Courses and Video lectures: <https://nptel.ac.in/>

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CO's - PO's & PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
C01	3	2	1	1	-	-	-	-	-	1	-	3	2	1
C02	3	3	2	2	-	-	-	-	-	1	-	3	3	2
C03	3	3	3	3	-	-	-	-	-	1	-	3	3	3
C04	3	3	3	3	-	-	-	-	-	1	-	3	3	3
C05	3	3	3	2	-	-	-	-	-	1	-	3	3	3
AVG	3	2.8	2.4	2.2	-	-	-	-	-	1	-	3	2.8	2.4

1 - low, 2 - medium, 3 - high, '-' - no correlation


 Chairman
 BoS / EEE

25CSI21
SDG No: 4, 8, 9, 10,17

PYTHON PROGRAMMING
(Common to: B.E. / B.Tech. all Branches)

L	T	P	C
3	0	2	4

COURSE OBJECTIVES:

- To understand the basics of python data types and operators
- To learn to solve problems using Python conditionals and loops.
- To define Python , lists, tuples, dictionaries to represent complex data .
- To define python function and use function calls to solve problems.
- To develop python program using modules and files.

UNIT-I	PYTHON FUNDAMENTALS	9
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Python Interpreter and Interactive Mode --Variables - Immutable variables - Data types - Tokens - Keywords - Operators - Python Reserved Words Statements - Indentation - Understanding error messages.

UNIT-II	STRING AND CONTROL FLOW	9
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Strings - Single-quote, double quote and multi-line strings - String Operations (Concatenation, Repetition, Indexing, Slicing, Splitting and Joining) Control Flow - If/Else Statements - for, while statements - Range () function - break and continue statement.

UNIT-III	LIST, TUPLES, DICTIONARIES	9
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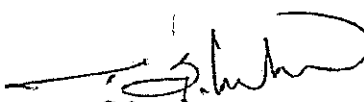
Lists - list operations - list slices - list methods - list loop - Tuples - assignment - tuple operations - Dictionaries - Operations and Methods in Dictionary - Looping and Dictionaries.

UNIT-IV	FUNCTIONS	9
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Functions- Elements of User Defined Functions - Fruitful Functions - Parameters and Arguments - Lambda Functions or Anonymous Functions - Scope - Function Composition

UNIT-V	MODULES AND FILES	9
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Modules: Standard Modules - OS and SYS modules - User defined Modules - Importing modules - Writing into a File - Reading from a File - File Methods


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TOTAL : 45 PERIODS

PRACTICAL EXERCISES:

List of Experiments

1. Python programming using simple Input/Output statements and data types.
2. Implement a python program using Operators.
3. Implementing programs using Strings.
4. Develop a python program using String operations.
5. Scientific problems using Decision making statements.
6. Develop a python program using Looping statements.
7. Create real-time applications using Lists
8. Applications using Tuples.
9. Develop real-time applications using Dictionaries.
10. Program using user defined functions.
11. Develop a python program using Lambda function.
12. Computations using NumPy functions.
13. Develop applications using File handling techniques.
14. Implement programs using written modules and Python Standard Libraries:

TOTAL : 30 PERIODS

TOTAL : 75(45+30) PERIODS

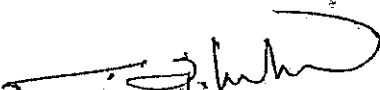
COURSE OUTCOMES:

At the end of the course the students will be able to

- CO1 :** Understand and use the Python interpreter and IDE for writing, running, and debugging code using data types and operators.
- CO2 :** Write simple Python programs using conditionals and loops for solving problems.
- CO3 :** Decompose a Python program using Python lists, tuples, dictionaries etc.
- CO4 :** Decompose a Python program into functions.
- CO5 :** Read and write data from/to files in Python programs and perform mathematical and scientific calculations using the math modules.

TEXT BOOKS:

- 1.R. G.Dromey "How to Solve it by Computer", Pearson Education., 2024.
- 2.Robert Sedgewick "Introduction to Programming in Python", Pearson Education., 2024.


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REFERENCE BOOKS:

1. John V. Guttag "Introduction to Computation and Programming using Python", The MIT press., 2016.
2. Paul Deitel and Harvey Deitel, "Python for Programmers", Pearson Education, 1st Edition, 2021.

E-RESOURCES:

1. <https://www.python.org/>

CO's - PO's & PSO's MAPPING

CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
C01	2	3	3	3	2	2	2	2	2	2	2	3	3	3
C02	2	3	3	3	2	2	2	2	2	2	2	3	3	3
C03	2	2	3	2	2	2	2	2	2	1	2	3	3	3
C04	1	2	3	3	1	2	2	2	2	1	2	2	3	3
C05	2	2	3	3	2	2	2	2	2	1	2	2	3	3
AVG	1.8	2.4	3	2.8	1.8	2	2	2	2	1.4	2	2.6	3	3

1 - low, 2 - medium, 3 - high, '-' - no correlation


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25ME121

SDG No.

4, 8, 9, 11

ENGINEERING GRAPHICS

(Common to B.E. - Civil, CSE, Mech, BME, CSE(CS),
CSE(AIML) & B.Tech. - BT, IT, PT, AIDS)

L	T	P	C
3	0	2	4

Course Objectives:

The main learning objective of this course is to prepare the students to:

- Construct standard plane curves and geometrical shapes used in engineering applications
- Draw and interpret projections of points, lines, and plane surfaces using first angle projection method
- Visualize and draw projections of basic solids and model them using CAD software
- Perform sectioning of solids and development of lateral surfaces for practical engineering applications using manual and CAD method
- Convert pictorial and isometric views into orthographic projections through freehand sketching and CAD practice

CONCEPTS AND CONVENTIONS (Not for Examination)

Importance of graphics in engineering applications - Use of drafting instruments - BIS conventions and specifications — Size, layout and folding of drawing sheets — Lettering and dimensioning.

UNIT-I PLANE CURVES

9

Basic Geometrical constructions, Curves used in engineering practices: Conics — Construction of ellipse, parabola and hyperbola by eccentricity method

Construction of cycloid — Construction of involutes of square and circle.

UNIT-II PROJECTION OF POINTS, LINES AND PLANE SURFACE

9

Principal Planes - First angle projection - Projection of points - Projection of straight lines inclined to both the principal planes by rotating line method.

Projection of planes inclined to both the principal planes by rotating object method.

UNIT-III PROJECTION OF SOLIDS

9+10

Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one of the principal planes and parallel to the other by rotating object method.

Practical: Projection of prisms, pyramids, cylinder and cone using CAD software.

UNIT-IV PROJECTION OF SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES

9+10

Sectioning of above solids in simple vertical position when the cutting plane is inclined to the one of the principal planes and perpendicular to the other.

Development of lateral surfaces of simple and sectioned solids — Prisms, pyramids cylinders and cones.

Practical: Projection of sectioning of above solids and Development of lateral surfaces of simple and sectioned solids using CAD software.

UNIT-V ORTHOGRAPHIC PROJECTION

9+10

Orthographic projection- Freehand sketching of multiple views from pictorial views of objects.

Practical: Orthographic projections from given isometric and pictorial views of simple objects using CAD software.

TOTAL : 75 PERIODS

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COURSE OUTCOMES:

At the end of the course the students will be able to

- CO1:** Create standard plane curves and geometrical shapes used in engineering applications
CO2: Produce and interpret projections of points, lines, and plane surfaces using the first angle projection method
CO3: Generate projections and CAD models of basic engineering solids
CO4: Execute sectional views and surface developments of solids using appropriate manual and CAD techniques
CO5: Analyze pictorial and isometric views to generate complete and accurate orthographic projections

TEXT BOOKS:

1. K Venugopal, Engineering Drawing and Graphics, Sixth edition, New Age International, 2013.
2. Natrajan K.V., "A Text Book of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 2018.

REFERENCE BOOKS:

1. Basant Agarwal and Agarwal C.M., "Engineering Drawing", McGraw Hill, 2nd Edit ion, 2019.
2. Gopalakrishna K.R., "Engineering Drawing" (Vol. I&II combined), Subhas Publications, Bangalore, 27th Edition, 2017.
3. 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.
4. Parthasarathy N. S. and Vela Murali, "Engineering Graphics", Oxford University, Press, New Delhi, 2015.
5. Shah M.B., and Rana B.C., "Engineering Drawing", Pearson Education India, 2nd Edition, 2009.

E-RESOURCES:

1. <https://archive.nptel.ac.in/courses/112/102/112102304/>
2. https://onlinecourses.nptel.ac.in/noc20_me79/preview
3. <https://www.youtube.com/watch?v=ANEvQyt3PnU>

CO's – PO's & PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	1	2	-	2	-	-	-	3	-	2	2	2	-
CO2	3	1	2	-	2	-	-	-	3	-	2	2	2	-
CO3	3	1	2	-	2	-	-	-	3	-	2	2	2	-
CO4	3	1	2	-	2	-	-	-	3	-	2	2	2	-
CO5	3	1	2	-	2	-	-	-	3	-	2	2	2	-
Avg	3	1	2	-	2	-	-	-	3	-	2	2	2	-

1 - low, 2 - medium, 3 - high, '-' - no correlation

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25STAT21	TAMILS AND TECHNOLOGY	L T P C
SDG No: 2, 4, 6, 9, 11	(Common to B.E./B.Tech. all branches)	1 0 0 1

COURSE OBJECTIVES:

- To understand about weaving and ceramic technology of Tamils.
- To compare the design and constructive technology of Cheras, Cholas, Pallavas and Nayakkars.
- To gain knowledge in various manufacturing technology of Tamils.
- To analyses the agriculture and fishery knowledge of Tamils.
- To learn about scientific Tamil and its usage in online platforms.

UNIT-I	WEAVING AND CERAMIC TECHNOLOGY	3
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Weaving Industry during Sangam Age – Ceramic technology – Black and Red Ware Potteries (BRW) – Graffiti on Potteries.

UNIT-II	DESIGN AND CONSTRUCTION TECHNOLOGY	3
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Designing and Structural construction House. & Designs in household materials during Sangam Age - Building materials and Hero stones of Sangam age – Details of Stage Constructions in Silappathikaram - Sculptures and Temples of Mamallapuram - Great Temples of Cholas and other worship places - Temples of Nayaka Period - Type study (Madurai Meenakshi Temple)- Thirumalai Nayakar Mahal - Chetti Nadu Houses, Indo - Saracenic architecture at Madras during British Period.

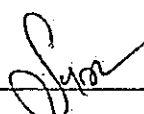
UNIT-III	MANUFACTURING TECHNOLOGY	3
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Art of Ship Building - Metallurgical studies - Iron industry - Iron smelting; steel -Copper and gold- Coins as source of history - Minting of Coins – Beads making industries Stone beads -Glass beads - Terracotta beads -Shell beads/ bone beats - Archeological evidences - Gem stone types described in Silappathikaram.

UNIT-IV	AGRICULTURE AND IRRIGATION TECHNOLOGY	3
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Dam, Tank, ponds, Sluice, Significance of Kumizhi Thoompu of Chola Period, Animal Husbandry - Wells designed for cattle use - Agriculture and Agro Processing - Knowledge of Sea - Fisheries - Pearl - Conche diving - Ancient Knowledge of Ocean - Knowledge Specific Society.

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UNIT-V

SCIENTIFIC TAMIL & TAMIL COMPUTING

3

Development of Scientific Tamil - Tamil computing – Digitalization of Tamil Books –
Development of Tamil Software – Tamil Virtual Academy – Tamil Digital Library – Online Tamil
Dictionaries – Sorkuvai Project

TOTAL: 15 PERIODS

COURSE OUTCOMES:

At the end of the course the student will be able to

- CO1: Relate the weaving ceramic technology of Tamils.
- CO2: Understand the knowledge of Tamils in design and construction technology.
- CO3: Recognize the manufacturing technology knowledge of Tamils.
- CO4: Criticize the agriculture and fishery knowledge of Tamils.
- CO5: Apply scientific Tamil in Various online platforms.

TEXT BOOK:

- 1. Tamils and Technology, Dr. P. Inthirani, Jai Balaji Publications, Chennai.

REFERENCES:

- 1. Thamizhaga Varalarum Makkal Panpaadum, Dr. K. K. Pillai, Ulaga Tamizharaichi Niruvanam, Chennai.

E- RESOURCES:

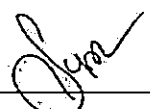
- 1. <https://www.tamilvu.org/>
- 2. <https://sorkuvai.com/>

CO's -PO's MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PS01	PS02	PS03
CO1	1	-	-	-	-	1	1	1	1	-	1	-	-	-
CO2	2	-	-	-	-	2	2	2	2	-	2	-	-	-
CO3	2	-	-	-	-	2	2	2	2	-	2	-	-	-
CO4	1	-	-	-	-	1	1	1	1	-	1	-	-	-
CO5	2	-	-	-	-	2	2	2	2	-	2	1	-	-
AVG	2	-	-	-	-	2	2	2	2	-	2	1	-	-

1 - Low, 2- Medium , 3-High, '-' No Correlation

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அலகு - IV

வேளாண்மை மற்றும் நீர்பாசனத் தொழில்நுட்பம்

3

அணை, ஏரி, குளங்கள், மதகு - சோழர்காலத் குழுமித் தூம்பின் முக்கியத்துவம் - கால்நடை பராமரிப்பு - கால்நடைகளுக்காக வடிவமைக்கப்பட்ட கிணறுகள் - வேளாண்மை மற்றும் வேளாண்மை சார்ந்த செயல்பாடுகள் - கடல்சார் அறிவு - மீன்வளம் - முத்து மற்றும் முத்துக்குளித்தல் - பெருங்கடல் குறித்த பண்டைய அறிவு - அறிவுசார் சமூகம்

அலகு - V

அறிவியல் தமிழ் மற்றும் கணினித்தமிழ்

3

அறிவியல் தமிழின் வளர்ச்சி - கணினித்தமிழ் வளர்ச்சி - தமிழ் நூல்களை மின்பதிப்பு செய்தல் - தமிழ் மென்பொருட்கள் உருவாக்கம் - தமிழ் இணையக் கல்விக்கழகம் - தமிழ் மின் நூலகம் - இணையத்தில் தமிழ் அகராதிகள் - சொற்குவைத் திட்டம்

மொத்தம்: 15 பாடவேளைகள்

பாடநெறி முடிவுகள் :

இப்பாடத்தைப் படிப்பதின் முடிவில் மாணவர்கள்

C01: நெசவு மற்றும் பானைத்தொழில்நுட்பத்தை பற்றிப் புரிந்துகொள்வார்கள்

C02: வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பத்தில் தமிழர்களின் அறிவைப் பெறுவார்கள்

C03: தமிழர்களின் உற்பத்தி தொழில்நுட்பத்தை கண்டறிவார்கள்

C04: தமிழர்களின் வேளாண்மை மற்றும் கடல்சார் அறிவைக் குறித்து விவர்த்திப்பார்கள்.

C05: பல்வேறு இணையப் பயன்பாடுகளில் அறிவியல் தமிழைப் பயன்படுத்திப்பார்ப்பார்கள்

பாடநூல்:

1. தமிழரும் தொழில்நுட்பமும், முனைவர் ப. இந்திராணி, ஜெய் பாலாஜி பதிப்பகம், சென்னை.

பார்வை நூல்:

1. தமிழக வரலாறும் மக்கள் பண்பாடும், டாக்டர் கே. கே. பிள்ளை, உலகத்-தமிழாராய்ச்சி நிறுவனம், சென்னை.

மின்-ஆதாரங்கள்:

1. <https://www.tamilvu.org/>

2. <https://sorkuvai.com/>

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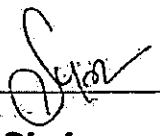
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CO's-PO's விவரணையாக்கம்:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	1	-	-	-	-	1	1	1	1	-	1	-	-	-
CO2	2	-	-	-	-	2	2	2	2	-	2	-	-	-
CO3	2	-	-	-	-	2	2	2	2	-	2	-	-	-
CO4	1	-	-	-	-	1	1	1	1	-	1	-	-	-
CO5	2	-	-	-	-	2	2	2	2	-	2	1	-	-
AVG	2	-	-	-	-	2	2	2	2	-	2	1	-	-

1- Low, 2- Medium, 3- High, '-' No Correlation

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25CSL21
SDG No.
4,8,9,10,12,13,17

DESIGN THINKING PRACTICES
(Common to B.E CSE, CSE(AIIML), CSE(CS) / B.Tech IT and AIDS)

L T P C
0 0 4 2

COURSE OBJECTIVES:

- Identify the problem statement of the customers.
- Understand the needs of the customers.
- Draw upon, interpret, and weight all the findings.
- Generate as many different ideas as possible and visualize them.
- Develop a prototype of ideas and test them.

LIST OF ACTIVITIES

Design Thinking is human-centered problem-solving tool which emphasize on empathy, collaboration, co-creation and stakeholder feedback to unlock creativity and innovation, to devices feasible and viable, idea/solutions.

Note: Each activity must use one or two design thinking tools from each phases for assessment.

S.No	Activities	Sugesstion Tools	Name of the tools
1	Introduction Overview of design thinking, Design thinking phases and tools.(6 hours)	Text book	1. Problem statements 2. Design Principles 3. Question 5x Why 4. Stakeholder Map 5. 5Wh questions
2	Understanding phase Learning about the users, their needs, problems, and experiences. (10 hours)	Dt 1 - 08	6. Interview for Empathy 7. Extreme & Lead User 8. Emotional Response Cards 9. Empathy Map
3	Observe phase Observe the behavior, problems, and needs without interference (10 hours)	Dt 09 - 14	10. Persona & User Profile 11. Analysis-Question-Builder 12. Customer Journey Map 13. AEIOU
4	Define phase Involves analyzing user research data and organize research fingins. (10 hours)	Dt 15 - 19	14. Peers Observing Peers 15. HMW-question 16. Storytelling 17. Context Mapping
5	Ideate phase Generate ideas through the phase an review the idea. (10 hours)	Dt 20 - 23	18. Define Success 19. Critical Items Diagram 20. Brainstorming 21. 2x2 Matrix
6	Prototype & Test Phase Importance of protype and testing in design thinking -create simple and scale down version of prototype (10 hours)	Dt 24 - 30	22. 6-3-5-Methode 23. Analogien & Benchmarking 24. Exploration Map 25. Prototype to Test 26. Service Blueprint
7	Report Submission (4 hours)		27. MVP 28. Testing Sheet 29. Feedback-Capture-Grid 30. Experience Testing

Case studies:

Students are required to acquire knowledge of Design Thinking tools and apply these concepts using case studies such as Student information systems, Hotel management, Transport management, Library Management System, Inventory and Supply Chain Management, Public Service Management and Employee management etc.,

TOTAL : 60 PERIODS

COURSE OUTCOMES:

At the end of the course the students will be able to

- CO1 : Getting customer insights and appropriate problem statement.
- CO2 : Observe the customer pains and gains to have better understanding.
- CO3 : Develop a point of view from the various insights gathered and write a problem Statement.
- CO4 : Ideate and develop innovative solution to the customer problem.
- CO5 : Create a prototype as a solution base and test the same.

TEXT BOOKS:

1. Thinking: A Comprehensive Textbook, Shalini Rahul Tiwari (Author), Rohit Rajendra Swarup (Author), First Edition, Wiley, 2024.
2. The Design Thinking Playbook, Michael Lewrick, Patrick Link, Larry Leifer, Wiley, 2018.

REFERENCE BOOKS:

1. Design Thinking: A Hands-on Approach, Chandramouli Subramanian, Thiagarajan Paramasivan, Sankaran Venkataramani, Atlantic, 2025.
2. Design Thinking for dummies, Chrisian Muller- Roterberg, Willey, 2020.

E-RESOURCES

1. DT-Tools- <https://en.dt-toolbook.com/tools-eng>
2. https://onlinecourses.swaya m2.ac.in/aic23_ge17/unit?un it=9&lesson=13
3. <https://archive.nptel.ac.in/co urses/110/106/110106124/>

CO's - PO's & PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	2	3	3	1	1	1	2	2	1	3	2	2
CO2	3	2	2	3	3	2	2	1	3	2	1	3	2	2
CO3	3	3	2	3	3	2	2	3	3	2	1	3	2	2
CO4	3	3	3	3	3	2	3	3	2	2	2	3	2	2
CO5	3	3	3	3	3	2	2	3	2	2	1	3	2	2
AVG	3	2.6	2.4	3	3	2	2	2.2	2.4	2	1.2	3	2	2

1 - low, 2 - medium, 3 - high, '-' - no correlation

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25MAT31	DISCRETE MATHEMATICS AND	L	T	P	C
SDG NO.4,8,9,17	COMPUTATIONAL STRUCTURES	3	1	0	4
(for B.E. /B.Tech- CSE, IT, AIDS, AIML & Cyber -Security)					

COURSE OBJECTIVES:

- To enhance student's logical and mathematical maturity and their ability to deal with abstraction.
- To introduce fundamental combinatorial principles for solving mathematical computational problems.
- To understand the basic concepts of graphs and graph models.
- To familiarize students with the applications of algebraic structures.
- To understand the concepts and significance of lattices and Boolean algebra, which are widely used in computer science and engineering.

UNIT-I	LOGIC AND PROOFS	9+3
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Propositional logic –Propositional equivalences –Predicates and quantifiers – Nested quantifiers– Rules of inference - Introduction to proofs – Consistency of premises and Indirect method of proof.

UNIT-II	COMBINATORICS	9+3
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Mathematical induction – Strong induction and well ordering – The basics of counting – The pigeonhole principle – Permutations and combinations – Recurrence relations – Solving linear recurrence relations–Inclusion and exclusion principle and its applications.

UNIT-III	GRAPHS AND GRAPH MODELS	9+3
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Graphs and graph models–Graph terminology and special types of graphs–Matrix representation of graphs and graph isomorphism – Connectivity – Euler and Hamilton paths.

UNIT-IV	ALGEBRAIC STRUCTURES	9+3
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Algebraic systems–Semi groups and monoids – Groups – Subgroups –Normal subgroup and cosets – Lagrange's theorem – Definitions and examples of Rings and Fields.

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UNIT-V

LATTICES AND BOOLEAN ALGEBRA

9+3

Partial ordering- Posets - Lattices as posets – Properties of lattices– Lattices as algebraic systems – Sublattices – Direct product and homomorphism – Some special lattices- Boolean algebra-Sub Boolean Algebra .

TOTAL : 60 PERIODS

COURSE OUTCOMES:

At the end of the course, students would be able :

- | | |
|------|--|
| CO1: | To apply propositional logic, rules of inference, and proof techniques to analyze and construct valid mathematical arguments. |
| CO2: | To model and solve combinatorial and computational problems. |
| CO3: | To apply graph concepts and representations to analyze graphs and graph models. |
| CO4: | To analyze algebraic structures and apply related concepts to solve problems in abstract algebra. |
| CO5: | To analyze algebraic structures, identify lattice properties and solve problems involving special lattices and sub-Boolean algebras. |

TEXT BOOKS:

1. Rosen.K.H., "DiscreteMathematicsanditsApplications", 7th Edition, Tata McGraw Hill Pub. Co. Ltd., New Delhi, Special Indian Edition, 2017.
2. Tremblay. J.P. and Manohar. R, "Discrete Mathematical Structures with Applications to Computer Science", Tata.Mc Graw Hill Pub. Co. Ltd, New Delhi, 30th Reprint, 2011.

REFERENCE BOOKS:

1. Grimaldi.R.P."Discrete and Combinatorial Mathematics :An Applied Introduction , 5thEdition, Pearson Education Asia, Delhi, 2013.
2. Koshy.T."Discrete Mathematics with Applications", Elsevier Publications, 2006.
3. Lipschutz. S. and Mark Lipson., "Discrete Mathematics", Schaum's Outlines, Tata McGraw Hill Pub. Co. Ltd., New Delhi, 3rd Edition, 2010.

E-RESOURCES:

1. <https://www.youtube.com/watch?v=FMh8qNV3PHk>
2. https://onlinecourses.nptel.ac.in/noc23_cs22/preview

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3. <https://www.youtube.com/watch?v=HipVU5vz3Q8&list=PLU6SqdyYsLV24T0XVb3z3mjl8QG0EBN>

CO's - PO's & PSO's MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PS01	PS02	PS03
CO1	3	3	2	2	-	-	-	2	-	-	2	1	3	2
CO2	3	3	2	2	-	-	-	2	-	-	2	3	3	3
CO3	3	3	2	2	-	-	-	3	-	-	2	3	3	3
CO4	3	3	2	2	-	-	-	2	-	-	2	2	3	1
CO5	3	2	2	2	-	-	-	2	-	-	2	1	3	1
AVG	3.00	2.80	2.00	2.00	-	-	-	2.20	-	-	2.00	2.00	3.00	2.00

1 - low, 2 - medium, 3 - high, '-' - no correlation,

25CSI31
SDG No: 4, 8, 9, 12,17

OPERATING SYSTEMS
(for B.E./B.Tech. –CSE, IT,AIDS,AI ML and CS)

L	T	P	C
3	0	2	4

COURSE OBJECTIVES:

- To understand the basic concepts, structure, and functions of operating systems.
- To learn process management, threads, CPU scheduling, and synchronization techniques.
- To study concurrency control mechanisms and deadlock handling methods.
- To understand memory management techniques such as paging, segmentation, and virtual memory.
- To learn I/O management, disk scheduling, file systems, and secondary storage management concepts.

UNIT-I

OPERATING SYSTEM OVERVIEW

9

Objectives and functions of OS - Evolution of OS - System call - Virtual machine-Symmetric Multiprocessing - Microkernel- Multiprocessor and Multicore Organization- OS Design Considerations for Multiprocessor and Multicore.

UNIT-II

PROCESS SCHEDULING

9

Process – Process States – Process description. Threads: Processes and Threads- Types of Threads- Uniprocessor Scheduling Types of Processor Scheduling - : FCFS, SPN, SRT, Round Robin, Priority, Multi-Level Queue.

UNIT-III

MUTUAL EXCLUSION AND SYNCHRONIZATION

9

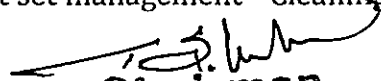
Principles of concurrency - Mutual exclusion: Software and hardware approaches - Semaphores - Monitors - Message Passing - Readers/ Writers problem. Deadlock and Starvation: Principles of deadlock - Deadlock Prevention - Deadlock Detection - Deadlock Avoidance.

UNIT-IV

MEMORY MANAGEMENT

9

Memory management requirements - Memory partitioning - Loading and Linking - Paging- Segmentation. Virtual Memory: Hardware and control structures – Virtual Memory Management Policies: Fetch Policy, Placement policy, Replacement policy- Resident set management - Cleaning policy - Load control.


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UNIT-V**I/O MANAGEMENT AND FILE MANAGEMENT****9**

I/O devices - Organization of I/O function - OS design issues - I/O buffering - Disk scheduling. File management: Overview - File organization and access - File directories - File sharing - Record blocking-Secondary storage management.

TOTAL: 45 PERIODS**PRACTICAL EXERCISES:**

1. System calls - fork, exec, getpid, exit, wait, close, stat, opendir, readdir.
2. I/O system calls -open, close, read, write, create, lseek, dup.
3. Simulate UNIX commands - ls, grep, chmod, passwd, who, date.
4. Shell programming.
 - Simple functions.
 - Basic tests.
 - Loops.
 - Patterns.
 - Expansions.
 - Substitutions.
5. Process Scheduling- FCFS, SJF, Priority and Round robin.
6. Synchronization using semaphores, Message Queues and Shared Memory.
7. Implementation of Interprocess Communication.
8. Implementation of memory management schemes –first fit, Best fit, worst fit and page replacement algorithms.

TOTAL:30 PERIODS**TOTAL:75(45+30) PERIODS****COURSE OUTCOMES:**

At the end of the course the students will be able to

- C01:** Understand the objectives, functions, and design principles of operating systems and multiprocessing environments.
- C02:** Apply process management concepts, threads, and CPU scheduling algorithms for process execution.
- C03:** Analyze and implement synchronization, concurrency control, and deadlock handling techniques.
- C04:** Demonstrate memory management techniques including paging, segmentation, and virtual memory.
- C05:** Apply I/O management, disk scheduling, file organization, and secondary storage management concepts.

TEXT BOOKS:

- 1 William Stallings, "Operating Systems Internals and Design Principles", Pearson Education, Ninth Edition, 2022.

REFERENCE BOOKS:

1. Silberchatz, Galvin, Gagne, "Operating System Concepts", John Wiley, Tenth Edition, 2018.
2. Dhananjay M. Dhamdhere, "Operating System a Concept Based Approach " McGraw Hill Publication, Third Edition ,2017.

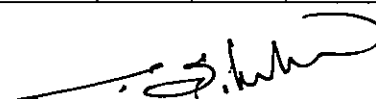
E-RESOURCES:

- 1.<https://nptel.ac.in/courses/106108101>
- 2.<https://nptel.ac.in/courses/106106144>

CO's – PO's & PSO's MAPPING

CO's	PO's											PSO's		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	1	1	1	-	-	-	-	1	1	1	2	1	2
CO2	2	3	1	3	1	-	-	-	3	2	2	3	3	1
CO3	2	2	3	3	2	-	-	-	3	1	1	1	1	1
CO4	2	2	1	2	1	-	-	-	1	3	2	1	1	2
CO5	2	3	3	2	1	-	-	-	3	1	2	3	1	2
AVG	2.2	2.2	1.8	2.2	1.3	-	-	-	2.2	1.6	1.6	1.4	1.4	1.6

1 - low, 2 - medium, 3 - high, '-' - no correlation


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25ADI31	FOUNDATIONS OF DATA SCIENCE	L	T	P	C
SDG No. 4,8,9,11,17	(for B.E./B.Tech. – CSE, IT)	3	0	2	4

COURSE OBJECTIVES:

- To understand the data science fundamentals and process.
- To learn to describe the data for the data science process.
- To learn to describe the relationship between data.
- To utilize the Python libraries for Data Wrangling.
- To present and interpret data using visualization libraries in Python

UNIT-I	INTRODUCTION	9
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Data Science: Advantages and Applications – Characteristics of Data – Data Science Workflow: Introduction – Identifying Research Objectives – Data Collection and Retrieval – Data Preprocessing – Exploratory Data Analytics – Model Development – Presenting Results and Application Deployment – Fundamentals of Data Mining – Concepts of Data Warehousing – Descriptive Statistical Analysis of Data.

UNIT-II	DESCRIBING DATA	9
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Types of Data - Types of Variables -Describing Data with Tables and Graphs – Describing Data with Averages - Describing Variability - Normal Distributions and Standard (z) Scores

UNIT-III	DESCRIBING RELATIONSHIPS	9
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Correlation Analysis and Association Measures – Scatter Plot Visualization Techniques – Pearson's Correlation Coefficient for Continuous Variables – Computational Methods for Correlation Estimation – Regression Modeling and Predictive Analytics – Linear Regression Functions – Least Squares Estimation Method – Standard Error and Model Accuracy Assessment – Coefficient of Determination (R^2) Interpretation – Multiple Linear Regression Models – Regression to the Mean and Predictive Inference.

UNIT-IV	PYTHON LIBRARIES FOR DATA WRANGLING	9
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Basics of Numpy arrays – aggregations – computations on arrays – comparisons, masks, boolean logic – fancy indexing – structured arrays – Data manipulation with Pandas – data indexing and selection – operating on data – missing data – Hierarchical indexing – combining datasets – aggregation and grouping – pivot tables

UNIT-V	DATA VISUALIZATION	9
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Importing Matplotlib – Line plots – Scatter plots – visualizing errors – density and contour plots – Histograms – legends – colors – subplots – text and annotation – customization – three dimensional plotting - Geographic Data with Base map - Visualization with Seaborn.

TOTAL : 45 PERIODS

PRACTICAL EXERCISES

LIST OF EXPERIMENTS

1. Download, install and explore the features of NumPy, SciPy, Jupyter, Statsmodels and Pandas packages.
2. Working with Numpy arrays
3. Working with Pandas data frames
4. Reading data from text files, Excel and the web and exploring various commands for doing descriptive analytics on the Iris data set.
5. Use the diabetes data set from UCI and Pima Indians Diabetes data set for performing the following:
 - a. Univariate analysis: Frequency, Mean, Median, Mode, Variance, Standard Deviation, Skewness and Kurtosis.
 - b. Bivariate analysis: Linear and logistic regression modeling
 - c. Multiple Regression analysis
 - d. Also compare the results of the above analysis for the two data sets.
6. Apply and explore various plotting functions on UCI data sets.
 - a. Normal curves
 - b. Density and contour plots
 - c. Correlation and scatter plots
 - d. Histograms
 - e. Three dimensional plotting
7. Visualizing Geographic Data with Basemap
8. Perform EDA on Wine Quality Data Set.
9. Use a case study on a dataset and apply the various EDA and visualization techniques and present an analysis report.

Tools: Python, Numpy, Scipy, Matplotlib, Pandas, statmodels, seaborn, plotly, bokeh

Note: Example data sets like: UCI, Iris, Pima Indians Diabetes etc.

TOTAL : 30 PERIODS

TOTAL : 75(45+30) PERIODS

COURSE OUTCOMES:

At the end of the course the students will be able to

- CO1 : Define the data science process
- CO2 : Understand different types of data description for data science process
- CO3 : Gain knowledge on relationships between data
- CO4 : Use the Python Libraries for Data Wrangling
- CO5 : Apply visualization Libraries in Python to interpret and explore data

TEXT BOOKS:

1. Keshav Sud, Pakize Erdogmus, Seifedine Kadry, "Introduction to Data Science and Machine Learning," IntechOpen, 2020.
2. David Cielen, Arno D. B. Meysman, and Mohamed Ali, "Introducing Data Science", Manning

Publications, 2016. (Unit I)

3. Robert S. Witte and John S. Witte, "Statistics", Eleventh Edition, Wiley Publications, 2017. (Units II and III)
4. Jake VanderPlas, "Python Data Science Handbook", O'Reilly, 2016. (Units IV and V)

REFERENCE BOOKS:

1. Laura Igual, Santi Seguí, Jordi Vitrià, "Introduction to Data Science A Python Approach to Concepts, Techniques and Applications" Springer International Publishing, 2024
- 2.. Allen B. Downey, "Think Stats: Exploratory Data Analysis in Python", Green Tea Press, 2014.

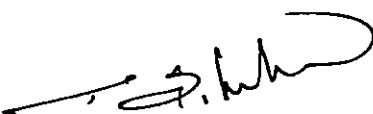
E-RESOURCES:

1. <https://nptel.ac.in/courses/106106179>
2. <https://nptel.ac.in/courses/106106212>

CO's - PO's & PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	2	1	2	2	-	-	1	1	1	2	2	2	2
CO2	2	1	-	1	1	-	-	2	1	1	2	2	3	1
CO3	2	2	1	2	2	1	1	1	2	1	3	2	2	3
CO4	1	2	2	1	2	-	-	1	1	2	2	3	3	2
CO5	2	2	1	2	2	-	-	1	1	1	2	2	2	2
AVG	2	2	1	2	2	1	1	1	1	1	2	2	2	2

1 - low, 2 - medium, 3 - high, '-' - no correlation


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25CSI32	DATA STRUCTURES	L	T	P	C
SDG No:4, 8, 9, 12,17 (for BE/B.Tech.-CSE ,IT,AIDS,AIML,CS and EEE)		3	0	2	4

COURSE OBJECTIVES:

- To understand the fundamentals of data structures, abstract data types, and algorithm complexity analysis.
- To learn array and linked list representations and their operations for efficient data storage and manipulation.
- To study stack and queue data structures and their applications in problem solving.
- To understand tree structures, tree traversal techniques, and priority queue implementations.
- To learn hashing techniques and graph traversal algorithms for efficient data processing.

UNIT-I INTRODUCTION 8

Need for data structures – Types of data structures – Abstract Data Type – Algorithm complexity analysis of linear and non-linear data structures – Best case and worst-case complexities – Asymptotic notations.

UNIT-II ARRAYS AND LISTS 8

Array representation and operations – Matrix representation using multi-dimensional arrays – Linked list representation – Operations on singly linked list – Types of linked list – Polynomial addition – Sparse matrices.

UNIT-III STACKS AND QUEUES 9

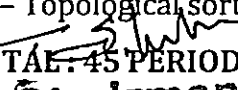
Stack ADT – Representation and operations – Expressing handling – Role of stack in implementing recursive algorithms – Queue ADT – Representation and operations – Types of queues – Circular queue – Dequeue – Priority queue.

UNIT-IV TREES 10

Terminologies – Binary Tree – Traversal – Expression trees – Binary Heap – Priority queue implementation using Binary Heap – Binary Search Tree – AVL Tree – m-way search trees – B Tree – B+ Tree – Application – Tree structure.

UNIT-V HASHING AND GRAPHS 10

Hash table – Hash functions – Resolving collisions – Rehashing. GRAPHS: Graph terminologies – Types of graphs – Representation – Breadth First Search – Depth First Search – Topological sort.

TOTAL: 45 PERIODS

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PRACTICALS:

1. Solving problems using arrays.
2. Searching and Sorting algorithms.
3. Implementation of linked list.
4. Applications of linked list.
5. Implementation of stack and queue.
6. Applications of stack.
7. Operations on Binary Search Trees.
8. Applications of Binary Search Tree, AVL tree.
9. Graphs – Depth First Search and Breadth First Search.
10. Hashing and Collision Resolution.

TOTAL:30 PERIODS

TOTAL:75(45+30) PERIODS

COURSE OUTCOMES:

At the end of the course the students will be able to

- CO1 :** Explain the concepts of data structures, abstract data types, and algorithm complexity analysis.
- CO2 :** Apply array and linked list operations for solving data organization and manipulation problems.
- CO3 :** Implement stack and queue operations and apply them in recursive and scheduling applications.
- CO4 :** Analyze and implement tree structures, binary heaps, binary search trees, AVL trees, and B-trees.
- CO5 :** Apply hashing techniques and graph traversal algorithms such as BFS, DFS, and topological sorting for problem solving.

TEXT BOOKS:

1. Mark Allen Weiss, 'Data Structures and Algorithm Analysis in C'. 2nd Edition, Pearson Education, 2019.
2. Jean Paul Tremblay, Sorenson, 'An Introduction to Data Structures with Applications'. 2nd Edition, McGraw Hill Publishing Company, New Delhi, 2017.

REFERENCE BOOKS:

1. Amol M. Jagtap, Ajit S. Mali, 'Data Structures Using C – A Practical Approach for Beginners'. Chapman and Hall/CRC, 1st edition, 2021.
2. Aaron M Tanenbaum, Moshe J Augenstein and Yedidyah Langsam, 'Data Structures Using C and C++'. 2nd edition, Prentice Hall, 2021.

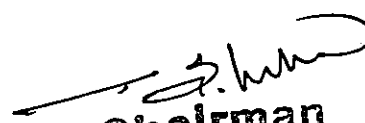
E-RESOURCES:

1. <https://nptel.ac.in/courses/106102064>
2. https://onlinecourses.nptel.ac.in/noc25_cs81/preview

CO's – PO's & PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	3	1	2	2	1	-	1	2	1	3	2	1	3
CO2	1	2	1	2	2	-	-	1	1	1	2	2	2	2
CO3	2	3	1	2	3	-	-	1	1	1	2	2	1	2
CO4	2	1	-	1	1	-	-	2	1	1	2	2	3	1
CO5	1	2	1	2	2	1	-	1	2	1	3	2	2	3
AVG	1.6	2.2	1	1.8	2	1	-	1.2	1.4	1	2.4	2	1.8	2.2

1 - low, 2 - medium, 3 - high, '-' - no correlation


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25CSI33	JAVA PROGRAMMING	L	T	P	C
SDG No. 4,8,9,12,17	(for BE/B.Tech. –CSE ,IT,AIDS,AIML and CS)	3	0	2	4

COURSE OBJECTIVES:

- To understand the fundamentals of Java programming and object-oriented concepts.
- To learn exception handling mechanisms and multithreaded programming in Java.
- To study GUI development using Swing and event handling techniques.
- To understand Java collections framework and data manipulation techniques.
- To learn database connectivity using JDBC for Java applications.

UNIT-I	INTRODUCTION TO JAVA	8
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Java and Internet - Byte Code - Features of Java - Java Development Environment- Java Programming: Methods and Classes- Constructor - Garbage Collection - Overloading - Inheritance - Overriding -Packages and Interfaces - Java I/O systems -String Handling : String, String Buffer and StringBuilder.

UNIT-II	EXCEPTION HANDLING	8
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Exception Handling: Fundamentals of Exception handling and types - Built in Exceptions - User defined Exceptions.

UNIT-III	THREADS	9
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Multithreaded Programming : Thread Model - The Main Thread - Creating a Thread - Creating Multiple Threads – Thread priorities - Synchronization - Inter thread communication.

UNIT-IV	SWING AND EVENT HANDLING	10
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Introduction to Abstract Window Tool kit - Swing class : Key Swing features – J Component – Swing Menu Basics – Model view Controller Architecture- Event Handling: The Delegation Event Model -Event class: Keyboard and Mouse events handling.

UNIT-V	COLLECTIONS FRAMEWORK AND DATABASE CONNECTIVITY	10
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Collections overview- Collections Classes – Spliterator - Working with maps - Comparators – Arrays - Data Base Connectivity: basic structure of JDBC API.

TOTAL : 45 PERIODS


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PRACTICALS:

1. Control statements in Java
2. Classes
3. Inheritance
4. Exception Handling
5. Packages & Interface
6. Multithreading
7. Swing
8. Case study Database Connectivity
9. Collections Framework

TOTAL:30 PERIODS

TOTAL:75(45+30) PERIODS

COURSE OUTCOMES:

At the end of the course the students will be able to

- CO1 :** Explain Java programming concepts, object-oriented principles, packages, interfaces, and string handling techniques.
- CO2 :** Apply exception handling mechanisms and user-defined exceptions in Java applications.
- CO3 :** Develop multithreaded Java programs using synchronization and inter-thread communication techniques.
- CO4 :** Design GUI-based applications using Swing components and event handling mechanisms.
- CO5 :** Apply collections framework concepts and JDBC API for data management and database connectivity in Java applications.

TEXT BOOKS:

1. Herbert Schildt, " Java The Complete Reference ", Tata McGraw Hill Education, 12th Edition,2021.

REFERENCE BOOKS:

1. Cay S. Horstmann "Core Java, Volume I: Fundamentals", Oracle Press, 12th Edition 2021
2. Cay S. Horstmann "Core Java, Vol. II-Advanced Features", Oracle Press, 12th Edition,2022

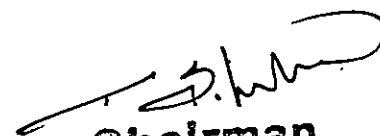
E-RESOURCES:

1. <https://nptel.ac.in/courses/106105191>
2. https://onlinecourses.nptel.ac.in/e-learning/preview/noc22_cs47

CO's – PO's & PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
C01	1	1	3	1	3	-	-	3	2	2	2	3	1	2
C02	2	1	3	2	1	-	-	2	1	1	3	3	3	2
C03	3	3	1	2	2	-	-	3	2	1	2	3	1	3
C04	3	1	2	2	2	-	-	1	2	1	3	3	1	1
C05	1	1	2	3	2	-	-	3	2	1	2	3	3	3
AVG	2	1.4	2.2	2	2	-	-	2.4	1.8	1.2	2.4	3	1.8	2.2

1 - low, 2 - medium, 3 - high, '-' - no correlation


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25ECI31	DIGITAL PRINCIPLES AND COMPUTER ORGANIZATION	L	T	P	C
SDG 4,8,9	(BE/B.Tech-Common to CSE, AI&DS, IT, Cyber security, AIML)	3	0	2	4

COURSE OBJECTIVES:

- Analyze and design combinational circuits
- Analyze and design sequential circuits
- Understand the basic structure and operation of a digital computer.
- Study the design of data path unit, control unit for processor and to familiarize with the hazards.
- Understand the concept of various memories and I/O interfacing.

UNIT-I	COMBINATIONAL LOGIC	9
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Combinational Circuits – Karnaugh Map - Analysis and Design Procedures – Binary Adder – Subtractor – Decimal Adder – Magnitude Comparator – Decoder – Encoder – Multiplexers – Demultiplexers

UNIT-II	SEQUENTIAL LOGIC CIRCUITS	9
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Introduction to Sequential Circuits – Flip-Flops – operation and excitation tables, Triggering of FF, Analysis and design of clocked sequential circuits – Design – Moore/Mealy models, state minimization, state assignment, circuit implementation - Registers – Counters.

UNIT-III	COMPUTER FUNDAMENTALS	9
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Functional Units of a Digital Computer: Von Neumann Architecture – Operation and Operands of Computer Hardware Instruction – Instruction Set Architecture (ISA): Memory Location, Address and Operation – Instruction and Instruction Sequencing – Addressing Modes, Encoding of Machine Instruction – Interaction between Assembly and High Level Language.

UNIT-IV	DATAPATH AND CONTROL DESIGN	9
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Building a Data Path – ALU-Designing a Control Unit – Hardwired Control, Microprogrammed Control – Pipelining – Data Hazard – Control Hazards.

UNIT-V	MEMORY AND I/O	9
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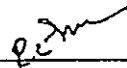
Memory Concepts and Hierarchy – Memory Management – Cache Memories: Mapping and Replacement Techniques – Virtual Memory – DMA – I/O – Accessing I/O: Parallel and Serial Interface – Interrupt I/O – Interconnection Standards: USB, SATA

TOTAL: 45 PERIODS

PRACTICAL EXERCISES:

1. Design and implementation of half adder and full adder
2. Design and implementation of half subtractor and full subtractor
3. Implementation of code converters

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4. Implementation of encoder and decoder circuits
5. Implementation of functions using Multiplexers.
6. Implementation of the synchronous and asynchronous counters
7. Implementation of a Universal Shift register.

PRACTICAL: 30 PERIODS
TOTAL (45+30): 75 PERIODS

COURSE OUTCOMES:

At the end of the course, the students will be able to

- CO1: Design various combinational digital circuits using logic gates.
- CO2: Design sequential circuits and analyze the design procedures.
- CO3: State the fundamentals of computer systems and analyze the execution of an instruction.
- CO4: Analyze different types of control design and identify hazards.
- CO5: Identify the characteristics of various memory systems and I/O communication.

TEXT BOOKS:

1. M. Morris Mano, Michael D. Ciletti, "Digital Design : With an Introduction to the Verilog HDL, VHDL, and System Verilog", Sixth Edition, Pearson Education, 2018.
2. David A. Patterson, John L. Hennessy, "Computer Organization and Design, The Hardware/Software Interface", Sixth Edition, Morgan Kaufmann/Elsevier, 2020.

REFERENCE BOOKS:

1. Carl Hamacher, Zvonko Vranesic, Safwat Zaky, Naraig Manjikian, "Computer Organization and Embedded Systems", Sixth Edition, Tata McGraw-Hill, 2012.
2. William Stallings, "Computer Organization and Architecture – Designing for Performance", Tenth Edition, Pearson Education, 2016.
3. M. Morris Mano, "Digital Logic and Computer Design", Pearson Education, 2016.

E-RESOURCES:

1. NPTEL-Online Courses and Video lectures: <https://nptel.ac.in/>

CO's – PO's & PSO's MAPPING

CO/ PO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	2	1	1	1	1	2	2	3	3
CO2	3	3	3	3	2	1	1	1	1	1	2	1	2	2
CO3	3	3	3	3	2	2	1	1	1	1	2	2	3	1
CO4	3	3	3	3	1	1	1	1	1	1	1	1	3	1
CO5	3	3	3	3	1	2	1	1	1	1	1	1	2	1
AVG	3	3	3	3	1.8	1.6	1	1	1	1	1.6	1.4	2.6	1.6

1 - low, 2 - medium, 3 - high, '-' - no correlation

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25MDC34

DISASTER RISK REDUCTION AND MANAGEMENT

L	T	P	C
3	0	0	0

COURSE OBJECTIVES:

- To impart knowledge on concepts related to disaster, disaster risk reduction, disaster management
- To acquaint with the skills for planning and organizing disaster response
- To develop disaster response skills by adopting relevant tools and technology
- To Enhance awareness of institutional processes for Disaster response in the country
- To Develop rudimentary ability to respond to their surroundings with potential Disaster response in areas where they live, with due sensitivity

UNIT-I

HAZRADS, VULNERABILITY AND DISASTER RISKS

9

Definition: Disaster, Hazard, Vulnerability, Resilience, Risks – Types of Disasters: Natural, Human induced, Climate change induced –Earthquake, Landslide, Flood, Drought, Fire etc – Technological disasters- Structural collapse, Industrial accidents, oil spills -Causes, Impacts including social, Economic, political, environmental, health, psychosocial, etc.- Disaster vulnerability profile of India and Tamil Nadu - Global trends in disasters: urban disasters, pandemics, Complex emergencies, - Inter relations between Disasters and Sustainable development Goals

UNIT-II

DISASTER RISK REDUCTION (DRR)

9

Sendai Framework for Disaster Risk Reduction, Disaster cycle - Phases, Culture of safety, prevention, mitigation and preparedness community Based DRR, Structural- nonstructural measures, Roles and responsibilities of- community, Panchayati Raj Institutions / Urban Local Bodies (PRIs/ULBs), States, Centre, and other stakeholders- Early Warning System – Advisories from Appropriate Agencies.- Relevance of indigenous Knowledge, appropriate technology and Local resources.

UNIT-III

DISASTER MANAGEMENT

9

Components of Disaster Management – Preparedness of rescue and relief, mitigation, rehabilitation and reconstruction- Disaster Risk Management and post disaster management – Compensation and Insurance- Disaster Management Act (2005) and Policy - Other related policies, plans, programmes and legislation - Institutional Processes and Framework at State and Central Level- (NDMA –SDMA-DDMA-NRDF- Civic Volunteers)


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UNIT-IV

TOOLS AND TECHNOLOGY FOR DISASTER MANAGEMENT

9

Early warning systems -Components of Disaster Relief: Water, Food, Sanitation, Shelter, Health, Waste Management, Institutional arrangements (Mitigation, Response and Preparedness, – Role of GIS and Information Technology Components in Preparedness, Risk Assessment, Response and Recovery Phases of Disaster – Disaster Damage Assessment. - Elements of Climate Resilient Development –Standard operation Procedure for disaster response – Financial planning for disaster Management

UNIT-V

DISASTER MANAGEMENT: CASE STUDIES

9

Discussion on selected case studies to analyse the potential impacts and actions in the contest of disasters-Landslide Hazard Zonation: Earthquake Vulnerability Assessment of Buildings and Infrastructure: Case Studies, Drought Assessment: Case Studies, Coastal Flooding: Storm Surge Assessment, Floods: Fluvial and Pluvial Flooding: Case Studies; Forest Fire: Case Studies, Man Made disasters: Case Studies, Space Based Inputs for Disaster Mitigation and Management and field works related to disaster management.- Field work-Mock drill -

TOTAL : 45 PERIODS

COURSE OUTCOMES:

At the end of the course the students will be able to

- CO1 : To impart knowledge on the concepts of Disaster, Vulnerability and Disaster Risk reduction (DRR)
- CO2 : To enhance understanding on Hazards, Vulnerability and Disaster Risk Assessment prevention and risk reduction
- CO3 : To develop disaster response skills by adopting relevant tools and technology
- CO4 : Enhance awareness of institutional processes for Disaster response in the country and
- CO5 : Develop rudimentary ability to respond to their surroundings with potential Disaster response in areas where they live, with due sensitivity

TEXT BOOKS:

1. Taimpo (2016), Disaster Management and Preparedness, CRC Publications
2. Singh R (2017), Disaster Management Guidelines for earthquakes, Landslides, Avalanches and tsunami, Horizon Press Publications
3. Singhal J.P. "Disaster Management", Laxmi Publications, 2010. ISBN-10: 9380386427 ISBN-13: 978-9380386423
4. Tushar Bhattacharya, "Disaster Science and Management", McGraw Hill India Education Pvt. Ltd., 2012. ISBN-10: 1259007367, ISBN-13: 978-1259007361]

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REFERENCE BOOKS:

1. Govt. of India: Disaster Management Act, Government of India, New Delhi, 2005.
2. Government of India, National Disaster Management Policy, 2009.
3. Shaw R (2016), Community based Disaster risk reduction, Oxford University Press

E-RESOURCES:

1. <https://archive.nptel.ac.in/courses/124/107/124107010/>
2. <https://nptel.ac.in/courses/124107010>

CO's - PO's & PSO's MAPPING

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
C01	3	3	2	3	-	-	2	2	-	-	2	2	-	1
C02	3	3	3	3	-	-	2	1	-	-	2	2		1
C03	3	3	3	3	-	-	2	2	-	-	-	2		1
C04	3	3	2	3	-	-	2	1	-	-	2	2		1
C05	3	3	2	3	-	-	2	2	-	-	2	3		1

1 - low, 2 - medium, 3 - high, '-' - no correlation


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25MAT41	PROBABILITY THEORY AND STATISTICAL METHODS	L	T	P	C
SDG NO.2,4,8,9,12	(for B.E. /B.Tech – BME, BT, PT, CSE, IT, AIDS, AIML & Cyber -Security)	3	0	0	3

COURSE OBJECTIVES:

- To introduce core probability concepts such as axioms, conditional probability, and Bayes' theorem, while equipping students to handle random variables and their properties, including moments and generating functions.
- To enable students to understand, apply, and interpret standard probability distributions in various real-world scenarios and to introduce the basic concepts of one-dimensional random variables.
- To understand the relationship between multiple random variables and derive marginal and conditional distributions from joint distributions.
- To introduce the basic concepts and classifications of the design of experiments, which play an important role in the fields of engineering and statistical quality control.
- To equip learners with the skills to monitor, analyze, and maintain process stability by detecting variations in manufacturing or production data.

UNIT-I	PROBABILITY AND RANDOM VARIABLES	9
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Axioms of probability – Conditional probability – Baye's theorem – Discrete and continuous random variables – Moments – Moment generating functions.

UNIT-II	DISTRIBUTION FUNCTIONS	9
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Discrete distributions – Binomial, Poisson and Geometric, Continuous distributions – Uniform, Exponential and Normal distributions.

UNIT-III	TWO-DIMENSIONAL RANDOM VARIABLES	9
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Joint distributions– Marginal and conditional distributions– Covariance –Correlation.

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UNIT-IV.

DESIGN OF EXPERIMENTS

9

One way and two way classifications - Completely randomized design - Randomized block design - Latin square design.

UNIT-V

STATISTICAL QUALITY CONTROL

9

Control charts for measurements ($\bar{X}$ and R charts) – Control charts for attributes (p, c and np charts) – Tolerance limits.

TOTAL : 45 PERIODS

COURSE OUTCOME:

At the end of the Course the students will be able to

- CO1:** Understand and apply the axioms of probability, conditional probability and Bayes' theorem to solve problems, and analyze discrete and continuous random variables using moments and moment generating functions.
- CO2:** Compute probabilities using discrete and continuous distributions; including use of parameters and standardization for the Normal distribution.
- CO3:** Analyze bivariate random variables using joint, marginal, and conditional distributions, compute and interpret covariance and correlation between variables.
- CO4:** Apply the basic concepts of classifications of design of experiments in the field of agriculture.
- CO5:** construct, interpret, and use appropriate control charts for variables and attributes, and relate control limits to tolerance limits and process capability in statistical quality control.

TEXT BOOKS:

1. Johnson. R.A., Miller. I and Freund. J., "Miller and Freund's Probability and Statistics for Engineers", Pearson Education, Asia, 9th Edition, 2016.
2. Milton. J.S. and Arnold. J. C., "Introduction to Probability and Statistics", Tata Mc Graw Hill, 4th Edition, 2007.
3. Grewal. B.S., " Higher Engineering Mathematics", Khanna Publishers, New Delhi, 44th Edition, 2018.

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REFERENCE BOOKS:

1. Devore. J.L., " Probability and Statistics for Engineering and the Sciences", Cengage Learning, New Delhi, 8th Edition, 2014.
2. Papoulis.A. and Unni Krishna pillai.S., "Probability, Random Variables and Stochastic Processes", McGraw Hill Education India,4th Edition, New Delhi,2010.
3. Ross. S.M., " Introduction to Probability and Statistics for Engineers and Scientists", 5th Edition, Elsevier,2014.
4. Spiegel. M.R., Schiller J and Srinivasan. R.A., " Schaum's Outline of Theory and Problems of Probability and Statistics", Tata McGraw Hill Edition,4th Edition,2012.

E-Resources :

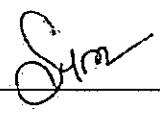
1. <https://www.youtube.com/watch?v=V44y-aWTSYE&list=PLyqSpQzTE6M9JEOrchuG0by2TQn1NKBIS&index=1>
2. https://onlinecourses.nptel.ac.in/e-learning/preview/noc24_ma30

CO's- PO's & PSO's MAPPING :

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PS01	PS02	PS03
C01	3	3	1	1	-	-	-	2	-	-	3	2	3	2
C02	3	3	1	1	-	-	-	2	-	-	3	2	3	2
C03	3	3	1	1	-	-	-	2	-	-	3	2	3	3
C04	3	3	1	1	-	-	-	2	-	-	3	2	2	3
C05	3	3	1	1	-	-	-	2	-	-	3	3	3	3
Avg	3.00	3.00	1.00	1.00	-	-	-	2.00	-	-	3.00	2.20	2.80	2.60

1- Low, 2- Medium, 3-High, "-" No Correlation

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25CST41
SDG No. 4,8,9,11,12

DESIGN AND ANALYSIS OF ALGORITHM
(for BE/B.Tech. -CSE,IT,AIDS and AIML)

L	T	P	C
3	0	0	3

COURSE OBJECTIVES:

- To understand algorithm analysis techniques and asymptotic notations for evaluating algorithm efficiency.
- To learn divide and conquer strategies and recurrence relation solving methods.
- To study backtracking and branch and bound techniques for solving optimization problems.
- To understand dynamic programming and greedy algorithms for efficient problem solving.
- To learn string matching, network flow algorithms, and complexity classes such as P, NP, and NP-complete problems.

UNIT-I

TIME COMPLEXITY ANALYSIS

7

Introduction - Rate of growth of functions-Asymptotic notations (Revisited)- Internal Sorts: Selection Sort, Bubble Sort, Insertion Sort -Heap Sort(Priority Queue)-Time Complexity Analysis of Sorting Algorithms

UNIT-II

DIVIDE AND CONQUER

9

Introduction -Merge Sort-Quick Sort- Maximum sub array sum- Closest Pair of Points -Complexity Analysis- Recurrence relations and methods to solve them: Recursion tree, substitution, Master Method

UNIT-III

BACKTRACKING AND BRANCH AND BOUND ALGORITHMS

9

Backtracking-Introduction - 8 Queens Problem-Hamiltonian Cycle - Branch and Bound- Introduction - Job Assignment Problem - Traveling Salesman Problem

UNIT-IV

DYNAMIC PROGRAMMING AND GREEDY ALGORITHMS

10

Dynamic Programming - 0/1 Knapsack Problem-Optimal Binary search trees- Greedy Approach- Huffman Coding- Fractional Knapsack problem-Activity Selection Problem.

UNIT-V

STRING ALGORITHMS, NETWORK FLOW, AND COMPLEXITY

10

String Matching Algorithms- Rabin-Karp algorithm - Network Flow- Definition-Maximum Flow- Ford Fulkerson algorithm - Introduction to P, NP, NP-complete - Definition

TOTAL 45 PERIODS

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COURSE OUTCOMES:

At the end of the course the students will be able to

- CO1:** Analyze the time complexity of algorithms using asymptotic notations and sorting techniques.
- CO2:** Apply divide and conquer strategies and solve recurrence relations for algorithm design.
- CO3:** Implement backtracking and branch and bound algorithms to solve combinatorial optimization problems.
- CO4:** Apply dynamic programming and greedy methods for solving optimization and decision-making problems.
- CO5:** Analyze string matching algorithms, network flow problems, and computational complexity classes including P, NP, and NP-complete problems.

TEXT BOOKS:

1. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein, "Introduction to Algorithms", 4th Edition, Prentice Hall of India, 2022.
2. Anany Levitin, "Introduction to the design and analysis of Algorithms", Pearson, Third edition, 2011

REFERENCE BOOKS:

1. Horowitz E., Sahni S., and Rajasekaran Sanguthevar, "Fundamental of Computer Algorithms", Universities Press (Computer Science), Second Edition, 2008.
2. Steven S. Skiena, "The Algorithm Design Manual", 2nd Edition, Springer, 2008

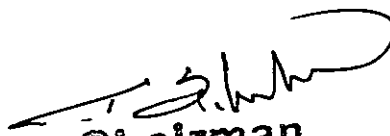
E-RESOURCES:

1. <https://nptel.ac.in/courses/106106226>
2. <https://nptel.ac.in/courses/106106139>

CO's - PO's & PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	1	3	2	-	-	-	2	1	2	3	2	1	1
CO2	2	1	1	1	1	-	-	1	3	3	3	2	3	3
CO3	1	3	3	3	1	-	-	1	2	1	2	2	1	2
CO4	1	2	2	3	-	-	-	2	3	3	1	3	1	3
CO5	1	2	3	2	3	-	-	3	1	3	3	1	3	3
AVG	1.4	1.8	2.4	2.2	1.7	-	-	1.8	2	2.4	2.4	2	1.8	2.4

1 - low, 2 - medium, 3 - high, '-' - no correlation


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25CST42
SDG No. 4,8,9,12,17

THEORY OF COMPUTATION
(for B.E –CSE)

L	T	P	C
3	0	0	3

COURSE OBJECTIVES:

- To understand foundations of computation including automata theory
- To construct models of regular expressions and languages.
- To design context free grammar and pushdown automata
- To understand Turing machines and their capability
- To understand Undecidability and NP class problems

UNIT-I

FINITE AUTOMATA

7

Introduction- Basic Mathematical Notation and techniques - Finite State systems - Basic Definitions - Finite Automaton - DFA & NFA - Regular Languages - Regular Expression - Equivalence of NFA and DFA - Equivalence of finite Automaton and regular expressions - Minimization of DFA - Pumping Lemma for Regular sets.

UNIT-II

CONTEXT FREE GRAMMAR

9

Grammar Introduction - Types of Grammar - Context Free Grammars (CFG) and Languages - Derivations and Languages - Ambiguity - Relationship between derivation and derivation trees - Simplification of CFG - Greibach Normal form - Chomsky normal form.

UNIT-III

PUSHDOWN AUTOMATA

9

Pushdown Automata - Definitions - Moves - Instantaneous descriptions - Deterministic pushdown automata - Equivalence of Pushdown automata and CFL - pumping lemma for CFL

UNIT-IV

TURING MACHINES

10

Definitions of Turing machines - Models - Computable languages and functions - Techniques for Turing machine construction - Multi head and Multi tape Turing Machines - The Halting problem.

UNIT-V

**UNSOLVABLE PROBLEMS AND COMPUTABLE
FUNCTIONS**

10

Unsolvability Problems and Computable Functions - Recursive and recursively enumerable languages - Universal Turing machine. Measuring and Classifying Complexity: - P and NP completeness - Polynomial time reductions

TOTAL: 45 PERIODS

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COURSE OUTCOMES:

At the end of the course the students will be able to

- CO1 : Apply the finite automata to solve computable problems efficiently.
- CO2 : Analyze the regular expressions for effective pattern recognition.
- CO3 : Apply the pushdown automata for language recognition and processing.
- CO4 : Analyze Turing machines for language acceptance and computational feasibility.
- CO5 : Evaluate the undecidability of languages and their implications in computation.

TEXT BOOKS:

1. Hopcroft J.E, Motwani R, and Ullman J D, Introduction to Automata Theory, Language and Computations, 3rd Edition, Pearson Education (ISBN 1292039051), 2014.
2. Martin J, Introduction to Languages and the Theory of Computation, 3rd Edition, TMH, 2007.

REFERENCE BOOKS:

1. Kamala Krithivasan and Rama R, Introduction to Formal Languages, Automata Theory and Computation, Pearson Education 2009.
2. Peter Linz , An Introduction to Formal Languages and Automata, Fifth edition, 2012.
3. Harry R Lewis and Christos H Papadimitriou, Elements of the Theory of Computation, Second Edition, Prentice Hall of India, Pearson Education, New Delhi, 2003

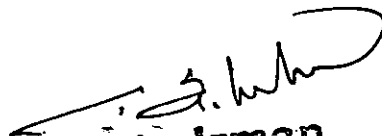
E-RESOURCES:

1. <https://nptel.ac.in/courses/106104028>
2. <https://nptel.ac.in/courses/106106242>

CO's - PO's & PSO's MAPPING

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CO1	1	3	2	3	-	-	-	1	1	2	3	1	3	2
CO2	2	2	3	2	1	-	-	3	3	2	3	3	1	2
CO3	2	2	3	2	1	-	-	1	3	1	2	1	2	2
CO4	2	2	2	1	-	-	-	1	3	3	2	1	3	2
CO5	2	2	2	1	1	-	-	1	1	3	2	3	1	3
AVG	1.8	2.2	2.4	1.8	1	-	-	1.4	2.2	2.2	2.4	1.8	2	2.2

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25CST43
SDG No. 4,9,16

STANDARDS IN COMPUTER SCIENCE
(for BE/B.Tech. –CSE and CS)

L	T	P	C
1	0	0	1

COURSE OBJECTIVES:

- To understand the fundamental concepts, principles, importance, and process of standardization in Computer Science and Information Technology.
- To familiarize students with major national and international standards related to software engineering, IT service management, Internet, web technologies, and cybersecurity.
- To develop awareness of professional standards, ethical practices, quality management, and information security frameworks used in the computing industry.

UNIT-I

OVERVIEW OF STANDARDS

5

Basic concepts of standardization: Purpose of Standardization, marking and certification of articles and processes; Importance of standards to industry, policy makers, trade, sustainability and innovation. Objectives, roles and functions of BIS, Bureau of Indian Standards Act, ISO/IEC Directives; WTO Good Practices for Standardization. Important Indian and International Standards.

UNIT-II

INTERNATIONAL STANDARDS IN COMPUTER SCIENCE

5

Introduction – Importance of standards in IT– Overview of key international standards organizations
ANSI and IEEE Standards – ANSI standards for software engineering (e.g., ANSI/ISO/IEC 12207:2008 – Software Life Cycle Processes)– IEEE standards and their applications in software engineering (e.g., IEEE 830– 1998 – Requirements Specifications). **ISO/IEC 20000:** IT Service Management – Scope and requirements– Service delivery process– Certification and implementation challenges. **IETF Standards in Internet Protocols**– Overview of key IETF standards (e.g., RFC 791 for IPv4)– Evolution and adoption of internet protocols– **W3C Standards for the World Wide Web** – Key W3C standards (e.g., HTML5, CSS3, Web Accessibility Guidelines)– Role of standards in web development and interoperability.

UNIT-III

ISO/IEC 27001

5

Information Security Management – Principles and Framework– Risk assessment and Management– Controls and compliance– **NIST Standards and Frameworks** – NIST Cybersecurity Framework (CSF)NIST Special Publications (e.g., SP 800 series) for cybersecurity. **ACM Standards and Guidelines** – ACM Code of Ethics and Professional Conduct– ACM Computing Classification System (CCS) and its role in standardization.

COURSE OUTCOMES:

At the end of the course the students will be able to

- CO1 :** Explain the fundamentals of standardization and the roles of major standards organizations such as BIS, ISO, IEC, ANSI, IEEE, and WTO.
- CO2 :** Describe and apply relevant software, IT service, telecommunications, Internet, web, and cybersecurity standards in computing applications.
- CO3 :** Evaluate the importance of quality, information security, professional ethics, and industry standards for responsible and sustainable computing practices.

TEXT BOOKS:

1. Hironori Washizaki (Ed.), Guide to the Software Engineering Body of Knowledge (SWEBOK Guide), Version 4.0, IEEE Computer Society, 2024; latest updated release Version 4.0a, 2025.
2. Alan Calder, ISO/IEC 27001:2022 – Information Security Management Systems: A Practical Guide, IT Governance Publishing.

Note: ISO/IEC 27001:2022 is the current edition, with Amendment 1:2024.

REFERENCE BOOKS:

1. Bureau of Indian Standards (BIS), *Manual for Standards Formulation*, BIS, 2022.
2. Michael Kunas, *Implementing Service Quality Based on ISO/IEC 20000: A Management Guide*, IT Governance Publishing, 2012.

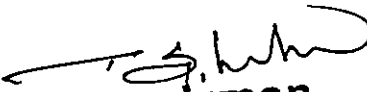
E-RESOURCES:

1. https://www.bis.gov.in/?utm_source=chatgpt.com
2. https://standards.ieee.org/?utm_source=chatgpt.com

CO's – PO's & PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	2	3	2	1	-	-	2	1	1	1	2	1	3
CO2	3	1	1	1	1	-	-	2	3	3	3	3	1	2
CO3	3	2	3	2	1	-	-	2	1	1	2	2	3	3
CO4	1	2	3	2	-	-	-	3	2	3	3	1	2	3
CO5	1	1	3	3	2	-	-	1	3	3	1	2	2	2
AVG	2	1.6	2.6	2	1.3	-	-	2	2	2.2	2	2	1.8	2.6

1 - low, 2 - medium, 3 - high, '-' - no correlation


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25CST44	OBJECT ORIENTED SOFTWARE ENGINEERING	L	T	P	C
SDG No. 4,8,9,12,16	(for BE/B.Tech. -CSE,IT,AIDS,AI ML and CS)	3	0	0	3

COURSE OBJECTIVES:

- To understand the fundamental concepts, software processes, and life cycle models in software engineering.
- To learn requirements gathering, analysis, specification, and software modeling techniques.
- To understand software design principles, coding practices, and software quality metrics.
- To study software testing methods, testing levels, and quality assurance techniques.
- To learn software project estimation models and project management techniques.

UNIT-I	INTRODUCTION	8
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Introduction - The Software problem - Software Engineering Problem - Software Engineering Approach - Software Process - Characteristics of a Software Process - Software Development Process - Software Life cycle models- Agile Software Development - Traditional Model vs. Agile Model - Classification of Agile Methods - Introduction to Agile process- SCRUM- Extreme Programming.

UNIT-II	SOFTWARE REQUIREMENTS AND ANALYSIS	8
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Requirements Analysis and Specification - Requirements Gathering and Analysis- Value of good SRS - Requirement process- Requirement Specification - desirable characteristics, components and Structure of requirements document - Functional Specification with use cases - basics - DFDs - Data Dictionary -ER Diagram- Validation

UNIT-III	SOFTWARE DESIGN AND CODING	9
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Design concepts - Cohesion and Coupling- Function-oriented Design -Object Oriented Design- Detailed Design - Verification - Metrics - Programming Principles and Guidelines - Incrementally Developing Code- Code inspection - Metrics

UNIT-IV	TESTING	10
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Testing Fundamentals - Levels of Testing: Unit Testing - Integration Testing - System Testing - Acceptance Testing - Testing Process - Black Box Testing: Equivalence Class Partitioning - Boundary Value Analysis - White box Testing: Control Flow based criteria - Data Flow based Testing - Metrics

UNIT-V	SOFTWARE PROJECT MANAGEMENT	10
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Software Project Estimation: Decomposition Techniques-COCOMO Model- Estimation for Object Oriented Projects- Specialized Estimation Techniques

TOTAL : 45 PERIODS

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COURSE OUTCOMES:

At the end of the course the students will be able to

- CO1:** Explain software engineering principles, software processes, life cycle models, and agile development methodologies.
- CO2:** Apply requirements analysis, specification, and software modeling techniques for software development.
- CO3:** Design software systems using appropriate design principles, coding standards, and software metrics.
- CO4:** Analyze and apply software testing techniques, testing levels, and quality assurance methods.
- CO5:** Apply software project estimation and management techniques using models such as COCOMO for software projects.

TEXT BOOKS:

1. Bernd Bruegge and Allen H. Dutoit, "Object-Oriented Software Engineering: Using UML, Patterns and Java", Third Edition, Pearson Education, 2009.
2. Roger S. Pressman, Object-Oriented Software Engineering: An Agile Unified Methodology, First Edition, Mc Graw-Hill International Edition, 2014.

REFERENCE BOOKS:

1. Carlo Ghezzi, Mehdi Jazayeri, Dino Mandrioli, Fundamentals of Software Engineering, 2nd edition, PHI Learning Pvt. Ltd., 2010.
2. Craig Larman, Applying UML and Patterns, 3rd ed, Pearson Education, 2005.

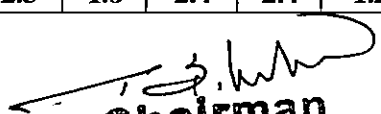
E-RESOURCES:

1. https://online.courses.nptel.ac.in/noc25_cs108/preview

CO's - PO's & PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	2	1	2	2	-	-	-	1	1	2	2	2	1
CO2	2	3	2	3	2	-	-	2	2	3	2	3	2	1
CO3	2	3	2	1	1	-	-	2	2	3	2	2	3	1
CO4	2	3	2	2	3	-	-	2	2	3	2	2	3	1
CO5	2	3	1	2	2	-	-	-	-	-	1	3	2	2
AVG	2	2.8	1.6	2	2	-	-	2	1.8	2.5	1.8	2.4	2.4	1.2

1 - low, 2 - medium, 3 - high, '-' - no correlation


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25CSI42
SDG No. 4,8,9,11,16

DATABASE MANAGEMENT SYSTEMS
(for BE/B.Tech. -CSE, IT,AIDS,AI ML and CS)

L	T	P	C
3	0	2	4

COURSE OBJECTIVES:

- To learn the fundamentals of data models, relational algebra and SQL.
- To represent a database system using ER diagrams and to learn normalization techniques.
- To understand the fundamental concepts of transaction, concurrency and recovery processing To understand Turing machines and their capability.
- To understand the internal storage structures using different file and indexing techniques which will help in physical DB design.
- To have an introductory knowledge about the Distributed databases, NOSQL and database security.

UNIT-I	INTRODUCTION TO DATABASES AND DBMS	8
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Understanding Data and Information - Database vs DBMS - Modern Databases - DBMS Architecture and Components - Data Models - Relational Model - Codd's 12 Rules - Object-Relational Mapping (ORM).

UNIT-II	STRUCTURED QUERY LANGUAGE (SQL)	10
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SQL Basic Commands - Constraints - Database Objects - SQL Functions - Subqueries- Correlated Subqueries- Nested subqueries - Recursive queries - Common Table Expressions (CTEs) - Triggers and Stored procedures.

UNIT-III	DATABASE DESIGN AND NORMALIZATION	9
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Database Design fundamentals - Entity-Relationship Diagrams (ERD) - ERD to tables - Functional Dependencies and Normal Forms: 1NF, 2 NF, 3 NF, BCNF, 4 NF, 5NF and 6 NF - Domain-Key Normal Form (DKNF) - Nested Normal Form (NNF) - Denormalization and Trade-offs - Emerging trends in Database Design - Dealing with real-world complexities in Database Design.

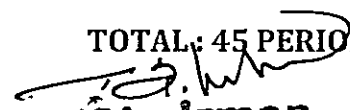
UNIT-IV	QUERY OPTIMIZATION AND TRANSACTION MANAGEMENT	9
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Query Optimization and Execution Plans -Optimization Visualization Tool - DB Sharding - Vitess - Vitess vs MySQL- Table partitioning - Transaction Management and ACID Properties - Concurrency Control: Lock based protocols -Deadlock handling - Multi version concurrency control (MVCC) - Transaction isolation

UNIT-V	NOSQL AND NEWSQL DATABASES	9
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NoSQL Vs NewSQL- NoSQLDatabases: MongoDB and Cassandra - NewSQL databases: Redis and NuoDB -Selection of NoSQL or NewSQL over RDBMS - CAP Theorem and BASE Properties - HeidiSQL - In-Memory Databases and Caching - Database Security and Encryption - Database Performance Tuning

TOTAL: 45 PERIODS


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PRACTICAL EXPERIMENTS:

1. Create a relational database with tables for storing employee details and perform CRUD operations.
2. Create a relational database for e-commerce applications and add primary key, foreign key, check constraints and triggers.
3. Create an ER diagram for the library management system and implement the database schema in RDBMS.
4. Create a Mongo DB database for an event management system.
5. Design a distributed database for an e-commerce platform to handle order processing.
6. Develop an in-memory caching solution using Redis for a content publishing platform (Blog).
7. Develop a secure RDBMS solution for a banking financial transactions system.

COURSE OUTCOMES:

At the end of the course the students will be able to

- CO1 :** Analyze the data models and the types of data used in databases.
- CO2 :** Implement SQL queries for creating databases and performing the relational operations.
- CO3 :** Apply the normalization theory in relational databases for removing anomalies.
- CO4 :** Analyze the basic issues of transaction processing, concurrency control, deadlock and its recovery schemes.
- CO5 :** Analyze the performance of NoSQL and NewSQL databases related to design.

TEXT BOOKS:

1. Abraham Silberschatz, Henry F. Korth and S. Sudarshan, Database System Concepts, McGraw - Hill, Sixth Edition, 2018
2. Ramez Elmasri and Shamkant B. Navathe, Fundamental Database Systems, Pearson Education, Seventh Edition, 2016

REFERENCE BOOKS:

1. Peter Rob and Corlos Coronel, Database System, Design, Implementation and Management, Thompson Learning Course Technology, Ninth edition, 2011
2. Guy Harrison , Next Generation Databases: NoSQLand Big Data, Apress.

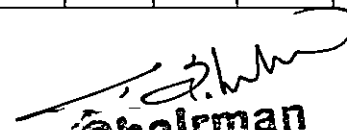
E-RESOURCES:

1. <https://nptel.ac.in/courses/106106220>
2. <http://acl.digimat.in/nptel/courses/video/106105175/L01.html>

CO's - PO's & PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
C01	2	2	3	2	1	-	-	2	1	1	1	2	1	3
C02	3	1	1	1	1	-	-	2	3	3	3	3	1	2
C03	3	2	3	2	1	-	-	2	1	1	2	2	3	3
C04	1	2	3	2	-	-	-	3	2	3	3	1	2	3
C05	1	1	3	3	2	-	-	1	3	3	1	2	2	2
AVG	2	1.6	2.6	2	1.3	-	-	2	2	2.2	2	2	1.8	2.6

1 - low, 2 - medium, 3 - high, '-' - no correlation


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 BasicSE&IT

25CSI42	ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING	L	T	P	C
SDG No. 4,8,9,11,12	(for B.E –CSE)	3	0	2	4.

COURSE OBJECTIVES:

- Study about uninformed and Heuristic search techniques.
- Learn techniques for reasoning under uncertainty
- Introduce Machine Learning and supervised learning algorithms
- Study about ensembling and unsupervised learning algorithms
- Learn the basics of deep learning using neural networks

UNIT-I **PROBLEM SOLVING** **9**

Introduction to AI - AI Applications - Problem solving agents – search algorithms – uninformed search strategies – Heuristic search strategies – Local search and optimization problems – adversarial search – constraint satisfaction problems (CSP).

UNIT-II **PROBABILISTIC REASONING** **9**

Acting under uncertainty – Bayesian inference – naïve bayes models. Probabilistic reasoning– Bayesian networks – exact inference in BN–approximate inference in BN – causal networks.

UNIT-III **SUPERVISED LEARNING** **9**

Introduction to machine learning–Linear Regression Models : Least squares, single & multiple variables, Bayesian linear regression, gradient descent, Linear Classification Models: Discriminate function – Probabilistic discriminative model - Logistic regression, Probabilistic generative model – Naive Bayes, Maximum margin classifier – Support vector machine, Decision Tree, Random forests.

UNIT-IV **ENSEMBLE TECHNIQUES AND UNSUPERVISED LEARNING** **9**

Combining multiple learners: Model combination schemes, Voting, Ensemble Learning - bagging, boosting, stacking, Unsupervised learning: K-means, Instance Based Learning: KNN, Gaussian mixture models and Expectation maximization.

UNIT-V **NEURAL NETWORKS** **9**

Perceptron - Multilayer perceptron, activation functions, network training – gradient descent optimization – stochastic gradient descent, error back propagation, from shallow networks to deep networks –Unit saturation (akathe vanishing gradient problem) – ReLU, hyper parameter tuning, batch normalization, regularization, dropout.

TOTAL:45 PERIODS**PRACTICAL EXERCISES:**

1. Implementation of Uninformed search algorithms (BFS,DFS)
2. Implementation of Informed search algorithms (A*,memory-boundedA*)
3. Implement naïve Bayes models
4. Implement Bayesian Networks
5. Build Regression models
6. Build decision trees and random forests
7. Build SVM models
8. Implement ensembling techniques
9. Implement clustering algorithms
10. Implement EM for Bayesian networks
11. Build simple NN models
12. Build deep learning NN models

TOTAL:30 PERIODS**TOTAL:75(45+30)PERIODS****COURSE OUTCOMES:**

At the end of the course the students will be able to

- CO1 : Use appropriate search algorithms for problem solving
- CO2 : Apply reasoning under uncertainty
- CO3 : Build supervised learning models
- CO4 : Build ensembling and unsupervised models
- CO5 : Build ensembling and unsupervised models

TEXT BOOKS:

1. Stuart Russell and Peter Norvig, "Artificial Intelligence--A Modern Approach", Fourth Edition, Pearson Education, 2021.
2. Ethem Alpaydin, "Introduction to Machine Learning", MIT Press, Fourth Edition, 2020.

REFERENCE BOOKS:

1. Dan W. Patterson, "Introduction to Artificial Intelligence and Expert Systems", Pearson Education, 2007
2. Kevin Night, Elaine Rich, and Nair B., "Artificial Intelligence", McGraw Hill, 2008.
3. Patrick H. Winston, "Artificial Intelligence", Third Edition, Pearson Education, 2006.

4. Deepak Khemani, "Artificial Intelligence", Tata McGraw Hill Education, 2013

E-RESOURCES:

1. <https://nptel.ac.in/courses/106106226>
2. <https://nptel.ac.in/courses/106106139>

CO's – PO's & PSO's MAPPING

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C03	2	1	2	1	1	-	-	2	1	1	3	1	1	1
C04	3	1	3	1	-	-	-	2	1	2	1	2	2	2
C05	3	1	1	2	2	-	-	3	1	2	3	2	1	2
AVG	2.4	1.2	2	2	1.3	-	-	1.8	1.6	1.8	2.6	1.6	1.8	1.8

1 - low, 2 - medium, 3 - high, '-' - no correlation

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25SDC41	SOFT AND ANALYTICAL SKILLS – I	L	T	P	C
SDG No.4,8,10	(Common to B.E./B.Tech. All Branches)	1	0	0	1

COURSE OBJECTIVES:

- Develop effective communication, presentation, and public speaking skills for academic and professional contexts.
- Enhance interpersonal, teamwork, collaboration, and professional etiquette skills required in the workplace.
- Strengthen students' aptitude and arithmetic problem-solving abilities through quantitative techniques.
- Improve logical reasoning and analytical thinking skills for competitive examinations and placement assessments.
- Equip students with the confidence and employability skills necessary for career development and lifelong learning.

UNIT-I COMMUNICATION AND PRESENTATION SKILLS 3

Communication Fundamentals (Verbal and Non-verbal Communication, Barriers to Effective Communication, Active Listening Skills); Public Speaking Skills and Overcoming Stage Fear (Glossophobia); Presentation Techniques (Seminar and TED Talk Presentations)

UNIT-II COLLABORATIVE SKILLS FOR PROFESSIONAL SUCCESS 3

Interpersonal Communication and Professional Etiquette; Teamwork, Team Dynamics, and Stages of Team Development (Tuckman's Model); Collaboration and Problem Solving in Group Discussions

UNIT-III CRACKING APTITUDE 3

Divisibility Rules – LCM & GCD(HCF) – Average

UNIT-IV CORE ARITHMETIC 3

Ratio & Proportion – Time & Work – Mixture & Alligation

UNIT-V REASONING 3

Coding- Decoding – Blood Relation- Direction Sense

TOTAL : 15 PERIODS

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COURSE OUTCOMES:

At the end of the course the students will be able to

- CO1: Demonstrate effective communication, public speaking, and presentation skills in academic and professional environments.
- CO2: Apply interpersonal, teamwork, collaboration, and professional etiquette skills to work effectively in groups.
- CO3: Solve aptitude problems involving divisibility rules, LCM, HCF, and averages using appropriate quantitative techniques.
- CO4: Apply arithmetic concepts such as ratio and proportion, time and work, and mixture and alligation to solve quantitative problems.
- CO5: Analyze and solve logical reasoning problems involving coding-decoding, blood relations, and direction sense.

TEXT BOOKS:

1. Meenakshi Raman and Sangeeta Sharma, Technical Communication: Principles and Practice, 4th Edition, Oxford University Press, 2024.
2. R.S. Aggarwal, Quantitative Aptitude for Competitive Examinations, Revised Edition 2025, S. Chand Publishing.

REFERENCE BOOKS:

1. Barun K. Mitra, Personality Development and Soft Skills, 2nd Edition, Oxford University Press, 2023.
2. Arun Sharma, A Modern Approach to Verbal and Non-Verbal Reasoning, Revised Edition, McGraw Hill Education, 2024.

E. RESOURCES:

- <https://www.indiabix.com/aptitude/questions-and-answers>
- https://www.mindtools.com/pages/article/newLDR_86.htm
- <https://www.tutorialspoint.com/quantitative Aptitude/index.htm>

CO's-PO's MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	2	3	-	-	1	-
CO2	-	-	-	-	-	-	-	1	3	2	-	-	-	1
CO3	3	2	-	-	-	-	-	-	-	-	-	-	1	-
CO4	3	3	-	-	-	-	-	-	-	-	-	-	2	-
CO5	2	3	-	1	-	-	-	-	-	-	-	-	1	1
AVR	2.67	2.67		1.00				1.00	2.50	2.50			1.25	1.00

1- Low, 2- Medium, 3-High, "-" No Correlation