SHREE VENKATESHWARA HI-TECH ENGINEERING COLLEGE

(Autonomous)

Gobichettipalayam, Erode -638455

Regulation 2025 (Autonomous)

Curriculum and Syllabus

Choice Based Credit System(CBCS)

B.Tech.-Information Technology

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Regulation 2025 (UG)
Curriculum and Syllabus
B.Tech.-Information Technology

I. Program Educational Objective (PEO)

PEO1 : Basic Skills : Demonstrate technical competence with analytical and critical thinking to understand and meet the diversified requirements of industry and academia.

PEO2 : Technical Skills : Exhibit technical leadership, team skills to provide businesssolutions to real world problems and Pursue lifelong learning, use cutting edge technologies.

PEO3 : Multi-Disciplinary & Managerial Skills : Work in multi-disciplinary industries with social and environmental responsibility, workethics and adaptability to address complex engineering and social problems.

II. Program Outcomes (POs)

PO1: 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.

PO2: Problem Analysis: Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions with consideration for sustainable development. (WK1 to WK4)

PO3: 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)

PO4: 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).

PO5: 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)

PO6: 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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PO7: Ethics: Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws. (WK9)

PO8: Individual and Collaborative Teamwork: Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams.

PO9: 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

PO10: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.

PO11: 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)

PSO1 : Computing Solutions: Have proficiency in programming skills to design, develop and apply appropriate techniques, to solve complex engineering problems.

PSO2 : Professional Practice: Have knowledge to build, automate and manage business solutions using cutting edge technologies.

PSO3 : Emerging Technologies: Have excitement towards explore in applied computer technologies

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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	3	3	-	2	1	1	1
		Communicative English - I	-	-	-	1	-	1	-	2	3	-	3	-	-	-
		Matrices and Calculus	3	3	2	1	-	-	-	2	-	2	3	2	2	-
		Engineering Physics	3	3	2	1	2	-	-	-	-	-	1	3	2	2
		Engineering Chemistry	3	2	2	1	1	2	-	-	-	2	2	-	-	1
		Problem Solving Using C Programming	2	3	3	3	2	-	-	-	1	-	-	3	3	3
		Heritage of Tamils	-	-	-	-	-	1	1	2	2	2	2	-	-	-
		Idea Lab	3	2	3	2	2	-	-	-	-	-	-	2	2	2
		Mandatory Course - I Yoga for Human Excellence	-	-	-	-	-	-	-	2	3	-	2	-	-	-
	II	Communicative English - II	-	1	1	-	-	-	1	2	-	2	3	1	1	-
		Numerical Methods and Differential Equations	3	3	2	1	1	-	2	-	-	2	3	2	2	1
		Physics for Information Science	3	1	2	1	2	1	1	-	-	-	-	3	3	2
		Basic Electrical and Electronics Engineering	3	3	2	2	-	-	-	-	3	-	2	3	3	2
		Engineering Graphics	3	1	2	-	2	-	-	0	3	0	2	2	2	-
		Python Programming	2	2	3	3	2	2	2	2	2	1	2	3	3	3
		Tamils and Technology	2	-	-	-	-	2	2	2	2	-	2	-	-	-
		Design Thinking Practices	3	3	2	3	3	2	2	2	2	2	1	3	2	2

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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
II	III	Discrete Mathematics and Computational Structures	3	3	2	2	-	-	-	2	-	-	-	-	-	2
		Foundations of Data Science	2	2	1	2	2	1	1	1	1	1	1	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
		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 Theory and Statistical Methods	3	3	1	1	-	-	-	2	-	-	-	-	-	3
		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 Information Technology	1.67	2	1.3	1.5	2	2	1.67	2	1	1.33	1	1.67	1.67	2
		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
		Web Programming	3	3	3	3	3	2	-	2	1	2	3	3	2	1
		Soft and Analytical Skills-I	2	1	2	2	1	-	-	2	2	2	2	2	2	2
		Mandatory Courses-III&	-	-	-	-	--	-	-	-	-	-	-	-	-	-

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

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SUMMARY OF CREDITS

S.No	Course Category	Credits per Semester								Total Credits	Credits in %	Credits as per AU Curriculum R25	Credits as per AICTE Model Curriculum 2022
		I	II	III	IV	V	VI	VII	VIII				
1	BS	11	6	4	3					24	14.63	24	23
2	HUM	5	4				2	6		17	10.36	18	16
3	ES(G)		8							8	4.87	3	29
4	ES(PC)	4	4	20	15	15	11	4		72	43.90	77	59
5	ES(PE)					6	3	6		15	9.14	15	12
6	OE							3		3	1.82	3	
7	SL						1			1	0.60	1	9
8	SD	2	2		1	3	2	3	10	24	14.63	22	
9	MC	√		√	√								
Total Credits / Semester		**22**	**24**	**24**	**19**	**24**	**19**	**22**	**10**	**164**	**100**	**163**	**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 vertical or a combination of different verticals 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 vertical from any one of the other programmes.

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SHREE VENKATESHWARA HI-TECH ENGINEERING COLLEGE
(Autonomous)
Gobichettipalayam, Erode -638455

Regulation 2025 (UG)
Curriculum and Syllabus
B.Tech.-Information Technology

SEMESTER I

S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	Max.Marks		
				L	T	P			CA	ES	TM
Induction Program											
1.	23IPA11	Induction Programme	-	-	-	-	-	0	-	-	-
Theory											
2.	25ENI11	Communicative English - I	HUM	3	0	2	5	4	50	50	100
3.	25MAT11	Matrices and Calculus	BS	3	0	0	3	3	40	60	100
4.	25PHI11	Engineering Physics	BS	3	0	2	5	4	50	50	100
5.	25CYI11	Engineering Chemistry	BS	3	0	2	5	4	50	50	100
6.	25CSI11	Problem Solving Using C Programming	ES(PC)	3	0	2	5	4	50	50	100
7.	25TAT11	Heritage of Tamils	HUM	1	0	0	1	1	40	60	100
Practical Lab											
8.	25MEL11	Idea Lab	SD	0	0	4	4	2	60	40	100
Mandatory Course											
9.	25MDC11	Yoga for Human Excellence	MC	0	0	1	1	0	100	-	100
			Total	**16**	**0**	**13**	**29**	**22**			

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SHREE VENKATESHWARA HI-TECH ENGINEERING COLLEGE
(Autonomous)
Gobichettipalayam, Erode -638455

Regulation 2025 (UG)
Curriculum and Syllabus
B.Tech.-Information Technology

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
Theory												
1.	25ENI21	Communicative English - II	HUM	2	0	0	2	3	4,5,8, 9,16	50	50	100
2.	25MAT21	Numerical Methods and Differential Equations	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	4,7,9, 12	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**				

Chairman
BoS/CSE& IT

SHREE VENKATESHWARA HI-TECH ENGINEERING COLLEGE
(Autonomous)
Gobichettipalayam, Erode -638455

Regulation 2025 (UG)
Curriculum and Syllabus
B.Tech.-Information Technology
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
Theory												
1.	25MAT31	Discrete Mathematics and Computational Structures	BS	3	1	0	4	4	4,8,9, 17	40	60	100
2.	25ADI31	Foundation of Data Science	ES(PC)	3	0	2	5	4	4,8,9, 11	50	50	100
3.	25CSI31	Operating Systems	ES(PC)	3	0	2	5	4	4,8,9, 12,17	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)

Chairman
BoS/CSE& IT

SHREE VENKATESHWARA HI-TECH ENGINEERING COLLEGE
(Autonomous)
Gobichettipalayam, Erode -638455

Regulation 2025 (UG)
Curriculum and Syllabus
B.Tech.-Information Technology

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
Theory												
1.	25MAT41	Probability Theory and Statistical Methods	BS	3	0	0	3	3	2,4,8,9 ,12	40	60	100
2.	25CST42	Theory of Computation	ES(PC)	3	0	0	3	3	4,8,12, 17	40	60	100
3.	25ITT41	Standards in Information Technology	ES(PC)	1	0	0	1	1	4,9,16	100	-	100
4.	25CST44	Object Oriented Software Engineering	ES(PC)	3	0	0	3	3	4, 8, 9, 12,17	40	60	100
5.	25CSI42	Database Management Systems	ES(PC)	3	0	2	5	4	4,8,9, 16,17	50	50	100
6.	25ITI41	Web Programming	ES(PC)	3	0	2	5	4	4,8,9	50	50	100
7.	25SDC41	Soft and Analytical Skills-I	SD	1	0	0	1	1	4,8,10	100	-	100
Mandatory Course												
8.		Mandatory Courses – III &	MC	3	0	0	3	0		100	-	100
			Total	**20**	**0**	**4**	**24**	**19**				

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

Chairman
BoS/CSE&IT

SHREE VENKATESHWARA HI-TECH ENGINEERING COLLEGE
(Autonomous)
Gobichettipalayam, Erode -638455

Regulation 2025 (UG)
Curriculum and Syllabus
B.Tech.-Information Technology

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
Theory												
1.	25CST51	Principles of Compiler Design	ES(PC)	3	0	0	3	3		40	60	100
2.	25ITI51	Full Stack Development	ES(PC)	3	0	2	5	4		50	50	100
3.	25ITI52	Machine Learning	ES(PC)	3	0	2	5	4		50	50	100
4.	25CSI51	Computer Networks	ES(PC)	3	0	2	5	4		50	50	100
5.		Programme Elective-I*	ES(PE)	2	0	2	4	3		50	50	100
6.		Programme Elective-II*	ES(PE)	2	0	2	4	3		50	50	100
7.	25ITI53	Industrial Oriented Course-I	SD	1	0	2	3	2		50	50	100
8.	25SDC51	Soft and Analytical Skills-II	SD	1	0	0	1	1		100	-	100
			Total	**18**	**0**	**12**	**30**	**24**				

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

Chairman
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SHREE VENKATESHWARA HI-TECH ENGINEERING COLLEGE
(Autonomous)
Gobichettipalayam, Erode -638455

Regulation 2025 (UG)
Curriculum and Syllabus
B.Tech.-Information Technology

SEMESTER VI

S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	SDG Mapping	Max.Marks		
				L	T	P				CA	ES	TM
Theory												
1.	25CYT61	Climate Change and Sustainability	HUM	2	0	0	2	2		40	60	100
2.	25ITT61	Computer Vision	ES(PC)	3	0	0	3	3		40	60	100
3.	25ITI61	IOT Architecture and Protocols	ES(PC)	3	0	2	5	4		50	50	100
4.	25ITI62	UI/UX Design and Human Centered Design	ES(PC)	3	0	2	5	4		50	50	100
5.		Programme Elective III*	ES(PE)	2	0	2	4	3		50	50	100
6.	25ITI63	Industrial Oriented Course-II	SD	1	0	2	3	2		50	50	100
7.		Self Learning Course	SL	1	0	0	1	1		100	-	100
			Total	**15**	**0**	**8**	**23**	**19**				

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

@ The students individually undergo training in reputed Firms/Research Institute/Laboratories for the specified duration (02 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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SHREE VENKATESHWARA HI-TECH ENGINEERING COLLEGE
(Autonomous)
Gobichettipalayam, Erode -638455

Regulation 2025 (UG)
Curriculum and Syllabus
B.Tech.-Information Technology

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
Theory												
1.	25UHV71	Universal Human Values-II	HUM	3	0	0	3	3		40	60	100
2.	25EST71	Engineering Entrepreneurship Development	HUM	3	0	0	3	3		40	60	100
3.		Open Elective**	OE	3	0	0	3	3		40	60	100
4.		Programme Elective IV*	ES(PE)	2	0	2	4	3		50	50	100
5.		Programme Elective V*	ES(PE)	2	0	2	4	3		50	50	100
6.	25CRI71	Ethical Hacking & penetration testing	ES(PC)	3	0	2	5	4		50	50	100
Practicals												
7.	25ITL71	Summer Internship@	SD	0	0	2	2	1		100	-	100
8.	25ITL72	Mini Project	SD	0	0	4	4	2		100	-	100
			Total	**16**	**0**	**10**	**26**	**22**				

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

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

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

Chairman
BoS/CSE& IT

SHREE VENKATESHWARA HI-TECH ENGINEERING COLLEGE
(Autonomous)
Gobichettipalayam, Erode -638455

Regulation 2025 (UG)
Curriculum and Syllabus
B.Tech.-Information Technology

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.	25ITL81	Project Work	SD	0	0	20	20	10	4,8,9, 10,17	60	40	100
			Total	**0**	**0**	**20**	**20**	**10**				

TOTAL CREDITS: 164

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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 EconomicThought 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

Data Science and Analytics	Network and Security	Artificial Intelligence	Emerging Technologies	IT Services	Internet of Things and Smart Applications
Business Analytics	Principles of Cryptography and Cyber Security	Artificial Intelligence	Quantum Computing	Dev-ops	Dynamic Paradigm for IoT
Information Retrieval Techniques	Digital Forensics & Malware Analysis	Generative AI	Drone Technologies	Multimedia and Animation	Smart IoT Architecture
Business Intelligence	Network Security	Deep Learning	Blockchain Technologies	App Development	Wearable Computing
Image and Video Analytics	Security and Privacy Cloud	Large Language Models	Augmented Reality/Virtual Reality	Cloud Service Management	IoT in 5G Networks
Data Analytics using R	Software Defined Networks	Ethics and AI	Robotic Process Automation	Mobile Application Development	IoT and Smart Cities
Big Data analytics	IOT Security	Explainable AI	Cloud Computing	UI and UX Design	Game Development
Exploratory Data Analysis	Cyber Security	Game Theory	Cryptocurrency and Blockchain Technologies	Software Testing and Automation	IOT Security

Registration of Programme Elective Courses from Streams:

Programme Elective Courses will be registered in Semesters V and VI. These courses are listed in groups called streams that represent a particular areaof 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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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	25CEO11	Civil and Infrastructure Engineering	OE	3	0	0	3	3	40	60	100
2	25CEO12	Environmental Pollution and waste management	OE	3	0	0	3	3	40	60	100
3	25CEO13	Environmental Impact Assessment	OE	3	0	0	3	3	40	60	100
4	25CEO14	Building Services	OE	3	0	0	3	3	40	60	100
5	25CEO15	Water, Sanitation and Health	OE	3	0	0	3	3	40	60	100
OFFERED BY DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING											
1	25CSO11	Foundation of AR/VR	OE	3	0	0	3	3	40	60	100
2	25CSO12	Web Designing	OE	3	0	0	3	3	40	60	100
3	25CSO13	Block Chain fundamentals	OE	3	0	0	3	3	40	60	100
4	25CSO14	Knowledge Management	OE	3	0	0	3	3	40	60	100
5	25CSO15	Cloud Computing Essentials	OE	3	0	0	3	3	40	60	100
OFFERED BY DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING											
1	25ECO11	Basics of Electronics in Automation	OE	3	0	0	3	3	40	60	100
2	25ECO12	Wireless Optical Communication	OE	3	0	0	3	3	40	60	100
3	25ECO13	Soft Computing techniques	OE	3	0	0	3	3	40	60	100
4	25ECO14	Consumer electronics	OE	3	0	0	3	3	40	60	100
5	25ECO15	Principles of communication Engineering	OE	3	0	0	3	3	40	60	100
OFFERED BY DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING											
1	25EEO11	Renewable Energy Sources	OE	3	0	0	3	3	40	60	100
2	25EEO12	Electrical Vehicle	OE	3	0	0	3	3	40	60	100
3	25EEO13	Energy Auditing and Conservation	OE	3	0	0	3	3	40	60	100
4	25EEO14	Domestic and Industrial Electrical Installations	OE	3	0	0	3	3	40	60	100
5	25EEO15	Microcontroller Based System Design	OE	3	0	0	3	3	40	60	100

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OFFERED BY DEPARTMENT OF MECHANICAL ENGINEERING											
1.	25MEO11	Industrial Instrumentation	OE	3	0	0	3	3	40	60	100
2.	25MEO12	Energy Technology	OE	3	0	0	3	3	40	60	100
3.	25MEO13	Reverse Engineering	OE	3	0	0	3	3	40	60	100
4.	25MEO14	Fire Safety Engineering	OE	3	0	0	3	3	40	60	100
5.	25MEO15	Nano Technology	OE	3	0	0	3	3	40	60	100
6.	25MEO16	Entrepreneurship Development	OE	3	0	0	3	3	40	60	100
OFFERED BY DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE											
1	25ADO11	Introduction to Big Data	OE	3	0	0	3	3	40	60	100
2	25ADO12	Principles of Data Science	OE	3	0	0	3	3	40	60	100
3	25ADO13	Data Visualization and its Applications	OE	3	0	0	3	3	40	60	100
4	25ADO14	Data Warehousing and Mining	OE	3	0	0	3	3	40	60	100
5	25ADO15	Principles of Cyber Security	OE	3	0	0	3	3	40	60	100
OFFERED BY DEPARTMENT OF INFORMATION TECHNOLOGY											
1	25ITO11	Basics of Java Programming	OE	3	0	0	3	3	40	60	100
2	25ITO12	Ethical Hacking	OE	3	0	0	3	3	40	60	100
3	25ITO13	E-Commerce and Applications	OE	3	0	0	3	3	40	60	100
4	25ITO14	Basics of Android Application Development	OE	3	0	0	3	3	40	60	100
5	25ITO15	Introduction to Web Design	OE	3	0	0	3	3	40	60	100
OFFERED BY DEPARTMENT OF PHARMACEUTICAL TECHNOLOGY											
1	25PTO11	Nutraceuticals	OE	3	0	0	3	3	40	60	100
2	25PTO12	IPR for Pharma Industry	OE	3	0	0	3	3	40	60	100
3	25PTO13	Pharmaceutical Nanotechnology	OE	3	0	0	3	3	40	60	100
4	25PTO14	Basics of Human Anatomy and physiology	OE	3	0	0	3	3	40	60	100
OFFERED BY DEPARTMENT OF BIOMEDICAL ENGINEERING											
1	25BMO11	Biosensors and Instrumentation	OE	3	0	0	3	3	40	60	100
2	25BMO12	Medical Robotics	OE	3	0	0	3	3	40	60	100
3	25BMO13	Biometric systems and their applications	OE	3	0	0	3	3	40	60	100
4	25BMO14	Healthcare Management systems	OE	3	0	0	3	3	40	60	100

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5	25BMO15	IoT in Healthcare	OE	3	0	0	3	3	40	60	100
OFFERED BY DEPARTMENT OF BIOTECHNOLOGY											
1.	25BTO11	Biofertilizer Technology	OE	3	0	0	3	3	40	60	100
2.	25BTO12	Ecology	OE	3	0	0	3	3	40	60	100
3.	25BTO13	Biotechnology for Forensics	OE	3	0	0	3	3	40	60	100
4.	25BTO14	Microbiology and Macromolecule	OE	3	0	0	3	3	40	60	100
5.	25BTO15	Biodiversity and Taxonomy	OE	3	0	0	3	3	40	60	100
OFFERED BY DEPARTMENT OF CSE (CYBER SECURITY)											
1	25CRO11	Mobile Device Security	OE	3	0	0	3	3	40	60	100
2	25CRO12	Malware Analysis	OE	3	0	0	3	3	40	60	100
3	25CRO13	Hardware Security	OE	3	0	0	3	3	40	60	100
4	25CRO14	Web and Mobile Application Security	OE	3	0	0	3	3	40	60	100
5	25CRO15	Information Security	OE	3	0	0	3	3	40	60	100
OFFERED BY DEPARTMENT OF CSE(ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)											
1	25AMO11	AI For Everyone	OE	3	0	0	3	3	40	60	100
2	25AMO12	Machine Learning and its Applications	OE	3	0	0	3	3	40	60	100
3	25AMO13	Quantum AI	OE	3	0	0	3	3	40	60	100
4	25AMO14	Reinforcement Learning	OE	3	0	0	3	3	40	60	100
5	25AMO15	Network Automation Using AIML	OE	3	0	0	3	3	40	60	100

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		L	T	P	C
25IPA11	INDUCTION PROGRAMME	-	-	-	0
SDG No. 3,4,10,11,16	(Common to B.E./B.Tech. all Branches)				

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 dont's, 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
CO1	-	-	-	-	-	-	-	3	3	-	3	1	-	-
CO2	-	-	-	-	-	-	-	3	3	-	3	1	-	-
CO3	-	-	-	-	-	-	1	2	3	-	2	1	1	-
CO4	-	-	-	-	-	-	-	2	3	-	2	1	1	-
CO5	-	-	-	-	-	-	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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		L	T	P	C
25ENI11	COMMUNICATIVE ENGLISH–I	3	0	2	4
SDG No. 4,5,8,9,16	(Common to B.E./B.Tech. All Branches)				

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

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

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, Kulbhusan 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	MATRICES AND CALCULUS	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 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 – Involutes and Evolutes (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 paralleopiped 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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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	-	-	-	2	-	2	3	1	3	1
CO2	3	3	2	2	-	-	-	3	-	2	3	1	3	1
CO3	3	3	2	2	-	-	-	3	-	2	3	2	3	2
CO4	3	3	2	1	-	-	-	2	-	2	3	2	3	2
CO5	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 – CO_2 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 (IndianEdition), 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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25CYI11	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

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

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

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

Classi ication 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

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; H_2-O_2 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 ($HCl+CH_3COOH$) 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=o6iurO2Cwd0 (NPTEL-NOC IITM)

Unit 2:
https://www.youtube.com/watch?v=0EWCqClsFOA&list=PLyqSpQzTE6M8682dGkNTN8936vSY4CbqZ (NPTEL-NOC IITM)

Unit 3:
https://www.youtube.com/watch?v=jSNImOwpxYg&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	PSO1	PSO2	PSO3
CO1	3	3	3	1	1	3	-	-	-	-	-	-	-	-
CO2	3	2	1	1	2	2	-	-	-	-	1	-	-	1
CO3	3	3	1	1	1	1	-	-	-	-	-	1	-	1
CO4	3	2	1	1	1	1	-	-	-	-	-	-	-	-
CO5	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

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		L	T	P	C
25CSI11 SDG No: 4, 8, 9, 10,17	**PROBLEM SOLVING USING C PROGRAMMING** (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.

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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",

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.geeks for geeks.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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25TAT11	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 Thinai 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 Modernliterature 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, Yazh 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.

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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 otherparts 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 Thinai 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, Ulaga 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	PSO1	PSO2	PSO3
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)	1	0	0	1

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 சமண பௌத்த 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, ஒயிலாட்டம், தோல்பாவைக் கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் விளையாட்டுகள்.

அலகு - IV தமிழர்களின் திணைக் கோட்பாடுகள் 3

தமிழகத்தின் தாவரங்களும், விலங்குகளும் - தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம்

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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, கையெழுத்துப்படிகள் - தமிழ்ப் புத்தகங்களின் அச்சு வரலாறு.

மொத்தம்: 15 பாடவேளைகள்

பாடநெறி முடிவுகள்:

இப்பாடத்தைப் படிப்பதின் முடிவில் மாணவர்கள்

CO1: தமிழின் பல்வேறு இலக்கியங்களைப் பற்றிய அறிவைப் பெறுவார்கள்.

CO2: தமிழ் கலாச்சார பாரம்பரியத்தின் தனித்தன்மையைக் கற்றுக்கொள்வார்கள்.

CO3: தமிழகத்தின் பல்வேறு கலைவடிவங்களைக் கண்டறிவார்கள்.

CO4: தமிழர்களின் திணைக்கோட்பாடுகளை அறிந்துகொள்வார்கள்.

CO5: 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/

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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	-	-	-	-	-
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	IDEA LAB	L	T	P	C
SDG No. 4, 8, 9, 11, 12	(Common to B.E./B.Tech all branches)	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

CO1:	Design and simulate electronic circuits and translate them into PCB layouts using industry-standard tools.
CO2:	Fabricate and test printed circuit boards ensuring reliability and functionality of electronic components.
CO3:	Write and debug embedded programs using Arduino/Raspberry Pi for real-world applications
CO4:	Operate welding, lathe, and plumping tools to build enclosures and mechanical fixtures for prototypes.
CO5:	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

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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 simpli ied 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

Physical exercises: Hand exercises – Leg exercises. Breathing exercises: Eye exercises – Kapalabathi. Makarasana. Body massages: Acupressure – Relaxation.

UNIT-II KAYA KALPA 3

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

Agna. Santhi : Clearence. Thuriya. Thuriyatheetham meditation

UNIT-IV HUMAN RESOURCES DEVELOPMENT 3

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

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. Simpli ied 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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25ENI21	COMMUNICATIVE ENGLISH – II	L	T	P	C
SDG No. 4,5,8.9,16	(Common to B.E./B.Tech. All Branches)	2	0	2	3

COURSE OBJECTIVES:

- To develop the learners' fundamental communication skills by introducing basic grammar, everyday conversations, and descriptive writing.
- To enable learners to understand and apply advanced grammar structures, enhance their listening skills for process comprehension, improve presentation abilities, read technical documents, and write formal complaint and editorial letters.
- To equip learners with essential communication skills for interviews, group discussions, debates, and professional correspondence.
- To develop learners' skills in reported speech, descriptive speaking, review listening, fluent reading, and formal correspondence.
- To prepare learners for job interviews, professional speaking, resume writing, and job-related communication.

UNIT-I INTRODUCTION TO EFFECTIVE COMMUNICATION 6+3

Grammar : Prefix/ Suffix- Active and Passive Voice- Model Passive

Listening : Listening to Short literary Texts - Listening to a Presentation and Completing Gap Filling Exercise

Speaking : Talking about Daily Routine, Hobbies, Favorites, Family, etc.

Reading : Describing a Product through Comparing & Contrasting it with other Products

Writing : Writing a short biography on Achievers based on given hints.

UNIT-II PROCESS COMMUNICATION AND TECHNICAL WRITING 6+3

Grammar : Subject - Verb Agreement -Infinitives - Gerunds

Listening : Listening to Process Description and Drawing a Flow Chart

Speaking : General and Technical Presentation.

Reading : Reading Technical Manuals.

Writing : Writing Complaint Letter to Companies - Letter to the Editor.

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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 HillEducation, 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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		L	T	P	C
25MAT31	DISCRETE MATHEMATICS AND				
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

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

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

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

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 , 5th Edition, 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=PLU6SqdYcYsfLV24T0XVb3z3mjl8QG0EBN

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.

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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

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

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

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

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

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

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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 variouscommands for doing descriptive analytics on the Iris data set.
5. Use the diabetes data set from UCI and Pima Indians Diabetes data set forperforming 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 PEROIDS

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

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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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		L	T	P	C
25CSI31 SDG No: 4, 8, 9, 12,17	**OPERATING SYSTEMS** (for B.E./B.Tech. –CSE, IT,AIDS,AIML and CS)	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 - Scheduling Algorithms: 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

CO1: Understand the objectives, functions, and design principles of operating systems and multiprocessing environments.

CO2: Apply process management concepts, threads, and CPU scheduling algorithms for process execution.

CO3: Analyze and implement synchronization, concurrency control, and deadlock handling techniques.

CO4: Demonstrate memory management techniques including paging, segmentation, and virtual memory.

CO5: Apply I/O management, disk scheduling, file organization, and secondary storage management concepts.

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TEXT BOOKS:

1 William Stallings, "Operating Systems Internals and Design Principles", Pearson Education, Ninth Edition, 2018.

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

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

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**

Exception Handling: Fundamentals of Exception handling and types - Built in Exceptions - User defined Exceptions.

UNIT-III **THREADS** **9**

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**

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**

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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CO's – PO's & PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	1	1	3	1	3	-	-	3	2	2	2	3	1	2
CO2	2	1	3	2	1	-	-	2	1	1	3	3	3	2
CO3	3	3	1	2	2	-	-	3	2	1	2	3	1	3
CO4	3	1	2	2	2	-	-	1	2	1	3	3	1	1
CO5	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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		L	T	P	C
25ECI31	DIGITAL PRINCIPLES AND COMPUTER ORGANIZATION				
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

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

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

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

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

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, programmers 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
CO1	3	3	2	3	-	-	2	2	-	-	2	2	-	1
CO2	3	3	3	3	-	-	2	1	-	-	2	2		1
CO3	3	3	3	3	-	-	2	2	-	-	-	2		1
CO4	3	3	2	3	-	-	2	1	-	-	2	2		1
CO5	3	3	2	3	-	-	2	2	-	-	2	3		1

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

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		L	T	P	C
25MAT41 SDG NO.2,4,8,9,12	PROBABILITY THEORY AND STATISTICAL METHODS (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

Axioms of probability – Conditional probability – Baye's theorem – Discrete and continuous random variables – Moments – Moment generating functions.

UNIT-II DISTRIBUTION FUNCTIONS 9

Discrete distributions – Binomial, Poisson and Geometric, Continuous distributions – Uniform, Exponential and Normal distributions.

UNIT-III TWO-DIMENSIONAL RANDOM VARIABLES 9

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,4thEdition,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
CO1	3	3	1	1	-	-	-	2	-	-	3	2	3	2
CO2	3	3	1	1	-	-	-	2	-	-	3	2	3	2
CO3	3	3	1	1	-	-	-	2	-	-	3	2	3	3
CO4	3	3	1	1	-	-	-	2	-	-	3	2	2	3
CO5	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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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 Un decidability 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**

Unsolvable 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

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
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

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

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25ITT41 SDG No.4,9,16	Standards in Information Technology (for B.Tech. –IT)	L	T	P	C
		1	0	0	1

COURSE OBJECTIVES:

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

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- ISO 9000 Series: Quality Management -Overview of ISO 9001-Quality management principles-Certification process and benefitsITU-T Standards in Telecommunications-Overview of ITU-T series (e.g., ITU-T X.509 for public key infrastructure)-Impact on global telecommunications standards- 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 **SO/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

TOTAL : 15 PERIODS

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 national and international standards organizations.

CO2 : Describe and apply relevant software engineering, IT service management, Internet, web, and telecommunications standards.

CO3 : Explain the importance of information security standards, cybersecurity frameworks, quality management, and professional ethics.

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REFERENCE BOOKS:

1. Manual for Standards Formulation 2022, Bureau of Indian Standards
2. Kunas, Michael, "Implementing service quality based on ISO/IEC 20000: A management guide" IT Governance publishing, 2012.
3. Kan, S. H. "Standards for Information Technology and Systems", Prentice Hall, 2017.
4. IEEE Computer Society. (2014) "IEEE Guide to the Software Engineering Body of Knowledge (SWEBOK)", Version 3.0. IEEE. Retrieved from IEEE Xplore
5. Calder, Alan. "ISO/IEC 27001:2013 – A Pocket Guide" IT Governance Publishing, 2013.
6. Sikos, Leslie," Web Standards: Mastering HTML5, CSS3, and XML." Apress, 2011.
7. Association for Computing Machinery. "ACM Code of Ethics and Professional Conduct: A Guide" ACM, 2018
8. Calder, Alan, "NIST Cybersecurity Framework: A Pocket Guide. IT Governance Publishing" 2018.

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	–	1	–	2	1	–	1	–	2	1	2
CO2	2	2	2	1	3	–	1	–	–	1	1	2	2	2
CO3	1	2	1	2	2	2	2	3	1	2	1	1	2	2
CO4	–	–	–	–	–	–	–	–	–	–	–	–	–	–
CO5	–	–	–	–	–	–	–	–	–	–	–	–	–	–
AVG	1.67	2	1.33	1.5	2	2	1.67	2	1	1.33	1	1.67	1.67	2

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

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		L	T	P	C
25CST44 SDG No. 4,8,9,12,16	**OBJECT ORIENTED SOFTWARE ENGINEERING** (for BE/B.Tech. –CSE,IT,AIDS,AIML 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**

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**

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**

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**

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**

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,AIML 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**

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**

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**

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**

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**

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.

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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
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

Chairman
BoS/CSE&IT

25ITI41	WEB PROGRAMMING	L	T	P	C
SDG No.4,8,9	(for B.Tech. –IT)	3	0	2	4

COURSE OBJECTIVES:

- To comprehend and analyze the basic concepts of web programming and internet protocols.
- To describe how the client-server model of Internet programming works.
- To demonstrate the uses of scripting languages
- To write simple scripts for the creation of websites
- To create database applications

UNIT I **WEBSITE BASICS** **9**

Internet Overview - Fundamental computer network concepts - Web Protocols - URL – Domain Name- Web Browsers and Web Servers- Working principle of a Website –Creating a Website - Client- side and server-side scripting.

UNIT II **WEB DESIGNING** **9**

HTML – Form Elements - Input types and Media elements - CSS3 - Selectors, Box Model, Backgrounds and Borders, Text Effects, Animations, Multiple Column Layout, User Interface.

UNIT III **CLIENT-SIDE PROCESSING AND SCRIPTING** **9**

JavaScript Introduction – Variables and Data Types-Statements – Operators - Literals-Functions-Objects-Arrays-Built-in Objects- Regular Expression, Exceptions, Event handling, Validation - JavaScript Debuggers.

UNIT IV **SERVER SIDE PROCESSING AND SCRIPTING–PHP** **9**

PHP - Working principle of PHP - PHP Variables - Constants - Operators – Flow Control and Looping - Arrays - Strings - Functions - File Handling - File Uploading – Email Basics - Email with attachments - PHP and HTML - Simple PHP scripts - Databases with PHP.

UNIT V **SERVLETS AND DATABASE CONNECTIVITY** **9**

Servlets: Java Servlet Architecture– Servlet Lifecycle- Form GET and POST actions-Sessions–Cookies–Database connectivity- JDBC Creation of simple interactive applications-Simple database Applications.

TOTAL: 45 PERIODS

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PRACTICAL EXERCISES:

1. Creation of interactive websites-Design using HTML and authoring tools
2. Form validation using JavaScript
3. Creation of simple PHP scripts
4. Handling multimedia content in web sites
5. Write programs using Servlets:
   i. To invoke servlets from HTML forms
   ii. Session tracking using hidden form fields and Session tracking for a hit count
6. Creation of information retrieval system using web, PHP and MySQL
7. Creation of personal Information System

TOTAL: 30 PERIODS

TOTAL: 75(45+30) PERIODS

COURSE OUTCOMES:

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

CO1: Apply JavaScript, HTML and CSS effectively to create interactive and dynamic websites.

CO2: Create simple PHP scripts.

CO3: Design and deploy simple web-applications.

CO4: Create simple database applications.

CO5: Handle multimedia components.

TEXT BOOKS:

1. Robin Nixon, "Learning PHP, MySQL, JavaScript, CSS & HTML5" Third Edition, O'Reilly publishers, 2014.
2. Paul Deitel, Harvey Deitel, Abbey Deitel, "Internet & World Wide Web - How to Program", 5th edition, Pearson Education, 2012.

REFERENCE BOOKS:

1. Jeffrey C. Jackson, "Web Technologies--A Computer Science Perspective", Pearson Education, 2006.
2. James F. Kurose, "Computer Networking :A Top-Down Approach ",Sixth Edition ,Pearson Education, 2012
3. StevenHolzener,"PHP–TheCompleteReference",1stEdition,Mc-GrawHill,2017
4. Fritz Schneider, ThomasPowell,"JavaScript–TheCompleteReference",3rdEdition,Mc- Graw Hill Publishers, 2017
5. Bates, "Developing Web Applications", Wiley Publishers,2006

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E-RESOURCES:

1. https://www.w3schools.com/
2. https://onlinecourses.swayam2.ac.in/e-learning/preview/nou26_cs03

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	3	2	3	2	-	2	2	2	3	3	2	1
CO2	3	3	3	3	3	2	-	2	-	2	3	3	2	1
CO3	3	3	3	2	3	2	-	2	2	2	3	3	2	1
CO4	3	3	3	3	3	1	-	1	1	2	3	3	2	1
CO5	3	3	3	3	3	1	-	-	-	2	3	3	2	1
AVG	**3**	**3**	**3**	**3**	**3**	**2**	**-**	**2**	**1**	**2**	**3**	**3**	**2**	**1**

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	-	-	-	-	-	-	-	-	-	-	-	1
CO5	2	3	-	1	-	-	-	-	-	-	-	-	-	1
AVR	2.67	2.67	-	1.00	-	-	-	1.00	2.50	2.50	-	1.00	-	1.00

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

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