SRI RANGANATHAR
INSTITUTE OF ENGINEERING AND TECHNOLOGY
(An Autonomous Institution)
(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai)
Athipalayam, Coimbatore - 641 110. website: sriet.ac.in, Ph: 0422 - 2697792

REGULATIONS 2024
CHOICE BASED CREDIT SYSTEM
B. E. COMPUTER SCIENCE AND ENGINEERING

Vision

"Our vision is to empower students with cutting-edge software programming skills, adaptability to evolving technological landscapes, and heightened competence, ensuring their readiness for dynamic industrial challenges and optimizing their employability prospects."

Mission

- Enlightening young generation with effective pedagogies, hands-on practice and advanced skills.
- Stimulating the interest of students through add-on courses for better collaborative learning and employability.
- Providing guidance on innovative research and leadership proficiency.
- Inculcating human values along with social skills.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

Bachelor of Computer Science and Engineering curriculum is designed to impart Knowledge, Skill and Attitude on the graduates to

PEO1:	Have successful career or pursue higher studies and research or emerge as entrepreneurs
PEO2:	Indulge in problem identification, analysis and formulation to provide technically Superior, economically feasible, environmentally compatible and socially acceptable design Solutions in computer science and allied domains.
PEO3:	Contribute towards entrepreneurship, research, exercise and leadership through Effective communication, teamwork and knowledge up gradation through lifelong learning.

PROGRAMME OUTCOMES:

Students graduating from Computer Science and Engineering shall be able to:

PO1 Engineering Knowledge: Apply knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization for 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.

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.
PO4 Conduct investigations of complex problems: Conduct investigations of complex engineering problems using research-based knowledge including design of experiments, modelling, analysis & interpretation of data to provide valid conclusions.
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.
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.
PO7 Ethics: Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to National & International laws.
PO8 Individual and Collaborative Team Work: 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 to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)
PSO1: Addressing societal problems through design and development of software and firmware solutions using latest Computer Science Tools and Technologies.
PSO2: Involving enthusiastically in software development, software testing, storage, computing and business intelligence sectors.

PEO / PO MAPPING:

PEOs	PO's											PSOs	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	3	3	3	3	3	3	3	3	3	3	3	3	3
2	3	2	2	2	2	1	2	1	3		2	3	3
3	3	1	2	1	2	2	3	2	1	2	3	3	3

Mapping of Course Outcome and Programme Outcome

Year	Semester	Semester	Course name	PO's											PSOs	
				1	2	3	4	5	6	7	8	9	10	11	1	2
I	I	24HS3151	Functional English	2	2	2	2	2	3	3	3	2	3	3		
		24MA3151	Matrices and Calculus	3	3	1	1	0	0	0	0	2	0	2		
		24GE3151	Programming In C	2	2	2	1	2	1	1	1	2		3	2	2
		24GE3051	Engineering Graphics	3	3	2	1	1						2	1	3
		24GE3152	Heritage of Tamil													
		24PH3051	Engineering Physics	3	1	2										
		24GE3171	Programming in C Laboratory	2	2	3	2	1	2		2	1	2	2	2	2
		24ES3151	Basic Computing Skills for Engineers	3	2	2	2	3	2						3	2
		24GE3172	Soft Skills - 1													
I	II	24HS3252	Professional English	3	3	2	3	3	3	3	3	3	3	3		
		24MA3251	Statistics and Numerical Methods	3	3	1	1				2		2	3		
		24GE3052	Problem Solving and Python Programming	2	3	3	3	2					2	2	3	3
		24BE3051	Basic Electrical and Electronics Engineering	3	3	3	2	2	1	1	1	1	1	2	3	3
		24GE3252	Tamils and Technology													
		24CY3051	Engineering Chemistry	3	1	1	1		2					1		
		24GE3072	Problem Solving and Python Programming Laboratory	2	3	3	3	2					2	2	2	3

		24GE3071	Engineering Practice Lab	3	2	2		2					1	2	1	
		24GE3272	Soft skills – II													
		24MA3054	Discrete Mathematics	3	3	2	2		2			3		2		
		24CS3351	Digital Principles and System Design	3	2	2	2	3	3	2	3	3	2	2	1	1
		24CS3352	Computer Architecture	2	1	1									2	2
		24CS3301	Data Structures	2	2	1	2	2	1		1	1	1	2	2	2
	III	24CS3391	Object Oriented Programming	2	1	2	2	2			2	2	1	2	3	2
		24CS3353	Software Engineering	3	2	2									2	2
		24CS3381	Object Oriented Programming Laboratory	2	2	2	2	2			2	2	2	2	2	2
		24CS3311	Data Structures Laboratory	2	2	2	1	2			2	2	2	2	2	2
		24GE3361	Advanced Logical Thinking													
		24CS3401	Design and Analysis of Algorithms	2	2	3	1		1					1		1
		24CS3451	Operating Systems	2	2	2	2	1			2	2	2	2	1	2
		24CS3452	Theory of Computation	2	2	2	2	1			1	2	2	2	2	2
II	**IV**	24CS3492	Database Management Systems	2	2	3	2	1			2	2	2	2	2	2
		24GE3451	Environmental Science and Sustainability	2	2	2	2	2	2	1	2	1	1	2	2	1
		24CS3461	Operating Systems Laboratory	2	2	2	2	2			2	2	2	2	2	2
		24CS3481	Database Management Systems Laboratory	2	3	2	2	1			2	1	3	2	2	2

		24CS3491	Project Using Design Thinking													
		24CS3411	Summer Internship													

REGULATIONS 2024
CHOICE BASED CREDIT SYSTEM
B. E. COMPUTER SCIENCE AND ENGINEERING
CURRICULUM AND SYLLABI FOR I TO VIII SEMESTERS

SEMESTER – I

S. No.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
MANDATORY NON CREDIT COURSE								
1	24IP3151	Induction Program	MNC	Two Weeks				0
THEORY COURSES								
2	24HS3151	Functional English	HSMC	2	0	0	2	2
3	24MA3151	Matrices and Calculus	BSC	3	1	0	4	4
4	24GE3151	Programming in C	ESC	3	0	0	3	3
5	24GE3051	Engineering Graphics	ESC	2	2	0	4	4
6	24GE3152	Heritage of Tamil	HSMC	1	0	0	1	1
THEORY COURSE WITH LABORATORY COMPONENT								
7	24PH3051	Engineering Physics	BSC	3	0	2	5	4
LABORATORY COURSES								
8	24GE3171	Programming in C Laboratory	ESC	0	0	4	4	2
PROFESSIONAL DEVELOPMENT COURSE								
10	24ES3151	Basic Computing Skills for Engineers	EEC	0	0	2	2	1
11	24GE3172	Soft Skills - 1	EEC	0	0	2	2	1
			TOTAL	**14**	**3**	**10**	**27**	**22**

SEMESTER – II

S. No.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY COURSES								
1	24HS3252	Professional English	HSMC	2	0	0	2	2
2	24MA3251	Statistics and Numerical Methods	BSC	3	1	0	4	4
3	24GE3052	Problem Solving and Python Programming	ESC	3	0	0	3	3
4	24BE3051	Basic Electrical and Electronics Engineering	ESC	3	0	0	3	3
5	24GE3252	Tamils and Technology	HSMC	1	0	0	1	1
6	NX3251	NCC Credit Course Level 1 #	-	2#	0	0	2#	2#
THEORY COURSE WITH LABORATORY COMPONENT								
7	24CY3051	Engineering Chemistry	BSC	3	0	2	5	4
LABORATORY COURSES								
8	24GE3072	Problem Solving and Python Programming Laboratory	ESC	0	0	4	4	2
9	24GE3071	Engineering Practices Laboratory	ESC	0	0	4	4	2
PROFESSIONAL DEVELOPMENT COURSE								
10	24GE3272	Soft Skills - II	EEC	0	0	2	2	1
			TOTAL	**15**	**1**	**12**	**28**	**22**

 # NCC Credit Course level 1 is offered for NCC students only. The grades earned by the students will be recorded in the Mark Sheet, however the same shall not be considered for the computation of CGPA.

SEMESTER III

SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1.	24MA3054	Discrete Mathematics	BSC	3	1	0	4	4
2.	24CS3352	Computer Architecture	PCC	3	0	0	3	3
3.	24CS3301	Data Structures	PCC	3	0	0	3	3
4.	24CS3391	Object Oriented Programming	PCC	3	0	0	3	3
5.	24CS3353	Software Engineering	PCC	3	0	0	3	3
THEORY CUM PRACTICAL								
6.	24CS3351	Digital Principles and System Design	ESC	3	0	2	5	4
PRACTICALS								

7.	24CS3381	Object Oriented Programming Laboratory	PCC	0	0	3	3	1.5
8.	24CS3311	Data Structures Laboratory	PCC	0	0	3	3	1.5
9.	24GE3361	Advanced Logical Thinking	EEC	0	0	2	2	1
			TOTAL	**18**	**1**	**10**	**29**	**24**

$ Skill Based Course

SEMESTER IV

SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1.	24CS3451	Operating Systems	PCC	3	0	0	3	3
2.	24CS3452	Theory of Computation	PCC	3	1	0	4	4
3.	24CS3492	Database Management Systems	PCC	3	0	0	3	3
4.	24GE3451	Environmental Science and Sustainability	BSC	2	0	0	2	2
THEORY CUM PRACTICAL								
5.	24CS3401	Design and Analysis of Algorithms	PCC	3	0	2	5	4
	NX3451	NCC Credit Course Level 2[#]		3#	0	0	3#	3#
PRACTICALS								
6.	24CS3461	Operating Systems Laboratory	PCC	0	0	3	3	1.5
7.	24CS3481	Database Management Systems Laboratory	PCC	0	0	3	3	1.5
8.	24CS3491	Project Using Design Thinking (Products/SDLC)	EEC	0	0	2	2	1
9.	24CS3411	Summer Internship	EEC	0	0	0	0	1
			TOTAL	**14**	**1**	**10**	**25**	**21**

 # NCC Credit Course level 2 is offered for NCC students only. The grades earned by the students will be recorded in the Mark Sheet, however the same shall not be considered for the computation of CGPA.

$ Two weeks Summer Internship carries one credit and it will be done during IV semester summer vacation and same will be evaluated in V semester.

SEMESTER V

S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY CUM PRACTICAL								
1.	24CS3501	Compiler Design	PCC	3	0	2	5	4
2.	24CS3551	Artificial Intelligence	PCC	3	0	2	5	4
3.	24CS3591	Computer Networks	PCC	3	0	2	5	4
4.	24CS3552	Foundations of Data Science	PCC	3	0	2	5	4
5.		Professional Elective – I	PEC	2	0	2	4	3
6.		Professional Elective – II	PEC	2	0	2	4	3

7.		Mandatory Course-I	MC	3	0	0	3	Non-Credit Course
PRACTICAL								
8.	24CS3511	Mini project	EEC	0	0	2	2	1
			TOTAL	**19**	**0**	**14**	**33**	**23**

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

SEMESTER VI

S. NO.	COURSE CODE	COURSE TITLE	CATEORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1.		Open Elective – I	OEC	3	0	0	3	3
2.		Mandatory Course-II	MC	3	0	0	3	0
3.		NCC Credit Couse Level 3 #		3#	0	0	3	3#
THEORY CUM PRACTICAL								
4.	24CS3661	Cryptography and Cyber Security	PCC	3	0	2	5	4
5.	24CS3691	Embedded Systems and IoT	PCC	3	0	2	5	4
6.	24CS3662	Object Oriented Analysis and Design	PCC	2	0	2	4	4
7.	24CS3663	Machine Learning	PCC	2	0	2	4	3
8.		Professional Elective – III	PEC	2	0	2	4	3
PRACTICALS								
9.	24GE3661	Industry Oriented Course	EEC	0	0	2	2	1
			TOTAL	**18**	**0**	**12**	**30**	**22**

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

***Open Elective – I shall be chosen from the emerging technologies.**

 # NCC Credit Course level 3 is offered for NCC students only. The grades earned by the students will be recorded in the Mark Sheet, however the same shall not be considered for the computation of CGPA

SEMESTER VII / VIII*

S. NO.	COURSE CODE	COURSE TITLE	CATEORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1.	24GE3791	Human Values Ethics	HSMC	2	0	0	2	2
2.		Open Elective – II	OEC	3	0	0	3	3
3.		Open Elective – III	OEC	3	0	0	3	3
THEORY CUM PRACTICAL								
4.		Professional Elective IV	PCC	3	0	2	5	4
PRACTICALS								
5.	24CS3711	Project phase I	EEC	0	0	2	2	0
6.	24CS3712	Summer Internship-II	EEC	0	0	2	2	1
			TOTAL	**11**	**0**	**6**	**17**	**13**

***Open Elective II and III (Shall be chosen from the list of open electives offered by other Programmes).**

SEMESTER VIII /VII*

S. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1.		Elective-Management	HSMC	3	0	0	3	3
2.		Professional Elective – IV	PCC	3	0	0	3	3
PRACTICALS								
3.	24CS3811	Project Work / Internship	EEC	0	0	20	20	10
			TOTAL	**6**	**0**	**20**	**26**	**16**

***If students undergo internship in Semester VII, then the courses offered during semester VII will be offered during semester VIII.**

TOTAL CREDITS:164

MANDATORY COURSES I

S. NO	COURSE CODE	COURSE TITLE	CATEGO RY	PERIODS PER WEEK			TOTAL CONTAC T PERIODS	CREDIT S
				L	T	P		
1.	24MX3081	Introduction to Women and Gender Studies	OEC	0	0	0	0	0
2.	24MX3082	Elements of Literature	OEC	0	0	0	0	0
3.	24MX3083	Film Appreciation	OEC	0	0	0	0	0
4.	24MX3084	Disaster Risk Reduction and Management	OEC	0	0	0	0	0

MANDATORY COURSES II

S. NO	COURSE CODE	COURSE TITLE	CATEG ORY	PERIODS PER WEEK			TOTAL CONTAC T PERIODS	CREDITS
				L	T	P		
1.	24MX3085	Well, Being with Traditional Practices – Yoga, Ayurveda and Siddha	OEC	0	0	0	0	0
2.	24MX3086	History of Science and Technology in India	OEC	0	0	0	0	0
3.	24MX3087	State, Nation Building and Politics in India	OEC	0	0	0	0	0
4.	24MX3088	Political and Economic Thought for a Human Society	OEC	0	0	0	0	0

PROFESSIONAL ELECTIVE COURSES: VERTICALS

Vertical I Data Science	Vertical II Full Stack Development	Vertical III Cloud Computing and Data Center Technologies	Vertical IV Cyber Security and Data Privacy	Vertical V Creative Media	Vertical VI Emerging Technologies	Vertical VII Artificial Intelligence and Machine Learning
Exploratory Data Analysis	Web Technologies	Cloud Computing	Ethical Hacking	Augmented Reality/Virtual Reality	Augmented Reality/Virtual Reality	Knowledge Engineering
Recommender Systems	App Development	Virtualization	Digital and Mobile Forensics	Multimedia and Animation	Robotic Process Automation	Soft Computing
Neural Networks and Deep Learning	Cloud Services Management	Cloud Services Management	Social Network Security	Video Creation and Editing	Neural Networks and Deep Learning	Neural Networks and Deep Learning
Text and Speech Analysis	UI and UX Design	Data Warehousing	Modern Cryptography	UI and UX Design	Cyber security	Text and Speech Analysis
Business Analytics	Software Testing and Automation	Storage Technologies	Engineering Secure Software Systems	Digital marketing	Quantum Computing	Optimization Techniques
Image and Video Analytics	Web Application Security	Software Defined Networks	Cryptocurrency and Blockchain Technologies	Visual Effects	Cryptocurrency and Blockchain Technologies	Game Theory
Computer Vision	DevOps	Stream Processing	Network Security	Game Development	Game Development	Cognitive Science
Big Data Analytics	Principles of Programming Languages	Security and Privacy in Cloud	Security and Privacy in Cloud	Multimedia Data Compression and Storage	3D Printing and Design	Ethics And AI

Registration of Professional Elective Courses from Verticals:

Professional Elective Courses will be registered in Semesters V and VI. These courses are listed in groups called verticals that represent a particular area of specialisation / diversified group. Students are permitted to choose all the Professional Electives from a particular vertical or from different verticals. Further, only one Professional 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 2021, Clause 4.10(Amendments).

PROFESSIONAL ELECTIVE COURSES : VERTICALS

VERTICAL 1: DATA SCIENCE

S. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	CCS346	Exploratory Data Analysis	PEC	2	0	2	4	3
2.	CCS360	Recommender Systems	PEC	2	0	2	4	3
3.	CCS355	Neural Networks and Deep Learning	PEC	2	0	2	4	3
4.	CCS369	Text and Speech Analysis	PEC	2	0	2	4	3
5.	CCW331	Business Analytics	PEC	2	0	2	4	3
6.	CCS349	Image and Video Analytics	PEC	2	0	2	4	3
7.	CCS338	Computer Vision	PEC	2	0	2	4	3
8.	CCS334	Big Data Analytics	PEC	2	0	2	4	3

VERTICAL 2: FULL STACK DEVELOPMENT

S. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	CCS375	Web Technologies	PEC	2	0	2	4	3
2.	CCS332	App Development	PEC	2	0	2	4	3
3.	CCS336	Cloud Services Management	PEC	2	0	2	4	3
4.	CCS370	UI and UX Design	PEC	2	0	2	4	3
5.	CCS366	Software Testing and Automation	PEC	2	0	2	4	3
6.	CCS374	Web Application Security	PEC	2	0	2	4	3
7.	CCS342	DevOps	PEC	2	0	2	4	3
8.	CCS358	Principles of Programming Languages	PEC	3	0	0	3	3

VERTICAL 3: CLOUD COMPUTING AND DATA CENTER TECHNOLOGIES

S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	CCS335	Cloud Computing	PEC	2	0	2	4	3
2.	CCS372	Virtualization	PEC	2	0	2	4	3
3.	CCS336	Cloud Services Management	PEC	2	0	2	4	3
4.	CCS341	Data Warehousing	PEC	2	0	2	4	3
5.	CCS367	Storage Technologies	PEC	3	0	0	3	3
6.	CCS365	Software Defined Networks	PEC	2	0	2	4	3
7.	CCS368	Stream Processing	PEC	2	0	2	4	3
8.	CCS362	Security and Privacy in Cloud	PEC	2	0	2	4	3

VERTICAL 4: CYBER SECURITY AND DATA PRIVACY

S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	CCS344	Ethical Hacking	PEC	2	0	2	4	3
2.	CCS343	Digital and Mobile Forensics	PEC	2	0	2	4	3
3.	CCS363	Social Network Security	PEC	2	0	2	4	3
4.	CCS351	Modern Cryptography	PEC	2	0	2	4	3
5.	CB3591	Engineering Secure Software Systems	PEC	2	0	2	4	3
6.	CCS339	Cryptocurrency and Blockchain Technologies	PEC	2	0	2	4	3
7.	CCS354	Network Security	PEC	2	0	2	4	3
8.	CCS362	Security and Privacy in Cloud	PEC	2	0	2	4	3

VERTICAL 5: VERTICAL 5: CREATIVE MEDIA

S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	CCS333	Augmented Reality/Virtual Reality	PEC	2	0	2	4	3
2.	CCS352	Multimedia and Animation	PEC	2	0	2	4	3
3.	CCS371	Video Creation and Editing	PEC	2	0	2	4	3
4.	CCS370	UI and UX Design	PEC	2	0	2	4	3
5.	CCW332	Digital marketing	PEC	2	0	2	4	3
6.	CCS373	Visual Effects	PEC	2	0	2	4	3
7.	CCS347	Game Development	PEC	2	0	2	4	3
8.	CCS353	Multimedia Data Compression and Storage	PEC	2	0	2	4	3

VERTICAL 6: EMERGING TECHNOLOGIES

S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	CCS333	Augmented Reality/Virtual Reality	PEC	2	0	2	4	3
2.	CCS361	Robotic Process Automation	PEC	2	0	2	4	3
3.	CCS355	Neural Networks and Deep Learning	PEC	2	0	2	4	3
4.	CCS340	Cyber security	PEC	2	0	2	4	3
5.	CCS359	Quantum Computing	PEC	2	0	2	4	3
6.	CCS339	Cryptocurrency and Blockchain Technologies	PEC	2	0	2	4	3
7.	CCS347	Game Development	PEC	2	0	2	4	3
8.	CCS331	3D Printing and Design	PEC	2	0	2	4	3

VERTICAL 7: ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

SL. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	CCS350	Knowledge Engineering	PEC	2	0	2	4	3
2.	CCS364	Soft Computing	PEC	2	0	2	4	3
3.	CCS355	Neural Networks and Deep Learning	PEC	2	0	2	4	3
4.	CCS369	Text and Speech Analysis	PEC	2	0	2	4	3
5.	CCS357	Optimization Techniques	PEC	2	0	2	4	3
6.	CCS348	Game Theory	PEC	2	0	2	4	3
7.	CCS337	Cognitive Science	PEC	2	0	2	4	3
8.	CCS345	Ethics And AI	PEC	2	0	2	4	3

OPEN ELECTIVES

(Students shall choose the open elective courses, such that the course contents are not similar to any other course contents/title under other course categories)

OPEN ELECTIVES – I

S. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	OAS351	Space Science	OEC	3	0	0	3	3
2.	OIE351	Introduction to Industrial Engineering	OEC	3	0	0	3	3
3.	OBT351	Food, Nutrition and Health	OEC	3	0	0	3	3
4.	OCE351	Environment and Social Impact Assessment	OEC	3	0	0	3	3
5.	OEE351	Renewable Energy System	OEC	3	0	0	3	3
6.	OEI351	Introduction to Industrial Instrumentation and Control	OEC	3	0	0	3	3
7.	OMA351	Graph Theory	OEC	3	0	0	3	3

OPEN ELECTIVES – II

SL. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	OIE352	Resource Management Techniques	OEC	3	0	0	3	3
2.	OMG351	Fintech Regulation	OEC	3	0	0	3	3
3.	OFD351	Holistic Nutrition	OEC	3	0	0	3	3
4.	AI3021	IT in Agricultural System	OEC	3	0	0	3	3
5.	OEI352	Introduction to Control Engineering	OEC	3	0	0	3	3
6.	OPY351	Pharmaceutical Nanotechnology	OEC	3	0	0	3	3
7.	OAE351	Aviation Management	OEC	3	0	0	3	3

OPEN ELECTIVES – III

SL. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	OHS351	English for Competitive Examinations	OEC	3	0	0	3	3
2.	OMG352	NGOs and Sustainable Development	OEC	3	0	0	3	3
3.	OMG353	Democracy and Good Governance	OEC	3	0	0	3	3
4.	CME365	Renewable Energy Technologies	OEC	3	0	0	3	3
5.	OME354	Applied Design Thinking	OEC	3	0	0	3	3
6.	MF3003	Reverse Engineering	OEC	3	0	0	3	3
7.	OPR351	Sustainable Manufacturing	OEC	3	0	0	3	3
8.	AU3791	Electric and Hybrid Vehicles	OEC	3	0	0	3	3
9.	OAS352	Space Engineering	OEC	3	0	0	3	3
10.	OIM351	Industrial Management	OEC	3	0	0	3	3
11.	OIE354	Quality Engineering	OEC	3	0	0	3	3
12.	OSF351	Fire Safety Engineering	OEC	3	0	0	3	3
13.	OML351	Introduction to Non-destructive Testing	OEC	3	0	0	3	3
14.	OMR351	Mechatronics	OEC	3	0	0	3	3
15.	ORA351	Foundation of Robotics	OEC	3	0	0	3	3
16.	OAE352	Fundamentals of Aeronautical Engineering	OEC	3	0	0	3	3

17.	OGI351	Remote Sensing Concepts	OEC	3	0	0	3	3
18.	OAI351	Urban Agriculture	OEC	3	0	0	3	3
19.	OEN351	Drinking Water Supply and Treatment	OEC	3	0	0	3	3
20.	OEE352	Electric Vehicle Technology	OEC	3	0	0	3	3
21.	OEI353	Introduction to PLC Programming	OEC	3	0	0	3	3
22.	OCH351	Nano Technology	OEC	3	0	0	3	3
23.	OCH352	Functional Materials	OEC	3	0	0	3	3
24.	OFD352	Traditional Indian Foods	OEC	3	0	0	3	3
25.	OFD353	Introduction to food processing	OEC	3	0	0	3	3
26.	OPY352	IPR for Pharma Industry	OEC	3	0	0	3	3
27.	OTT351	Basics of Textile Finishing	OEC	3	0	0	3	3
28.	OTT352	Industrial Engineering for Garment Industry	OEC	3	0	0	3	3
29.	OTT353	Basics of Textile Manufacture	OEC	3	0	0	3	3
30.	OPE351	Introduction to Petroleum Refining and Petrochemicals	OEC	3	0	0	3	3
31.	CPE334	Energy Conservation and Management	OEC	3	0	0	3	3
32.	OPT351	Basics of Plastics Processing	OEC	3	0	0	3	3
33.	OEC351	Signals and Systems	OEC	3	0	0	3	3
34.	OEC352	Fundamentals of Electronic Devices and Circuits	OEC	3	0	0	3	3
35.	CBM348	Foundation Skills in Integrated Product Development	OEC	3	0	0	3	3
36.	CBM333	Assistive Technology	OEC	3	0	0	3	3
37.	OMA352	Operations Research	OEC	3	0	0	3	3
38.	OMA353	Algebra and Number Theory	OEC	3	0	0	3	3
39.	OMA354	Linear Algebra	OEC	3	0	0	3	3
40.	OCE353	Lean Concepts, Tools and Practices	OEC	3	0	0	3	3
41.	OBT352	Basics of Microbial Technology	OEC	3	0	0	3	3
42.	OBT353	Basics of Biomolecules	OEC	3	0	0	3	3
43.	OBT354	Fundamentals of Cell and Molecular Biology	OEC	3	0	0	3	3

OPEN ELECTIVES – IV

SL. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	OHS352	Project Report Writing	OEC	3	0	0	3	3
2.	OMA355	Advanced Numerical Methods	OEC	3	0	0	3	3
3.	OMA356	Random Processes	OEC	3	0	0	3	3
4.	OMA357	Queuing and Reliability Modelling	OEC	3	0	0	3	3
5.	OMG354	Production and Operations Management for Entrepreneurs	OEC	3	0	0	3	3
6.	OMG355	Multivariate Data Analysis	OEC	3	0	0	3	3
7.	OME352	Additive Manufacturing	OEC	3	0	0	3	3
8.	CME343	New Product Development	OEC	3	0	0	3	3
9.	OME355	Industrial Design & Rapid Prototyping Techniques	OEC	3	0	0	3	3
10.	MF3010	Micro and Precision Engineering	OEC	3	0	0	3	3
11.	OMF354	Cost Management of Engineering Projects	OEC	3	0	0	3	3
12.	AU3002	Batteries and Management system	OEC	3	0	0	3	3
13.	AU3008	Sensors and Actuators	OEC	3	0	0	3	3
14.	OAS353	Space Vehicles	OEC	3	0	0	3	3
15.	OIM352	Management Science	OEC	3	0	0	3	3
16.	OIM353	Production Planning and Control	OEC	3	0	0	3	3
17.	OIE353	Operations Management	OEC	3	0	0	3	3
18.	OSF352	Industrial Hygiene	OEC	3	0	0	3	3
19.	OSF353	Chemical Process Safety	OEC	3	0	0	3	3
20.	OML352	Electrical, Electronic and Magnetic materials	OEC	3	0	0	3	3
21.	OML353	Nanomaterials and Applications	OEC	3	0	0	3	3
22.	OMR352	Hydraulics and Pneumatics	OEC	3	0	0	3	3
23.	OMR353	Sensors	OEC	3	0	0	3	3
24.	ORA352	Concepts in Mobile Robots	OEC	3	0	0	3	3
25.	MV3501	Marine Propulsion	OEC	3	0	0	3	3
26.	OMV351	Marine Merchant Vessels	OEC	3	0	0	3	3

27.	OMV352	Elements of Marine Engineering	OEC	3	0	0	3	3
28.	CRA332	Drone Technologies	OEC	3	0	0	3	3
29.	OGI352	Geographical Information System	OEC	3	0	0	3	3
30.	OAI352	Agriculture Entrepreneurship Development	OEC	3	0	0	3	3
31.	OEN352	Biodiversity Conservation	OEC	3	0	0	3	3
32.	OEE353	Introduction to control systems	OEC	3	0	0	3	3
33.	OEI354	Introduction to Industrial Automation Systems	OEC	3	0	0	3	3
34.	OCH353	Energy Technology	OEC	3	0	0	3	3
35.	OCH354	Surface Science	OEC	3	0	0	3	3
36.	OFD354	Fundamentals of Food Engineering	OEC	3	0	0	3	3
37.	OFD355	Food safety and Quality Regulations	OEC	3	0	0	3	3
38.	OPY353	Nutraceuticals	OEC	3	0	0	3	3
39.	OTT354	Basics of Dyeing and Printing	OEC	3	0	0	3	3
40.	FT3201	Fibre Science	OEC	3	0	0	3	3
41.	OTT355	Garment Manufacturing Technology	OEC	3	0	0	3	3
42.	OPE353	Industrial safety	OEC	3	0	0	3	3
43.	OPE354	Unit Operations in Petro Chemical Industries	OEC	3	0	0	3	3
44.	OPT352	Plastic Materials for Engineers	OEC	3	0	0	3	3
45.	OPT353	Properties and Testing of Plastics	OEC	3	0	0	3	3
46.	OEC353	VLSI Design	OEC	3	0	0	3	3
47.	CBM370	Wearable Devices	OEC	3	0	0	3	3
48.	CBM356	Medical Informatics	OEC	3	0	0	3	3
49.	OCE354	Basics of Integrated Water Resources Management	OEC	3	0	0	3	3
50.	OBT355	Biotechnology for Waste Management	OEC	3	0	0	3	3
51.	OBT356	Lifestyle Diseases	OEC	3	0	0	3	3
52.	OBT357	Biotechnology in Health Care	OEC	3	0	0	3	3

SUMMARY

Name of the Programme: B.E. Computer Science and Engineering										
S.No	Subject Area	Credits per Semester								Total Credits
		I	II	III	IV	V	VI	VII/VIII	VIII/VII	
1	HSMC	3	3					2	3	16
2	BSC	8	8	4	2					23
3	ESC	9	10	4						29
4	PCC			15	17	16	14	4	3	59
5	PEC					6	3			12
6	OEC						3	6		9
7	EEC	2	1	1	2	1	1	2	10	15
8	Non-Credit /(Mandatory)					√	√			
Total		22	22	24	21	23	21	14	16	163

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, Moreover, for minor degree the student can register for courses from any one of the following verticals also.
Complete details are available in clause 4.10 (Amendments) of Regulations 2021.

VERTICALS FOR MINOR DEGREE (In addition to all the verticals of other programmes)

Vertical I	Vertical II	Vertical III	Vertical IV	Vertical V
Fintech and Block Chain	**Entrepreneurship**	**Public Administration**	**Business Data Analytics**	**Environment and Sustainability**
Financial Management	Foundations of Entrepreneruship	Principles of Public Administration	Statistics for Management	Sustainable infrastructure Development
Fundamentals of Investment	Team Building and Leadership Management for Business	Constitution of India	Datamining for Business Intelligence	Sustainable Agriculture and Environmental Management
Banking, Financial Services and Insurance	Creativity and Innovation in Entrepreneurship	Public Personnel Administration	Human Resource Analytics	Sustainable Bio Materials
Introduction to Blockchain and its Applications	Principles of Marketing Management for Business	Administrative Theories	Marketing and Social Media Web Analytics	Materials for Energy Sustainability
Fintech Personal Finance and Payments	Human Resource Management for Entrepreneurs	Indian Administrative System	Operation and Supply Chain Analytics	Green Technology
Introduction to Fintech	Financing New Business Ventures	Public Policy Administration	Financial Analytics	Environmental Quality Monitoring and Analysis
-	-	-	-	Integrated Energy Planning for Sustainable Development
-	-	-	-	Energy Efficiency for Sustainable Development

(Choice of courses for Minor degree is to be made from any one vertical of other programmes or from anyone of the following verticals)

VERTICAL 1: FINTECH AND BLOCK CHAIN

SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	CMG331	Financial Management	PEC	3	0	0	3	3
2.	CMG332	Fundamentals of Investment	PEC	3	0	0	3	3
3.	CMG333	Banking, Financial Services and Insurance	PEC	3	0	0	3	3
4.	CMG334	Introduction to Blockchain and its Applications	PEC	3	0	0	3	3
5.	CMG335	Fintech Personal Finance and Payments	PEC	3	0	0	3	3
6.	CMG336	Introduction to Fintech	PEC	3	0	0	3	3

VERTICAL 2: ENTREPRENERUSHIP

SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	CMG337	Foundations of Entrepreneruship	PEC	3	0	0	3	3
2.	CMG338	Team Building and Leadership Management for Business	PEC	3	0	0	3	3
3.	CMG339	Creativity and Innovation in Entrepreneurship	PEC	3	0	0	3	3
4.	CMG340	Principles of Marketing Management for Business	PEC	3	0	0	3	3
5.	CMG341	Human Resource Management for Entrepreneurs	PEC	3	0	0	3	3
6.	CMG342	Financing New Business Ventures	PEC	3	0	0	3	3

VERTICAL 3: PUBLIC ADMINISTRATION

SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	CMG343	Principles of Public Administration	PEC	3	0	0	3	3
2.	CMG344	Constitution of India	PEC	3	0	0	3	3
3.	CMG345	Public Personnel Administration	PEC	3	0	0	3	3
4.	CMG346	Administrative Theories	PEC	3	0	0	3	3
5.	CMG347	Indian Administrative System	PEC	3	0	0	3	3
6.	CMG348	Public Policy Administration	PEC	3	0	0	3	3

VERTICAL 4: BUSINESS DATA ANALYTICS

SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	CMG349	Statistics for Management	PEC	3	0	0	3	3
2.	CMG350	Datamining for Business Intelligence	PEC	3	0	0	3	3
3.	CMG351	Human Resource Analytics	PEC	3	0	0	3	3
4.	CMG352	Marketing and Social Media Web Analytics	PEC	3	0	0	3	3
5.	CMG353	Operation and Supply Chain Analytics	PEC	3	0	0	3	3
6.	CMG354	Financial Analytics	PEC	3	0	0	3	3

VERTICAL 5: ENVIRONMENT AND SUSTAINABILITY

SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	CES331	Sustainable infrastructure Development	PEC	3	0	0	3	3
2.	CES332	Sustainable Agriculture and Environmental Management	PEC	3	0	0	3	3

3.	CES333	Sustainable Bio Materials	PEC	3	0	0	3	3
4.	CES334	Materials for Energy Sustainability	PEC	3	0	0	3	3
5.	CES335	Green Technology	PEC	3	0	0	3	3
6.	CES336	Environmental Quality Monitoring and Analysis	PEC	3	0	0	3	3
7.	CES337	Integrated Energy Planning for Sustainable Development	PEC	3	0	0	3	3
8.	CES338	Energy Efficiency for Sustainable Development	PEC	3	0	0	3	3

24HS3151	FUNCTIONAL ENGLISH	L	T	P	C
		2	0	0	2

COURSE OBJECTIVES:

1. To develop engineering and technology students basic reading and writing skills.
2. To help learners develop their listening skills, enable them to listen to lectures and comprehend them by asking questions; and seeking clarifications.
3. To help learners develop their speaking skills and speak fluently in real contexts.
4. To help learners develop vocabulary of a general kind by developing their reading skills

UNIT I BASIC ENGLISH FOR EFFECTIVE COMMUNICATION 6

Listening: Listening to short extracts-British Council B1 & B2 speaking: Self Introduction, introducing others, Extempore, Impromptu, Reading: Reading short stories, comprehension - skimming-scanning Writing: Developing hints, Free writing Language development: Present Tense, Articles, Modal Verbs Vocabulary development: – Word formation –Prefixes & Suffixes, root words.

UNIT – II CONTEXTUAL COMMUNICATION SKILLS 6

Listening: Telephonic conversations, conceptual conversations, Listening to experience speaking: Sharing information of a personal kind, greeting, taking leave, Manuscript, Memorized Reading: Reading newspapers and understanding the context Writing: Paragraph writing -Day-to-day events, Cloze exercises Language development: Past Tense, Subject-verb Agreement Vocabulary development: Guessing meanings of words in context.

UNIT – III DISCOURSE AND STRUCTURE 6

Listening: Listening to product descriptions; and narratives from different sources-speaking: Short presentation, asking about routine actions and expressing facts and opinions, Reading: Interpreting pictures of visual graphics- Reading and reviewing Books/Articles Writing: Understanding text structure, jumbled sentences -Language development: Future Tense, Degrees of comparison, Gerunds and Infinitives -Vocabulary development: use of reference words and discourse markers, Idioms and Phrases

UNIT – IV INTERACTIVE AND WRITTEN COMMUNICATION 6

Listening- Listening to dialogues - listening to longer texts and filling up the blanks, speaking-Role Play, Travelogue -Reading: Reading different types of magazines Writing: Formal and Informal letter writing, E-mail etiquette Language development: Wh questions- Question Tags Vocabulary development: synonyms-antonyms, phrasal verbs, If Conditional Clause

UNIT – V ACADEMIC FLUENCY AND STRUCTURED EXPRESSION 6

Listening: Listening to a podcas speaking: conversational speaking, short group conversations, Reading: Journals both general and technical Writing: Writing short essays, hints development, dialogue writingLanguage development: Spelling and Punctuations, Cause and Effect, Transition words,Vocabulary development-collocations, Use of sequence words .

TOTAL: 30 PERIODS

COURSE OUTCOMES:

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

CO1 Write effectively and flawlessly avoiding grammatical errors in a variety of professional and social settings.

CO2 Utilize appropriate writing strategies in technical and business context.

CO3 Make use of listening skills in business and workplace environments and relates to oral communication confidently.

CO4 Develop corporate test-taking strategies as well as employability skills.

CO5 Exhibits learners' reading skills for effective communication in personal and official conversations / situations .

TEXT BOOKS:

1. Board of Editors. Fluency in English A course book for Engineering and Technology. Orient Blackswan, Hyderabad: 2016.
2. Rizvi, Ashraf. M. Effective Technical Communication, Tata McGraw-Hill, New Delhi, 2017

REFERENCES:

1. Raman, Meenakshi and Sharma, Sangeetha "Technical Communication Principles and Practice" Oxford University Press: New Delhi, 2014
2. Kumar, Suresh. E. "Engineering English" Orient Blackswan: Hyderabad, 2015.
3. Muralikrishna, & Sunita Mishra. Communication Skills for Engineers. Pearson, New Delhi. 2011.
4. Mitra K. Barun, "Effective Technical Communication – A Guide for Scientists and Engineers", Oxford University Press, New Delhi, 2006.

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

CO's	PO's											PSO's	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	1	1	1	1	1	3	3	1	3		3		
2	1	1	1	1	1	3	3	1	3		3		
3	2	3	2	3	2	3	3	2	3	3	3		
4	2	3	2	3	2	3	3	2	3	3	3		
5	2	3	3	3		3	3	2	3		3		
Low (1) ; Medium (2) ; High (3)													

Course Coordinator

(D. Indumathi)
AP/Eng.

BoS Chairman / HoD (S&H)

24MA3151	MATRICES AND CALCULUS	L	T	P	C
		3	1	0	4

COURSE OBJECTIVES:

1. To develop the use of matrix algebra techniques that is needed by engineers for practical application
2. To familiarize the students with concepts of differential calculus.
3. To make the student acquire sound knowledge of techniques in solving ordinary differential equations that model engineering problems.
4. To familiarize the student with functions of several variables.
5. To make the students understand various techniques of integration.

UNIT I MATRICES **9+3**

Eigenvalues and Eigenvectors of a real matrix – Characteristic equation – Properties of Eigenvalues and Eigenvectors – Cayley - Hamilton theorem – Diagonalization of matrices by orthogonal transformation – Reduction of a quadratic form to canonical form by orthogonal transformation – Nature of quadratic forms – Applications: Stretching of an elastic membrane.

UNIT – II DIFFERENTIAL CALCULUS **9+3**

Representation of functions - Limit of a function - Continuity - Derivatives - Differentiation rules - Maxima and Minima of functions of one variable.

UNIT – III DIFFERENTIAL EQUATIONS **9+3**

Higher order linear differential equations with constant coefficients – Method of variation of parameters – Cauchy's and Legendre's linear equations – Simultaneous first order linear equations with constant coefficients.

UNIT – IV FUNCTIONS OF SEVERAL VARIABLES **9+3**

Limits and Continuity – Partial derivatives – Total derivative – Differentiation of implicit functions – Jacobian and properties – Taylor's series for functions of two variables – Maxima and minima of functions of two variables – Lagrange's method of undetermined multipliers

UNIT – V INTEGRAL CALCULUS **9+3**

Definite and Indefinite integrals - Substitution rule - Techniques of Integration: Integration by parts, Trigonometric substitutions, Double integrals – Area enclosed by plane curves.

TOTAL: 45+15 PERIODS

COURSE OUTCOMES:

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

CO1 Use the matrix algebra methods for solving practical problems.
CO2 Use both the limit definition and rules of differentiation to differentiate functions
CO3 Explain the concept of differential equation.
CO4 Use differential calculus ideas on several variable functions.
CO5 Evaluate integrals both by using Riemann sums and by using the fundamental theorem of calculus.

TEXT BOOKS:

1. Bali N. P and Manish Goyal, "A Text book of Engineering Mathematics", Eighth Edition, Laxmi Publications Pvt Ltd., 2011.
2. Grewal. B.S, "Higher Engineering Mathematics", 41st Edition, Khanna Publications, Delhi, 2011.
3. Kreyszig Erwin, "Advanced Engineering Mathematics", John Wiley and Sons, 10th Edition, New Delhi, 2016

REFERENCES:

1. Dass, H.K., and Er. Rajnish Verma," Higher Engineering Mathematics", S. Chand Private Ltd., 2011.
2. Glyn James, "Advanced Modern Engineering Mathematics", 3rd Edition, Pearson Education, 2012
3. Peter V. O'Neil," Advanced Engineering Mathematics", 7th Edition, Cengage learning, 2012.
4. Ramana B.V, "Higher Engineering Mathematics", Tata McGraw Hill Publishing Company, New Delhi, 2008.
5. Sivarama Krishna Das P. and Rukmangadachari E., "Engineering Mathematics", Volume I, Second Edition, PEARSON Publishing, 2011.

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

CO's	PO's											PSO's	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	3	3	1	1				2		2	3		
2	3	3	1	1				2		2	3		
3	3	3	1	1				2		2	3		
4	3	3	1	1				2		2	3		
5	3	3	1	1				2		2	3		
Low (1) ; Medium (2) ; High (3)													

Course Coordinator **BOS Chairman/ HoD(S&H)**

SRI RANGANATHAR
INSTITUTE OF ENGINEERING AND TECHNOLOGY
(An Autonomous Institution)
(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai)
Athipalayam, Coimbatore - 641 110. website: sriet.ac.in, Ph: 0422 - 2697792

24GE3151	PROGRAMMING IN C	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

1. To understand the constructs of C Language.
2. To develop C programs using arrays and strings.
3. To develop modular applications in C using functions.
4. To develop applications in C using pointers and structures.
5. To do input/output and file handling in C.

UNIT I BASICS OF C PROGRAMMING **9**

Introduction to programming and features – Applications of C Language - Structure of C program - C programming: Data Types - Constants – Keywords – Operators and Expression Precedence and Associativity- Input/Output and assignment statements – Decision making statements - Switch statement - Looping statements – Preprocessor directives - Compilation process

UNIT II ARRAYS AND STRINGS **9**

Introduction to Arrays: Declaration, Initialization – One dimensional array –Two dimensional arrays - String operations: length, compare, concatenate, copy – Selection sort, linear and binary search.

UNIT III FUNCTIONS AND POINTERS **9**

Function prototype, function definition, function call, Built-in functions (string functions) – Recursion – Pointers – Null pointer and generic pointer – Pointer arithmetic – Arrays and pointers – Array of pointers – Parameter passing: Pass by value, Pass by reference.

UNIT – IV STRUCTURES AND UNION **9**

Structure - Nested structures – Pointer and Structures – Array of structures – Self-referential structures – Dynamic memory allocation - Singly linked list – typedef – Union - Storage classes and Visibility.

UNIT – V FILE PROCESSING **9**

Files – Types of file processing: Sequential access, Random access – Sequential access file - Random access- Command line arguments.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

Upon completion of the course, the students will be able to

CO1 Demonstrate knowledge on C Programming constructs.
CO2 Design and implement applications using arrays and strings
CO3 Develop and implement modular applications in C using functions.
CO4 Develop applications in C using structures and pointers.
CO5 Design applications using sequential and random-access file processing.

TEXT BOOKS:

1. ReemaThareja, "Programming in C", Oxford University Press, Second Edition, 2016.
2. Kernighan, B.W and Ritchie,D.M, "The C Programming language", Second Edition, Pearson Education, 2015.

REFERENCES:

1. Paul Deitel and Harvey Deitel, "C How to Program with an Introduction to C++", Eighth edition, Pearson Education, 2018.
2. Yashwant Kanetkar, Let us C, 17th Edition, BPB Publications, 2020.
3. Byron S. Gottfried, "Schaum's Outline of Theory and Problems of Programming with C", McGraw- Education, 1996.
4. Pradip Dey, Manas Ghosh, "Computer Fundamentals and Programming in C", Second
5. Edition, Oxford University Press, 2013.
6. Anita Goel and Ajay Mittal, "Computer Fundamentals and Programming in C", 1st Edition, Pearson Education, 2013.

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

COs	POs											PSOs	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	1	2	2	1	2	1	1	1	2		3	2	1
2	2	2	2	1	2	1	1	1	2		3	3	2
3	2	3	2	1	2	1	1	1	2		3		2
4	3	2	2	1	3	1	1	1	2		3	3	2
5	2	3	3	1	2	1	2	1	2		3		2
Low (1) ; Medium (2) ; High (3)													

COURSE COORDINATOR

BOS CHAIRMAN / HOD

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24GE3051	ENGINEERING GRAPHICS	L	T	P	C
		2	2	0	4

COURSE OBJECTIVES:

1. Drawing engineering curves
2. Drawing of projection of lines and plane surfaces
3. Drawing projection of solids.
4. Drawing section of solids and development of solids
5. Drawing isometric and freehand sketch of simple objects.

UNIT I PLANE CURVES **12**

Basic Geometrical constructions, Curves used in engineering practices: Conics — Construction of ellipse, parabola and hyperbola by eccentricity method — Construction of cycloid — construction of involutes of square and circle — Drawing of tangents and normal to the above curves.

UNIT – II PROJECTION OF LINES AND PLANE SURFACE **12**

Projection of straight lines (only First angle projections) inclined to both the principal planes - Determination of true lengths and true inclinations by rotating line method and traces. Projection of planes (polygonal and circular surfaces) inclined to both the principal planes by rotating object method.

UNIT – III PROJECTION OF SOLIDS **10**

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

UNIT – IV PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF SURFACES **12**

Sectioning of above solids in simple vertical position when the cutting plane is inclined to the one of the principal planes and perpendicular to the other — obtaining true shape of section. Development of lateral surfaces of simple and sectioned solids — Prisms, pyramids cylinders and cones

UNIT – V ISOMETRIC AND FREE HAND SKETCHING **14**

Principles of isometric projection — isometric scale - Isometric projections of simple solids and truncated solids - Prisms, pyramids, cylinders. Visualization concepts and Free Hand sketching: Visualization principles —Representation of Three dimensional objects — Layout of views- Freehand sketching of multiple views from pictorial views of objects.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

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

CO1 Draw basic geometrical constructions and draw various engineering curves such as conics (ellipse, parabola, hyperbola), cycloids, and involutes, including constructing tangents and normal to these curves.

CO2 Apply principles of orthographic projection to lines and plane surfaces in first angle projection, and determine true lengths and inclinations of lines and planes using the rotating line and rotating object methods.

CO3 Project simple solids with inclined axes using rotating object method.

CO4 Demonstrate proficiency in sectioning solids with inclined cutting planes and developing lateral surfaces of various solids, and also obtaining true shapes of sections and surface developments.

CO5 Draw isometric projections of simple and truncated solids using isometric scales and apply visualization principles to represent 3D objects accurately through freehand techniques.

TEXT BOOKS:

1. Bhatt N.D. and Panchal V.M., "Engineering Drawing", Charotar Publishing House, 53rd Edition, 2019.
2. Natrajan K.V., "A Text Book of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 2018.
3. Parthasarathy, N. S. and Vela Murali, "Engineering Drawing", Oxford University Press, 2015

REFERENCES:

1. Basant Agarwal and Agarwal C.M.,"Engineering Drawing", McGraw Hill, 2nd Edition, 2019.
2. Gopalakrishna K.R., "Engineering Drawing" (Vol. I&II combined), Subhas Publications, Bangalore, 27th Edition, 2017.
3. Luzzader, Warren.J. and Duff, John M., "Fundamentals of Engineering Drawing with an introduction to Interactive Computer Graphics for Design and Production, Eastern Economy Edition, Prentice Hall of India Pvt. Ltd, New Delhi, 2005.

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

CO's	PO's											PSO's	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	3	2	2	1	1						2	1	3
2	3	3	2	1	1						2	1	3
3	3	2	2	1	1						2	1	3
4	3	3	2	1	1						2	1	3
5	3	2	3	1	1						2	2	3
Low (1) ; Medium (2) ; High (3)													

M. Chandra.
Course Coordinator

BoS Chairman/HoD

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24GE3152 **தமிழர் மரபு** **L T P C**
1 0 0 1

COURSE OBJECTIVES:

1. இந்திய மொழிக் குடும்பங்கள் பற்றிய அறிவை வழங்குதல், திராவிட மொழிகள் மற்றும் தமிழ் ஒரு செம்மொழியாக நிலை பெறுதல்.
2. பாறை ஓவியங்கள் முதல் நவீன சிற்பங்கள் வரை தமிழ் கலையை ஆய்வு செய்தல், அதன் வரலாற்று மற்றும் கலாச்சார சூழலைப் புரிந்துகொள்வது.
3. நாட்டுப்புறக் கலைகளை ஆராய்தல், தமிழ் கலாச்சாரம் மற்றும் சமூகத்தில் அவற்றின் பங்கைப் புரிந்துகொள்வது.
4. தமிழ் கல்வெட்டுகளின் வரலாறு மற்றும் பரிணாம வளர்ச்சியைப் புரிந்து கொள்ளுதல்
5. இந்திய சுதந்திரப் போராட்டத்தில் தமிழர்களின் பங்கை பகுப்பாய்வு செய்தல்.

அலகு I மொழி மற்றும் இலக்கியம் **3**

இந்திய மொழிக் குடும்பங்கள் - திராவிட மொழிகள் - தமிழ் ஒரு செம்மொழி -தமிழ் செவ்விலக்கியங்கள் – சங்க இலக்கியங்களில் அகவாழ்வு மற்றும் புறவாழ்வு - திருக்குறளில் மேலாண்மைக் கருத்துக்கள் - தமிழ் இலக்கிய வளர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசன் ஆகியோரின் பங்களிப்பு.

அலகு – II மரபு - பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை **3**

நடுகல் முதல் நவீன சிற்பங்கள் வரை - ஐம்பொன் சிலைகள்- பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினைப் பொருட்கள், பொம்மைகள் - சுடுமண் சிற்பங்கள் - குமரிமுனையில் திருவள்ளுவர் சிலை

அலகு– III நாட்டுப்புறக் கலைகள் மற்றும் வீர விளையாட்டுகள் **3**

தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான் கூத்து, ஒயிலாட்டம், தோல்பாவைக் கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம் - இசைக் கருவிகள் மிருதங்கம், பறை, வீணை, யாழ், தமிழர்களின் விளையாட்டுகள்.

அலகு – IV கல்வெட்டு மற்றும் தொல்லியல் **3**

கல்வெட்டின் வரலாறு உத்தரமேரூர் கல்வெட்டு – தேர்தல் முறைகள் - தஞ்சாவூர் பெருவுடையார் கோயில் கல்வெட்டு – தொல்லியல் என்றால் என்ன? அதன் பணி - தமிழர் நகரங்கள் ; பூம்புகார், கீழடி ,அரிக்காமேடு, ஆதிச்சநல்லூர்

அலகு – V இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு **3**

இந்திய விடுதலைப்போரில் தமிழர்களின் பங்கு - சமூக நீதி மற்றும் சமத்துவ இயக்கங்கள் -சுயமரியாதை இயக்கம்- பெண்கள் உரிமை மற்றும் சமூக எழுச்சி இயக்கம் - சமூக நீதிக்கான சட்டங்கள் – இடஒதுக்கீடு மற்றும் கல்வி வாய்ப்பு

TOTAL: 15 PERIODS

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24PH3051	ENGINEERING PHYSICS	L	T	P	C
		3	0	2	4

COURSE OBJECTIVES:

1. To make the students effectively achieve an understanding the basics of Properties of Matter and i applications.
2. To introduce the basics of optics and lasers and its applications.
3. To enable the students to gain knowledge of fiber optic technology and its applications.
4. Equipping the students to successfully understand the importance of Thermal properties.
5. To inculcate an idea of significance of nano structures, quantum confinement and ensuing nano device applications.

UNIT I PROPERTIES OF MATTER 9

Elasticity - Stress-strain diagram and its uses - Factors affecting elastic modulus - Torsional stress and deformations - Torsional pendulum: theory and experiment.

Bending of beams - Bending moment - Cantilever: theory and experiment- Uniform and non-uniform bending: theory and experiment.

UNIT – II OPTICS AND LASERS 9

Optics: Reflection and refraction of light waves – Total internal reflection – Interference – Theory of Air-wedge experiment.

LASER: Principle of Spontaneous emission and stimulated emission. Population inversion, pumping methods- Einstein's A and B coefficients: derivation. Types of Lasers - Semiconductor Laser-homojunction and heterojunction - Industrial applications of Laser.

UNIT – III FIBER OPTIC TECHNOLOGY 9

Principle and propagation of light - Numerical aperture and Acceptance angle - Types of optical fibers (material, refractive index, mode) - Fiber optic communication System - Block diagram – Fiber optic sensors – temperature and displacement – Endoscope.

UNIT – IV THERMAL PHYSICS 9

Transfer of heat energy – thermal expansion of solids and liquids –bimetallic strips - thermal conduction, convection and radiation– thermal conductivity - Lee's disc method: (theory only) - conduction through compound media (series and parallel) – thermal insulation – applications: refrigerators, ovens and solar water heaters.

UNIT – V NANO DEVICES 9

Introduction - quantum confinement – quantum structures: quantum wells, wires and dots — band gap of nanomaterials. Tunneling – Single electron phenomena: Coulomb blockade – resonant tunneling diode – single electron transistor - Carbon nanotubes: Properties and applications - Optics in quantum structures – quantum well laser.

TOTAL: 45 PERIODS

LIST OF EXPERIMENTS (Any 5)

1. Determination of rigidity modulus of wire and moment of inertia of the disc -Torsional pendulum.
2. Determination of Young's modulus by uniform bending method.
3. Determination of Young's modulus by non-uniform bending method.

4. Simple harmonic oscillations of cantilever and Find young's modulus of the bar.
5. Determination of thickness of a thin wire by using travelling microscope – Air wedge method.
6. Determination of wavelength of the Laser using grating.
7. Determination of Numerical aperture and acceptance angle of an optical fiber.

TOTAL: 30 PERIODS

TOTAL : 45+30 = 75 PERIODS

COURSE OUTCOMES:

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

CO1 Understand the importance of properties of matter, elastic behaviour and Bending moment of materials.

CO2 Demonstrate a strong foundational knowledge in optics and laser, the thickness of the thin materials by using interference concept.

CO3 Express their knowledge in fiber optic technology.

CO4 Understand the importance of thermal properties of materials.

CO5 Understand the basics of quantum structures and their applications.

TEXT BOOKS:

1. Bhattacharya D K and Poonam Tandon, "Engineering Physics", 2nd edition, Oxford University Press, Chennai, 2017
2. Marikani A, "Engineering Physics", 3rd edition, PHI publishers, Chennai, 2021.
3. Parag K. Lala, Quantum Computing: A Beginner's Introduction, McGraw-Hill Education (Indian Edition), 2020.
4. Gaur, R.K. & Gupta, S.L. "Engineering Physics". Dhanpat Rai Publishers, 2012.

REFERENCES:

1. Charles Kittel, Introduction to Solid State Physics, Wiley India Edition, 2019
2. V. V.Mitin, V.A. Kochelap and M.A.Stroscio, Introduction to Nanoelectronics, Cambridge Univ.Press, 2008
3. G.W. Hanson, Fundamentals of Nanoelectronics, Pearson Education (Indian Edition) 2009.
4. Y.B.Band and Y.Avishai, Quantum Mechanics with Applications to Nanotechnology and Information Science, Academic Press, 2013.

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

CO's	PO's											PSO's	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	3	1	2										
2	3	1	2										
3	3	1	2										
4	3	1	1										
5	3	1	1										
Low (1) ; Medium (2) ; High (3)													

Course Coordinator **BoS Chairman / HoD (S&H)**

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24GE3171 **PROGRAMMING IN C LABORATORY**

L	T	P	C
0	0	4	2

COURSE OBJECTIVES:

1. To familiarize with C programming constructs
2. To develop programs in C using basic constructs.
3. To develop programs in C using arrays.
4. To develop applications in C using strings, pointers, functions.
5. To develop applications in C using structures.
6. To develop applications in C using file processing.

LIST OF EXPERIMENTS:

1. I/O statements, operators, expressions
2. decision-making constructs: if-else, goto, switch-case, break-continue
3. Loops: for, while, do-while
4. Arrays: 1D and 2D
5. Strings: operations
6. Functions: call, return, passing parameters by (value, reference)
7. Recursion
8. Pointers: Pointers to functions, Pointers to Pointers
9. Structures: Nested Structures, Arrays of Structures
10. Files: reading and writing, file operations.

TOTAL:60 PERIODS

COURSE OUTCOMES:

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

CO1 Demonstrate knowledge on C programming constructs.
CO2 Develop programs in C using basic constructs
CO3 Develop programs in C using arrays.
CO4 Develop applications in C using strings, pointers, functions
CO5 Develop applications in C using structures.
CO6 Develop applications in C using file processing.

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

CO's	PO's											PSO's	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	1	3	3	1	1	1		2	1	2	2	2	2
2	2	3	3	2	1	1		2	1	2	2	2	3
3	2	2	2	1	1	2		2		2	2	2	2
4	2	2	2	2	1	2		3		3	3	3	2
5	2	2	3	2	3	2		3		3	3	3	3
6	2	2	3	2	1	2		2	1	2	2	2	2

Low (1) ; Medium (2) ; High (3)

COURSE COORDINATOR

BOS CHAIRMAN / HOD

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24ES3151	BASIC COMPUTING SKILLS FOR ENGINEERS	L	T	P	C
		0	0	2	1

COURSE OBJECTIVES:

1. Create and edit documents, spreadsheets, and presentations using MS Office.
2. Use advanced features like mail merge, data forms, and subtotalling in MS Excel
3. Design professional slides and presentations using MS PowerPoint.
4. Apply data analysis and visualization techniques using charts and graphs.
5. Use internet resources effectively and safely.

UNIT -I MS OFFICE **7**

Creating, editing, saving and printing text documents - Font and paragraph formatting - Simple character formatting - Inserting tables, smart art, page breaks - Using lists and styles - Working with images - Using Spelling and Grammar check - Understanding document properties - Mail Merge.

UNIT – II MS EXCEL **7**

Spreadsheet basics - Creating, editing, saving and printing spreadsheets - Working with functions & formulas - Modifying worksheets with color & autoformats - Graphically representing data : Charts & Graphs - Speeding data entry : Using Data Forms - Analyzing data : Data Menu, Subtotal, Filtering Data- Formatting worksheets - Securing & Protecting spreadsheets.

UNIT – III MS POWER POINT **8**

Opening, viewing, creating, and printing slides - Applying auto layouts Adding custom animation - Using slide transitions - Graphically representing data : Charts & Graphs - Creating Professional Slide for Presentation.

UNIT -IV INTERNET **8**

Understanding how to search/Google - bookmarking and Going to a specific website - Copy and paste Internet content into your word file and emails - Understanding social media platforms such as Facebook & Many more - learn with best practices.

TOTAL: 30 PERIODS

COURSE OUTCOMES

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

CO1	To create, edit, and format professional documents using MS Word.
CO2	To design, create, and manage spreadsheets using MS Excel for data analysis.
CO3	To create engaging presentations using MS PowerPoint with multimedia elements.
CO4	To effectively use internet resources, apply online safety practices, and leverage social media.

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

CO's	PO's											PSO's	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	2				3							3	
2	3	2	2	2	3							3	2
3			2		3							3	
4					3	2						3	

Low (1) ; Medium (2) ; High (3)

COURSE COORDINATOR

BOS CHAIRMAN/ HOD

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24GE3172	SOFT SKILLS I	L	T	P	C
		0	0	2	1

COURSE OBJECTIVES:

1. To build verbal competence by improving skills in verbal analogy, sentence structuring, error spotting, and contextual language use.
2. To develop effective listening and communication strategies by overcoming barriers and applying the principles of the 7C's of communication.
3. To enhance interpersonal skills through training in group decision-making, negotiation, and paralanguage for professional settings.
4. To foster personal and professional development through self-grooming, SWOT analysis, and effective communication etiquette.

UNIT I VERBAL COMPETENCE **10**

1. Verbal Analogy
2. Cloze Test
3. Corporate vocabulary

UNIT II EFFECTIVE COMMUNICATION **10**

1. Overcoming Communication Barriers
2. Body Language and its Etiquette
3. 7C's of Communication

UNIT III INTERPERSONAL SKILLS **10**

1. Group Decision Making
2. Negotiation Skills
3. Self-Grooming & SWOT analysis

TOTAL: 30 PERIODS

Course Coordinator

[D. Indumathi]
AP/Eng.

BoS Chairman / HoD (S&H)

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24HS3252	PROFESSIONAL ENGLISH	L	T	P	C
		2	0	0	2

COURSE OBJECTIVES:

1. Develop strategies and skills to augment their ability to read and comprehend engineering and technology texts.
2. Foster their ability to write convincing job applications and effective reports.
3. Develop their speaking skills to make technical presentations and participate in group discussions.
4. Strengthen their listening skill which will help them comprehend lectures and talks in their areas of specialization.

UNIT I APPLIED ENGLISH FOR TECHNICAL CONTEXTS 6

Listening: Listening to motivational speech-Speaking: Asking for and giving directions -Reading: Reading short technical texts from newspapers and magazines -Writing: Extended definitions, checklists, recommendation-Vocabulary Development: Technical vocabulary, abbreviations - Language Development: Mixed tenses

UNIT – II TECHNICAL DOCUMENTATION AND COMMUNICATION 6

Listening: Listening to TED talks-Speaking: Describing a process, narrating a story-Reading:Reading advertisements, summarizing -Writing: Interpreting charts, graphs, Formal Letters (Quotations, Clarification, Placing orders & Complaint letters)-Vocabulary-Development: Vocabulary used in formal letters/emails and reports -Language Development: British and American spelling, numerical adjectives.

UNIT – III INTEGRATED SKILLS FOR ACADEMIC ENGLISH PROFICIENCY 6

Listening: Listening to classroom lectures, commentaries Speaking: Oral presentations -Reading: User manuals, speed reading techniques-Writing: Process writing, Use of sequence words, Analytical essays and issue-based essays -Vocabulary Development: Sequence words, misspelled words-Language Development: Identifying different types of sentences

UNIT – IV JOB READINESS AND CAREER SKILLS 6

Listening: Listening to documentaries, listening to virtual interviews Speaking: Mock interview Reading: Reading for detailed comprehension Writing: Email writing, Job application- Résumé preparation, Vocabulary Development: Finding suitable synonyms, Paraphrasing Language Development: Clauses, If conditionals

UNIT – V REPORTS AND COLLABORATIVE SPEAKING 6

Listening: Listening to talks based on the profession -Speaking: Participating in a group discussion - Reading: Reading pictography-Writing: Writing reports- feasibility, Survey and Industrial reports -Vocabulary Development: one-word substitution-Language Development: Reported speech, Active and Passive voice, Impersonal passive

TOTAL: 30 PERIODS

COURSE OUTCOMES:

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

CO1 Develop listening skills effectively in both academic and professional settings.

CO2 Enhance speaking skills by engaging confidently in technical and professional discussions.

CO3 Practice and refine reading techniques to efficiently extract key information from academic and technical texts.

CO4 Gains expertise in writing various forms of academic and professional documents.

CO5 Expand corporate vocabulary and gain job readiness through career-oriented tasks.

TEXT BOOKS:

1. Tom Hutchinson and Alan Waters, English for Specific Purposes: A Learning-Centered Approach, Cambridge University Press, 2019.
2. Paul Emmerson, English for Careers: Business, Professional, and Technical English, Cambridge University Press, 2008.

REFERENCES:

1. Michael Swan, Practical English Usage, Oxford University Press, 2005.
2. Gerald J. Alred, Charles T. Brusaw, and Walter E. Oliu, The Handbook of Technical Writing, St. Martin's Press, 2018.
3. M. Ashraf Rizvi, Business Communication, Tata McGraw-Hill Education, 2010.
4. M. K. Murthy, English for Engineers and Technologists, Wiley, 2014.

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

CO's	PO's											PSO's	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	1	1	1	1	1	3	3	1	3		3		
2	1	1	1	1	1	3	3	1	3		3		
3	2	3	2	3	2	3	3	2	3	3	3		
4	2	3	2	3	2	3	3	2	3	3	3		
5	2	3	3	3		3	3	2	3		3		
Low (1) ; Medium (2) ; High (3)													

Course Coordinator

[D. INDUMATHI]
AP/Eng.

BoS Chairman / HoD (S&H)

24MA3251	STATISTICS AND NUMERICAL METHODS	L	T	P	C
		3	1	0	4

COURSE OBJECTIVES:

1. To provide the necessary basic concepts of a statistical hypothesis testing to understand problems occurring in engineering and technology.
2. To understand and apply statistical principles in designing experiments and analyzing data to draw meaningful conclusions.
3. To introduce the basic concepts of solving algebraic and transcendental equations.
4. To introduce the numerical techniques of interpolation in various intervals and numerical techniques of differentiation and integration which plays an important role in engineering and technology disciplines.
5. To acquaint the knowledge of various techniques and methods of solving ordinary differential equations

UNIT – I TESTING OF HYPOTHESIS **9+3**

Sampling distributions - Tests for single mean, proportion and difference of means (Large and small samples) – Tests for single variance and equality of variances – Chi square test for goodness of fit – Independence of attributes.

UNIT – II DESIGN OF EXPERIMENTS **9+3**

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

UNIT – III SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS **9+3**

Solution of algebraic and transcendental equations - Fixed point iteration method – Newton Raphson method- Solution of linear system of equations - Gauss elimination method – Pivoting - Gauss Jordan method – Iterative methods of Gauss Jacobi and Gauss Seidel - Eigenvalues of a matrix by Power method for symmetric matrices.

UNIT – IV INTERPOLATION, NUMERICAL DIFFERENTIATION AND NUMERICAL INTEGRATION **9+3**

Lagrange's and Newton's divided difference interpolations – Newton's forward and backward difference interpolation – Approximation of derivatives using interpolation polynomials – Numerical single and double integrations using Trapezoidal and Simpson's 1/3 rules.

UNIT – V NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS **9+3**

Single step methods: Taylor's series method - Euler's method - Modified Euler's method - Fourth order Runge-Kutta method for solving first order differential equations - Multi step methods: Milne's predictor corrector method for solving first order differential equations.

TOTAL: 45+15 PERIODS

COURSE OUTCOMES:

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

CO1 Apply the concept of testing of hypothesis for small and large samples in real life problems.

CO2 Apply the basic concepts of classifications of design of experiments in the field of agriculture.

CO3 Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.

CO4 Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.

CO5 Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.

TEXT BOOKS:

1. Grewal, B.S., and Grewal, J.S., "Numerical Methods in Engineering and Science", Khanna Publishers, 10th Edition, New Delhi, 2015.
2. Johnson, R.A., Miller, I and Freund J., "Miller and Freund's Probability and Statistics for Engineers", Pearson Education, Asia, 8th Edition, 2015.

REFERENCES:

1. Burden, R.L and Faires, J.D, "Numerical Analysis", 9th Edition, Cengage Learning, 2016.
2. Devore. J.L., "Probability and Statistics for Engineering and the Sciences", Cengage Learning, New Delhi, 8th Edition, 2014.
3. Gerald. C.F. and Wheatley. P.O. "Applied Numerical Analysis" Pearson Education, Asia, New Delhi, 7th Edition, 2007.
4. Gupta S.C. and Kapoor V. K., "Fundamentals of Mathematical Statistics", Sultan Chand & Sons, New Delhi, 12th Edition, 2020.
5. Spiegel. M.R., Schiller. J. and Srinivasan. R.A., "Schaum's Outlines on Probability and Statistics ", Tata McGraw Hill Edition, 4th Edition, 2012.
6. Walpole. R.E., Myers. R.H., Myers. S.L. and Ye. K., "Probability and Statistics for Engineers and Scientists", 9th Edition, Pearson Education, Asia, 2010.

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

CO's	PO's											PSO's	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	3	3	1	1				2		2	3		
2	3	3	1	1				2		2	3		
3	3	3	1	1				2		2	3		
4	3	3	1	1				2		2	3		
5	3	3	1	1				2		2	3		
Low (1) ; Medium (2) ; High (3)													

Course Coordinator

BOS Chairman/ HoD(S&H)

24GE3052	PROBLEM SOLVING AND PYTHON PROGRAMMING	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

1. To understand the basics of algorithmic problem solving.
2. To learn to solve problems using Python conditionals and loops.
3. To define Python functions and use function calls to solve problems.
4. To use Python data structures - lists, tuples, dictionaries to represent complex data.
5. To do input/output with files in Python.

UNIT I COMPUTATIONALTHINKING AND PROBLEM SOLVING 9

Fundamentals of Computing – Identification of Computational Problems -Algorithms, building blocks of algorithms (statements, state, control flow, functions), notation (pseudo code, flow chart, programming language), simple strategies for developing algorithms (iteration, recursion) tower of Hanoi.

UNIT – II DATATYPE, EXPRESSIONS, CONDITIONS 9

Python interpreter and interactive mode, debugging; values and types: int, float, boolean, string and list; variables, expressions, statements, precedence of operators, comments, Conditionals: Boolean values and operators, conditional (if), alternative (if-else),chained conditional (if-elif-else)

UNIT – III CONTROL FLOW, FUNCTIONS, STRINGS 9

Iteration: state, while, for, break, continue, pass; Fruitful functions: return values, parameters, local and global scope, function composition, recursion; Strings: string slices, immutability, string functions and methods, string module.

UNIT – IV LISTS, TUPLES, DICTIONARIES 9

Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters; Tuples: operations and methods, tuple assignment, Dictionaries: operations and methods; advanced list processing.

UNIT – V FILES, MODULES, PACKAGES AND LIBRARIES 9

Files and exceptions: text files, reading and writing files, command line arguments, errors and exceptions, handling exceptions, modules, packages; NumPy and Pandas-Introduction, data frames, data handling.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

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

CO1 Develop algorithmic solutions to simple computational problems.
CO2 Develop and execute simple Python programs using condition.
CO3 Decompose a Python program into functions and execute simple program using functions.
CO4 Represent compound data using Python lists, tuples, dictionaries etc.
CO5 Read and write data from/to files in Python programs.

TEXT BOOKS:

1. Allen B. Downey, "Think Python: How to Think like a Computer Scientist", 2nd Edition, O'Reilly Publishers, 2016.
2. Karl Beecher, "Computational Thinking: A Beginner's Guide to Problem Solving and Programming", 1st Edition, BCS Learning & Development Limited, 2017.

REFERENCES:

1. Paul Deitel and Harvey Deitel, "Python for Programmers", Pearson Education, 1st Edition, 2021.
2. G Venkatesh and Madhavan Mukund, "Computational Thinking: A Primer for Programmers and Data Scientists", 1st Edition, Notion Press, 2021.
3. John VGuttag,"Introduction to Computation and Programming Using Python: With Applications to Computational Modeling and Understanding Data", Third Edition, MIT Press, 2021
4. Eric Matthes, "Python Crash Course, A Hands - on Project Based Introduction to Programming", 2nd Edition, No Starch Press, 2019.

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

COs	POs											PSOs	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	3	3	3	3	2					2	2	3	3
2	3	3	3	3	2					2	2	3	
3	3	3		3	2					2		3	
4	2	2		2	2					1		3	
5	1	2			1					1		2	
Low (1) ; Medium (2) ; High (3)													

COURSE COORDINATOR

BOS CHAIRMAN / HOD

SRI RANGANATHAR
INSTITUTE OF ENGINEERING AND TECHNOLOGY
(An Autonomous Institution)
(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai)
Athipalayam, Coimbatore - 641 110. website: sriet.ac.in, Ph: 0422 - 2697792

24BE3051	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

1. To introduce the basics of electric circuits and analysis.
2. To impart knowledge in the basics of working principles and application of electrical machines.
3. To introduce analog devices and their characteristics.
4. To educate on the fundamental concepts of digital electronics.
5. To introduce the functional elements and working of measuring instruments.

UNIT – I ELECTRICAL CIRCUITS 9

DC Circuits: Circuit Components: Conductor, Resistor, Inductor, Capacitor – Ohm's Law - Kirchhoff's Laws — Simple problems, Mesh analysis with independent sources only (Steady state) Introduction to AC Circuits and Parameters: Waveforms, Average value, RMS Value, Instantaneous power, real power, reactive power and apparent power, power factor – Steady state analysis of RLC circuits (Simple problems only)

.

UNIT – II ELECTRICAL MACHINES 9

Construction and Working principle- DC Separately and Self excited Generators, EMF equation, Types and Applications. Working Principle of DC motors, Torque Equation, Types and Applications. Construction, working principle and Applications of Transformer (single phase), Three Phase Induction Motor.

UNIT – III ANALOG ELECTRONICS 9

Resistor, Inductor and Capacitor in Electronic Circuits- PN Junction Diodes, Zener Diode Characteristics Applications Bipolar Junction Transistor-Biasing, JFET, SCR, MOSFET, IGBT Types, I-V Characteristics and Applications.

UNIT – IV DIGITAL ELECTRONICS 9

Review of number systems, binary codes, Combinational logic - representation of logic functions-SOP and POS forms, K-map representations -minimization using K maps (Simple Problems only).

UNIT – V MEASUREMENTS AND INSTRUMENTATION 9

Functional elements of an instrument, Standards and calibration, Operating Principle, types - Moving Coil and Moving Iron meters, Measurement of three phase power, Energy Meter, Instrument Transformers-CT and PT, DSO- Block diagram.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

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

CO1 Compute the electric circuit parameters for simple problems.
CO2 Explain the working principle and applications of electrical machines.
CO3 Analyze the characteristics of Analog electronic devices.
CO4 Explain the basic concepts of digital electronics.
CO5 Explain the operating principles of measurement instruments.

TEXT BOOKS:

1. Kothari DP and I.J Nagrath, "Basic Electrical and Electronics Engineering", Second Edition, McGraw Hill Education, 2020.
2. S.K. Bhattacharya "Basic Electrical and Electronics Engineering", Pearson Education, Second Edition, 2017.
3. Sedha R.S., "A text book book of Applied Electronics", S. Chand & Co., 2008.
4. James A. Svoboda, Richard C. Dorf, "Dorf's Introduction to Electric Circuits", Wiley, 2018.
5. A.K. Sawhney, Puneet Sawhney 'A Course in Electrical & Electronic Measurements & Instrumentation', Dhanpat Rai and Co, 2015.

REFERENCES:

1. Kothari DP and I.J Nagrath, "Basic Electrical Engineering", Fourth Edition, McGraw Hill Education, 2019.
2. Thomas L. Floyd, 'Digital Fundamentals', 11th Edition, Pearson Education, 2017.
3. Albert Malvino, David Bates, 'Electronic Principles, McGraw Hill Education; 7th edition, 2017.
4. Mahmood Nahvi and Joseph A. Edminister, "Electric Circuits", Schaum' Outline Series, McGraw Hill, 2002.
5. H.S. Kalsi, 'Electronic Instrumentation', Tata McGraw-Hill, New Delhi, 2010.

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

CO's	PO's											PSO's	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	3	3	3	2	2	2	1	1	1	1	3	3	3
2	3	2	2	2	2	2	1	1	1	1	2	2	3
3	3	3	3	1	2	2	1	1	1	1	2	3	3
4	3	3	2	2	2	2	1	1	1	1	2	2	3
5	3	2	3	2	2	2	1	1	1	1	2	3	3
Low (1) ; Medium (2) ; High (3)													

Course Coordinator

BOS Chairman/HOD

SRI RANGANATHAR
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24GE3252	தமிழர் தொழில்நுட்பம்	L	T	P	C
		1	0	0	1

COURSE OBJECTIVES:

1. பண்டைய தமிழரின் தொழில்நுட்பத் திறன்கள் பற்றி அறிதல்.
2. வழிபாட்டு கட்டிடக் கலையின் பரிணாம வளர்ச்சியை அறிதல்.
3. பண்டைய உற்பத்தி நுட்பங்களை மதிப்பீடு செய்தல்.
4. வேளாண்மை மற்றும் நீர்ப்பாசன முறைகளின் நவீன முன்னோடிகளைக் கண்டறிதல்.
5. தமிழில் அறிவியல் மற்றும் கணினி நுட்பங்களை அறிந்து பயன்படுத்து திறன் வளர்த்தல்.

அலகு I நெசவு மற்றும் பானை தொழில் நுட்பம் **3**

சங்க காலத்தில் நெசவுத் தொழில் – பானை தொழில் நுட்பம் - கருப்பு மற்றும் சிவப்புப் மட்பாண்டங்கள்.

அலகு – II வடிவமைப்பு மற்றும் கட்டுமான தொழில் நுட்பம் **3**

சங்க காலத்தில் வீட்டு வடிவமைப்புகள் - சங்க கால கட்டுமானப் பொருட்கள் - மாமல்லபுரத்தின் சிற்பங்கள் மற்றும் கோயில்கள் - சோழர்களின் பெரிய கோயில்கள் மற்றும் பிற வழிபாட்டுத் தலங்கள் - நாயக்கர் கால கோயில்கள் - செட்டி நாட்டு வீடுகள்.

அலகு– III உற்பத்தி தொழில்நுட்பம் **3**

கப்பல் கட்டும் கலை - இரும்புத் தொழில் - இரும்பு உருக்குதல் - செம்பு மற்றும் தங்க நாணயங்கள் - மணிகள் தயாரிக்கும் தொழில்கள் - கல் மணிகள் – கண்ணாடி மணிகள் - ஓடு மணிகள் - எலும்பு மணிகள்.

அலகு – IV வேளாண்மை மற்றும் நீர்ப்பாசன தொழில்நுட்பம் **3**

அணை, குளம், குளங்கள், மதகு, சோழர் கால குமிழி தூம்புவின் முக்கியத்துவம், கால்நடை பராமரிப்பு - விவசாயம் மற்றும் வேளாண்மை சார்ந்த செயல்பாடுகள் - கடல் பற்றிய அறிவு – மீன்பிடித்தல் - முத்து மற்றும் முத்துக்குளித்தல்.

அலகு -V அறிவியல் தமிழ மற்றும தமிழ்கணினி **3**

அறிவியல் தமிழ் வளர்ச்சி – தமிழ் கணினிமயமாக்கல் - தமிழில் இணையம் மற்றும் தகவல் தொடர்பு சாதனங்கள் -தமிழ் எழுதும் எழுத்துருக்கள் - தமிழில் தொழில்நுட்ப சொற்கள் - தமிழ் இணையக் கல்விக்கழகம்– தமிழ் மின் நூலகம்- மின் இதழ்கள்.

TOTAL: 15 PERIODS

24GE3252	TAMILS AND TECHNOLOGY	L	T	P	C
		1	0	0	1

COURSE OBJECTIVES:

1. To understand the technological skills of the ancient Tamils.
2. To study the evolutionary development of temple architecture.
3. To evaluate ancient production techniques.
4. To identify the ancient precedents of modern agricultural and irrigation practices.
5. To develop the ability to understand and use scientific and computer technologies in Tamil.

UNIT I WEAVING AND CERAMIC TECHNOLOGY 3

Weaving Industry during Sangam Age – Ceramic technology – Black and Red Ware Potteries (BRW) – Graffiti on Potteries.

UNIT – II DESIGN AND CONSTRUCTION TECHNOLOGY 3

Designing and Structural construction House & Designs in household materials during Sangam Age - Sculptures and Temples of Mamallapuram - Great Temples of Cholas and other worship places - Temples of Nayaka Period - Chetti Nadu Houses,

UNIT – III MANUFACTURING TECHNOLOGY 3

. Art of Ship Building - Iron industry - Iron smelting,steel -Copper and goldCoins as source of history - Minting of Coins – Beads making-industries Stone beads -Glass beads - Terracotta beads - Shell beads/ bone beats.

UNIT – IV AGRICULTURE AND IRRIGATION TECHNOLOGY 3

Dam, Tank, ponds, Sluice, Significance of Kumizhi Thoompu of Chola Period, Animal Husbandry - Agriculture and Agro Processing - Knowledge of Sea - Fisheries – Pearl - Conche diving .

UNIT – V SCIENTIFIC TAMIL & TAMIL COMPUTING 3

Development of Scientific Tamil - Tamil computing – Digitalization of Tamil Books – Tamil Digital Library – Internet and Information Communication Devices in Tamil – Tamil Writing Fonts – Technical Terms in Tamil – Tamil Virtual Academy – Tamil E-Library.

பாடநூல் / TEXT BOOKS:

1. தமிழக வரலாறு மக்களும் பண்பாடும் கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்.
2. கணினித் தமிழ் -முனைவர் இல, சுந்தரம், (விகடன் பிரசுரம்).
3. கீழடி வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. பொருநை ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு)
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL-(in print)
6. Social Life of the Tamils The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).

பார்வை நூல் : REFERENCES:

1. The Contributions of the Tamils to Indian Culture (Dr.M. Valarmathi) (Published by: International Institute of Tamil Studies).
2. Keeladi - 'Sangam City Civilization on the banks of river Vaigai (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu) Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author).
3. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
4. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) - Reference Book.

Course Coordinator

BoS Chairman / HoD (S&H)

24CY3051	ENGINEERING CHEMISTRY	L	T	P	C
		3	0	2	4

COURSE OBJECTIVES:

1. To inculcate sound understanding of water quality parameters and sample analysis methodologies.
2. To impart knowledge on the basic principles and preparatory methods of nanomaterials.
3. To introduce the basic concepts and applications of phase rule and alloys.
4. To familiarize the students with the operating principles, working processes and applications of energy conversion and storage devices.
5. To make students understand the fundamentals of polymer chemistry.

UNIT I WATER TREATEMENT & ANALYSIS **9**

Water: Sources and impurities, Water quality parameters, Boiler troubles: Scale and sludge, Boiler corrosion, Caustic embrittlement, Priming & Foaming. Desalination of brackish water: Reverse Osmosis Treatment of boiler feed water: Internal treatment (phosphate, colloidal, sodium aluminate and calgon conditioning) and External treatment – Ion exchange demineralization.

UNIT – II NANOCHEMISTRY **9**

Basics: Distinction between molecules, nanomaterials and bulk materials. Types of nanomaterials: definition, properties and uses of nanorods, nanowire and nanotube .Properties of nanomaterials (optical, electrical, mechanical and magnetic). Preparation of nanomaterials: Laser ablation, electrochemical deposition and electro spinning. Applications of nanomaterials in medicine, agriculture, energy, electronics and catalysis.

UNIT – III PHASE RULE AND ALLOYS **9**

Phase rule: Introduction, Terms. One component system – water system; Reduced phase rule; Construction of a simple eutectic phase diagram - Two component system: lead-silver system, Alloys: Introduction- Definition- properties of alloys- significance of alloying, functions and effect of alloying elements- Nichrome and stainless steel (18/8) – heat treatment of steel.

UNIT – IV ENERGY SOURCES AND STORAGE DEVICES **9**

Nuclear energy: light water nuclear power plant, breeder reactor. Solar energy conversion - Recent developments in solar cell materials. Geothermal energy; Batteries: Types of batteries, Primary battery – dry cell, Secondary battery – lead acid battery and lithium-ion battery; Electric vehicles – working principles; Fuel cells: H_2-O_2 fuel cell.

UNIT – V POLYMER CHEMISTRY **9**

Introduction: Classification of polymers – Natural and synthetic; Thermoplastic and Thermosetting. Functionality – Degree of polymerization. Types and mechanism of polymerization: Addition (Free Radical, cationic and anionic); condensation and copolymerization. Preparation, properties and uses of Nylon 6,6, and Epoxy resin.

TOTAL: 45 PERIODS

LIST OF EXPERIMENTS

1. Preparation of Na_2CO_3 as a primary standard and estimation of acidity of a water sample using the primary standard.
2. Determination of total, temporary & permanent hardness of water by EDTA method.
3. Determination of chloride content of water sample by Argentometric method.
4. Determination of strength of given hydrochloric acid using pH meter.
5. Synthesis of ZnO nanoparticles.

TOTAL : 30 PERIODS

TOTAL : 45+30 = 75 PERIODS

COURSE OUTCOMES:

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

CO1 To give proper water treatment methods for analysing the acid, hardness, chloride and the pH metry methodology.

CO2 To recognize and use fundamental ideas in nanoscience and nanotechnology when planning the synthesis of nanomaterials for engineering and technological use.

CO3 To utilize the phase rule and alloys expertise to work for the needs of material selection.

CO4 To identify various energy resource types and use them for proper uses in the energy sector.

CO5 To educate students the fundamentals of polymer chemistry.

TEXT BOOKS:

1. P. C. Jain and Monica Jain, "Engineering Chemistry", 17th Edition, Dhanpat Rai Publishing Company (P) Ltd, New Delhi, 2018.
2. Sivasankar B., "Engineering Chemistry", Tata McGraw-Hill Publishing Company Ltd, New Delhi, 2008.
3. S.S. Dara, "A Text book of Engineering Chemistry", S. Chand Publishing, 12th Edition, 2018.
4. O.G. Palanna, "Engineering Chemistry" McGraw Hill Education (India) Private Limited, 2nd Edition, 2017.

REFERENCES:

1. B. S. Murty, P. Shankar, Baldev Raj, B. B. Rath and James Murday, "Text book of nanoscience and nanotechnology", Universities Press-IIM Series in Metallurgy and Materials Science, 2018.
2. T. Pradeep, "Nano: The Essentials: Understanding Nano science and Nano technology", (2008) Tata McGraw-Hill Publishing Company Limited, New Delhi.
3. B.R.Puri, L.R.Sharma, M.S.Pathania.,"Principles of Physical Chemistry", Vishal Publishing Company, 2008.
4. O.V. Roussak and H.D. Gesser, Applied Chemistry-A Text Book for Engineers and Technologists, Springer Science Business Media, New York, 2nd Edition, 2013.

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

CO's	PO's											PSO's	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	3	2	2	2		1		2			1		
2	2	1	1	1		2		1			1		
3	3	1	1	1		1		1			1		
4	3	1	1	1		2		1			1		
5	3	1	2	1		2		2			2		
Low (1) ; Medium (2) ; High (3)													

Course Coordinator

BoS Chairman / HoD (S&H)

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24GE3072	PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY	L	T	P	C
		0	0	4	2

COURSE OBJECTIVES:

1. To understand the problem solving approaches.
2. To learn the basic programming constructs in Python.
3. To practice various computing strategies for Python-based solutions to real world problems.
4. To use Python data structures - lists, tuples, dictionaries.
5. To do input/output with files in Python.

LIST OF EXPERIMENTS:

1. Identification and solving of simple real life or scientific or technical problems, and developing flow charts for the same. (Electricity Billing, Retail shop billing, compute Electrical Current in Three Phase AC Circuit, etc.)
2. Python programming using simple statements and expressions (exchange the values of two variables, circulate the values of n variables, distance between two points).
3. Scientific problems using Conditionals and Iterative loops. (Number series, Number Patterns, pyramid pattern)
4. Implementing real-time/technical applications using Lists, Tuples. (Items present in a library/Components of a car/ Materials required for construction of a building – operations of list & tuples).
5. Implementing real-time/technical applications using Sets, Dictionaries. (Language, components of an automobile, Elements of a civil structure, etc.- operations of Sets & Dictionaries)
6. Implementing programs using Functions. (Factorial, largest number in a list, area of shape)
7. Implementing programs using Strings. (reverse, palindrome, character count)
8. Implementing programs using written modules and Python Standard Libraries pandas, numpy. Matplotlib)
9. Implementing real-time/technical applications using File handling. (copy from one file to another, word count, longest word)
10. Implementing real-time/technical applications using Exception handling. (divide by zero error, voter's age validity, student mark range validation).

TOTAL:60 PERIODS

COURSE OUTCOMES:

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

CO1	Develop algorithmic solutions to simple computational problems.
CO2	Develop and execute simple Python programs
CO3	Implement programs in Python using conditionals and loops for solving problems.
CO4	Deploy functions to decompose a Python program
CO5	Process compound data using Python data structures.

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

CO's	PO's											PSO's	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	3	3	3	3	2					2	2	3	3
2	3	3	3	3	2					2	2	3	
3	3	3	3	3	2					2		3	
4	2	2		2	2					1		3	
5	1	2			1					1		2	
Low (1) ; Medium (2) ; High (3)													

COURSE COORDINATOR

BOS CHAIRMAN / HOD

24GE3071	ENGINEERING PRACTICES LABORATORY	L	T	P	C
		0	0	4	2

COURSE OBJECTIVES:

1. Drawing pipe line plan; laying and connecting various pipe fittings used in common household plumbing work; Sawing; planning; making joints in wood materials used in common household.
2. Wiring various electrical joints in common household electrical wire work.
3. Welding various joints in steel plates using arc welding work; Machining various simple processes like turning, drilling, tapping in parts; Assembling simple mechanical assembly of common household equipment's; Making a tray out of metal sheet using sheet metal work.
4. Soldering and testing simple electronic circuits; Assembling and testing simple electronic components on PCB.

PART I **GROUP – A (CIVIL & ELECTRICAL)**

CIVIL ENGINEERING PRACTICES **15**

PLUMBING WORK:

1. Connecting various basic pipe fittings like valves, taps, coupling, unions, reducers,elbows and other components which are commonly used in household.
2. Preparing plumbing line sketches.
3. Laying pipe connection to the suction side of a pump
4. Laying pipe connection to the delivery side of a pump.
5. Connecting pipes of different materials: Metal, plastic and flexible pipes used in household appliances

WOOD WORK:

1. Sawing,
2. Planing and
3. Making joints like T-Joint, Mortise joint and Tenon joint and Dovetail joint.

PART II **ELECTRICAL ENGINEERING PRACTICES** **15**

1. Introduction to switches, fuses, indicators and lamps - Basic switch board wiring with lamp, fan and three pin socket
2. Staircase wiring
3. Fluorescent Lamp wiring with introduction to CFL and LED types.
4. Energy meter wiring and related calculations/ calibration
5. Study of Iron Box wiring and assembly
6. Study of Fan Regulator (Resistor type and Electronic type using Diac/Triac/quadrac)
7. Study of emergency lamp wiring/Water heater

GROUP – B (MECHANICAL AND ELECTRONICS)

PART III **MECHANICAL ENGINEERING PRACTICES** **15**

WELDING WORK:

1. Welding of Butt Joints, Lap Joints, and Tee Joints using arc welding.
2. Practicing gas welding.

BASIC MACHINING WORK:

1. (simple)Turning.
2. (simple)Drilling.

3. (simple)Tapping.

SHEET METAL WORK:

1. Making of a square tray

PART IV ELECTRONIC ENGINEERING PRACTICES 15

SOLDERING WORK:

1. Soldering simple electronic circuits and checking continuity.

ELECTRONIC ASSEMBLY AND TESTING WORK:

1. Assembling and testing electronic components on a small PCB.

ELECTRONIC EQUIPMENT STUDY:

1. Study an element of smart phone.
2. Assembly and dismantle of LED TV.

TOTAL: 60 PERIODS

OUTCOMES:

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

CO1 Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household wood work.

CO2 Wire various electrical joints in common household electrical wire work.

CO3 Weld various joints in steel plates using arc welding work;.

CO4 Machine various simple processes like turning, drilling, tapping in parts; Make a tray out of metal sheet using sheet metal work.

CO5 Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB.

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

CO's	PO's											PSO's	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	3	2	2		2					1	2	2	
2	3	2	2		2					1	2	2	
3	3	2	2		2					1	2	2	
4	3	2	2		2					1	2	2	
5	3	2	2		2					1	2	2	
Low (1) ; Medium (2) ; High (3)													

Course Coordinator

BoS Chairman/HoD

Chairman - Board of Studies
Department Of Mechanical Engineering
Sri Ranganathar Institute of Engineering and Technology
Coimbatore - 641 110.

24GE3272	SOFT SKILLS II	L	T	P	C
		0	0	2	1

COURSE OBJECTIVES:

1. To develop effective presentation skills through structured techniques, body language, and time management.
2. To enhance group discussion and public speaking abilities by fostering confidence, strategic thinking, and audience engagement.
3. To equip learners with essential interview skills, including preparation, etiquette, and handling various interview formats.
4. To improve professional communication and soft skills required for academic, corporate, and real-world scenarios.

UNIT I PRESENTATION SKILLS **10**

1. Presentation techniques
2. Virtual presentation
3. Public speaking

UNIT II GROUP DISCUSSION AND PUBLIC SPEAKING **10**

1. Introduction to Group Discussion
2. Group Discussion Strategies
3. Activities to improve GD skills

UNIT III INTERVIEW SKILLS **10**

1. Listening to Interviews
2. Interview Techniques and Etiquette
3. Online Interview Techniques

TOTAL: 30 PERIODS

Course Coordinator
(D. Indumathi)
AP/Eng.

BoS Chairman / HoD (S&H)

NCC Credit Course Level 1*

24NX3251	(ARMY WING) NCC Credit Course Level - I	L T P C 2 0 0 2
NCC GENERAL		**6**
NCC 1	Aims, Objectives & Organization of NCC	1
NCC 2	Incentives	2
NCC 3	Duties of NCC Cadet	1
NCC 4	NCC Camps: Types & Conduct	2
NATIONAL INTEGRATION AND AWARENESS		**4**
NI 1	National Integration: Importance & Necessity	1
NI 2	Factors Affecting National Integration	1
NI 3	Unity in Diversity & Role of NCC in Nation Building	1
NI 4	Threats to National Security	1
PERSONALITY DEVELOPMENT		**7**
PD 1	Self-Awareness, Empathy, Critical & Creative Thinking, Decision Making and Problem Solving	2
PD 2	Communication Skills	3
PD 3	Group Discussion: Stress & Emotions	2
LEADERSHIP		**5**
L 1	Leadership Capsule: Traits, Indicators, Motivation, Moral Values, Honour 'Code	3
L 2	Case Studies: Shivaji, Jhasi Ki Rani	2
SOCIAL SERVICE AND COMMUNITY DEVELOPMENT		**8**
SS 1	Basics, Rural Development Programmes, NGOs, Contribution of Youth	3
SS 4	Protection of Children and Women Safety	1
SS 5	Road / Rail Travel Safety	1
SS 6	New Initiatives	2
SS 7	Cyber and Mobile Security Awareness	1

TOTAL : 30 PERIODS

COURSE COORDINATOR

BOS CHAIRMAN

NCC Credit Course Level 1*

24NX3252	(NAVAL WING) NCC Credit Course Level - I	L	T	P	C
		2	0	0	2
NCC GENERAL					**6**
NCC 1	Aims, Objectives & Organization of NCC				1
NCC 2	Incentives				2
NCC 3	Duties of NCC Cadet				1
NCC 4	NCC Camps: Types & Conduct				2
NATIONAL INTEGRATION AND AWARENESS					**4**
NI 1	National Integration: Importance & Necessity				1
NI 2	Factors Affecting National Integration				1
NI 3	Unity in Diversity & Role of NCC in Nation Building				1
NI 4	Threats to National Security				1
PERSONALITY DEVELOPMENT					**7**
PD 1	Self-Awareness, Empathy, Critical & Creative Thinking, Decision Making and Problem-Solving				2
PD 2	Communication Skills				3
PD 3	Group Discussion: Stress & Emotions				2
LEADERSHIP					**5**
L 1	Leadership Capsule: Traits, Indicators, Motivation, Moral Values, Honour Code				3
L 2	Case Studies: Shivaji, Jhasi Ki Rani				2
SOCIAL SERVICE AND COMMUNITY DEVELOPMENT					**8**
SS 1	Basics, Rural Development Programmes, NGOs, Contribution of Youth				3
SS 4	Protection of Children and Women Safety				1
SS 5	Road / Rail Travel Safety				1
SS 6	New Initiatives				2
SS 7	Cyber and Mobile Security Awareness				1

TOTAL : 30 PERIODS

COURSE COORDINATOR

BOS CHAIRMAN

NCC Credit Course Level 1*

24NX3253	(AIR FORCE WING) NCC Credit Course Level - I	L	T	P	C
		2	0	0	2

NCC GENERAL		**6**
NCC 1	Aims, Objectives & Organization of NCC	1
NCC 2	Incentives	2
NCC 3	Duties of NCC Cadet	1
NCC 4	NCC Camps: Types & Conduct	2
NATIONAL INTEGRATION AND AWARENESS		**4**
NI 1	National Integration: Importance & Necessity	1
NI 2	Factors Affecting National Integration	1
NI 3	Unity in Diversity & Role of NCC in Nation Building	1
NI 4	Threats to National Security	1
PERSONALITY DEVELOPMENT		**7**
PD 1	Self-Awareness, Empathy, Critical & Creative Thinking, Decision Making and Problem Solving	2
PD 2	Communication Skills	3
PD 3	Group Discussion: Stress & Emotions	2
LEADERSHIP		**5**
L 1	Leadership Capsule: Traits, Indicators, Motivation, Moral Values, Honour Code	3
L 2	Case Studies: Shivaji, Jhasi Ki Rani	2
SOCIAL SERVICE AND COMMUNITY DEVELOPMENT		**8**
SS 1	Basics, Rural Development Programmes, NGOs, Contribution of Youth	3
SS 4	Protection of Children and Women Safety	1
SS 5	Road / Rail Travel Safety	1
SS 6	New Initiatives	2
SS 7	Cyber and Mobile Security Awareness	1

TOTAL : 30 PERIODS

COURSE COORDINATOR

BOS CHAIRMAN

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24MA3354	DISCRETE MATHEMATICS	L	T	P	C
		3	1	0	4

COURSE OBJECTIVES:

1. To extend student's logical and mathematical maturity and ability to deal with abstraction.
2. To introduce most of the basic terminologies used in computer science courses and application of ideas to solve practical problems.
3. To understand the basic concepts of combinatorics and graph theory.
4. To familiarize the applications of algebraic structures.
5. 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 – Proof methods and strategy.

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 – Generating functions – Inclusion and exclusion principle and its applications.

UNIT – III GRAPHS **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 – Homomorphism's – Normal subgroup and cosets – Lagrange's theorem – Definitions and examples of Rings and Fields.

UNIT – V LATTICES AND BOOLEAN ALGEBRA **9+3**

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

TOTAL: 45+15 PERIODS

COURSE OUTCOMES:

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

CO1 Understand program logic and testing concepts.
CO2 Apply counting principles.
CO3 Recognize functions mapping finite sets in computer science.
CO4 Identify structures at multiple levels.
CO5 Understand algebraic structures like groups, rings, and fields.

TEXT BOOKS:

1. Rosen. K.H., "Discrete Mathematics and its Applications", 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 McGraw Hill Pub. Co. Ltd, New Delhi, 30th Reprint, 2011.

REFERENCES:

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.

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

CO's	PO's											PSO's	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	3	3	2								2		
2	3	3											
3		3	2			2			3				
4		2	2	2									
5		2	2	2					2				
Low (1) ; Medium (2) ; High (3)													

Course Coordinator

BOS Chairman/ HoD(S&H)

24CS3352	COMPUTER ARCHITECTURE	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

1. To learn the basic structure and operations of a computer.
2. To learn the arithmetic and logic unit and implementation of fixed-point and floating point
3. To learn the basics of pipelined execution.
4. To understand the memory hierarchies, cache memories and virtual memories
5. To learn the different ways of communication with I/O devices.

UNIT – I BASIC STRUCTURE OF A COMPUTER SYSTEM **9**

Functional Units – Basic Operational Concepts – Performance – Instructions: Language of the Computer – Operations, Operands – Instruction representation – Logical operations – decision making – MIPS Addressing.

UNIT – II ARITHMETIC FOR COMPUTERS **9**

Addition and Subtraction – Multiplication – Division – Floating Point Representation – Floating Point Operations – Subword Parallelism..

UNIT – III PROCESSOR AND CONTROL UNIT **9**

A Basic MIPS implementation – Building a Datapath – Control Implementation Scheme – Pipelining – Pipelined datapath and control – Handling Data Hazards & Control Hazards – Exceptions.

UNIT – IV PARALLELISIM **9**

Parallel processing challenges – Flynn's classification – SISD, MIMD, SIMD, SPMD, and Vector Architectures - Hardware multithreading – Multi-core processors and other Shared Memory Multiprocessors - Introduction to Graphics Processing Units, Clusters, Warehouse Scale Computers and other Message-Passing Multiprocessors

UNIT – V MEMOERY &I/O SYSTEMS **9**

Memory Hierarchy - memory technologies – cache memory – measuring and improving cache performance – virtual memory, TLB's – Accessing I/O Devices – Interrupts – Direct Memory Access – Bus structure – Bus operation – Arbitration – Interface circuits - USB.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

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

CO1 Understand the basics structure of computers, operations and instructions
CO2 Design arithmetic and logic unit
CO3 Understand pipelined execution and design control unit
CO4 Understand parallel processing architectures
CO5 Understand the various memory systems and I/O communication

TEXT BOOKS:

1. David A. Patterson and John L. Hennessy, Computer Organization and Design: The Hardware/Software Interface, Fifth Edition, Morgan Kaufmann / Elsevier, 2014.
2. Carl Hamacher, Zvonko Vranesic, Safwat Zaky and Naraig Manjikian, Computer Organization and Embedded Systems, Sixth Edition, Tata McGraw Hill, 2012

REFERENCES:

1. William Stallings, Computer Organization and Architecture – Designing for Performance, Eighth Edition, Pearson Education, 2010.
2. John P. Hayes, Computer Architecture and Organization, Third Edition, Tata McGraw Hill, 2012.
3. John L. Hennessey and David A. Patterson, Computer Architecture – A Quantitative Approachl, Morgan Kaufmann / Elsevier Publishers, Fifth Edition, 2012

COs' – PO's & PSO's MAPPING

CO's	PO's											PSO's	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	2	1	1									2	
2	2	1	1									2	
3	3	2	2									2	2
4	2	1	1									2	
5	2	1	1									2	
Low (1) ; Medium (2) ; High (3)													

COURSE COORDINATOR

BOS CHAIRMAN / HOD

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24CS3301 **DATA STRUCTURES**

L	T	P	C
3	0	0	3

COURSE OBJECTIVES:

1. To understand the concepts of ADTs.
2. To learn linear data structures – lists, stacks, and queues.
3. To understand non-linear data structures – trees and graphs.
4. To apply Tree and Graph structures.
5. To understand sorting, searching and hashing algorithms.

UNIT – I LISTS **9**

Abstract Data Types (ADTs) – List ADT – Array-based implementation – Linked list implementation – Singly linked lists – Circularly linked lists – Doubly-linked lists – Applications of lists – Polynomial ADT – Radix Sort – Multilists.

UNIT – II STACKS AND QUEUES **9**

Stack ADT – Operations – Applications – Balancing Symbols – Evaluating arithmetic expressions- Infix to Postfix conversion – Function Calls – Queue ADT – Operations – Circular Queue – DeQueue – Applications of Queues

UNIT – III TREES **9**

Tree ADT – Tree Traversals - Binary Tree ADT – Expression trees – Binary Search Tree ADT – AVL Trees – Priority Queue (Heaps) – Binary Heap.

UNIT – IV MULTIWAY SEARCH TREES AND GRAPHS **9**

B-Tree – B+ Tree – Graph Definition – Representation of Graphs – Types of Graph - Breadth- first traversal – Depth-first traversal — Bi-connectivity – Euler circuits – Topological Sort – Dijkstra's algorithm – Minimum Spanning Tree – Prim's algorithm – Kruskal's algorithm.

UNIT – V SEARCHING, SORTING AND HASHING TECHNIQUES **9**

Searching – Linear Search – Binary Search. Sorting – Bubble sort – Selection sort – Insertion sort – Shell sort –. Merge Sort – Hashing – Hash Functions – Separate Chaining – Open Addressing – Rehashing – Extendible Hashing.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

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

CO1 Define linear and non-linear data structures.
CO2 Implement linear and non–linear data structure operations.
CO3 Use appropriate linear/non–linear data structure operations for solving a given problem.
CO4 Apply appropriate graph algorithms for graph applications.
CO5 Analyze the various searching and sorting algorithms.

TEXT BOOKS:

1. Mark Allen Weiss, Data Structures and Algorithm Analysis in C, 2nd Edition, Pearson Education, 2005.
2. Kamthane, Introduction to Data Structures in C, 1st Edition, Pearson Education, 2000.

REFERENCES:

1. Langsam, Augenstein and Tanenbaum, Data Structures Using C and C++, 2nd Edition, Pearson Education, 2015.
2. Thomas H. Cormen, Charles E. Leiserson, Ronald L.Rivest, Clifford Stein, Introduction to Algorithms", Fourth Edition, Mcgraw Hill/ MIT Press, 2022.
3. Alfred V. Aho, Jeffrey D. Ullman,John E. Hopcroft ,Data Structures and Algorithms, 1st edition, Pearson, 2002.
4. Kruse, Data Structures and Program Design in C, 2nd Edition, Pearson Education, 2006.

COs' – PO's & PSO's MAPPING

CO's	PO's											PSO's	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	2	3	1	2	2	1		1	2	1	3	2	1
2	1	2	1	2	2			1	1	1	2	2	2
3	2	3	1	2	3			1	1	1	2	2	1
4	2	1		1	1			2	1	1	2	2	3
5	1	2	1	2	2	1		1	2	1	3	2	2
Low (1) ; Medium (2) ; High (3)													

COURSE COORDINATOR

BOS CHAIRMAN / HOD

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24CS3391 OBJECT ORIENTED PROGRAMMING

L	T	P	C
3	0	0	3

COURSE OBJECTIVES:

1. To understand Object Oriented Programming concepts and basics of Java programming language.
2. To know the principles of packages, inheritance and interfaces.
3. To develop a java application with threads and generics classes.
4. To define exceptions and use I/O streams.
5. To design and build Graphical User Interface Application using JAVAFX.

UNIT – I INTRODUCTION TO OOP AND JAVA **9**

Overview of OOP – Object oriented programming paradigms – Features of Object-Oriented Programming – Java Buzzwords – Overview of Java – Data Types, Variables and Arrays – Operators – Control Statements – Programming Structures in Java – Defining classes in Java – Constructors-Methods -Access specifiers - Static members- Java Doc comments.

UNIT – II INHERITANCE, PACKAGES AND INTERFACES **9**

Overloading Methods – Objects as Parameters – Returning Objects –Static, Nested and Inner Classes. Inheritance: Basics– Types of Inheritance -Super keyword -Method Overriding –Dynamic Method Dispatch –Abstract Classes – final with Inheritance. Packages and Interfaces: Packages – Packages and Member Access –Importing Packages – Interfaces.

UNIT – III EXCEPTION HANDLING AND MULTITHREADING **9**

Exception Handling basics – Multiple catch Clauses – Nested try Statements – Java's Built-in Exceptions – User defined Exception. Multithreaded Programming: Java Thread Model– Creating a Thread and Multiple Threads – Priorities – Synchronization – Inter Thread Communication-Suspending –Resuming, and Stopping Threads –Multithreading. Wrappers – Auto boxing.

UNIT – IV I/O, GENERICS, STRING HANDLING **9**

I/O Basics – Reading and Writing Console I/O – Reading and Writing Files. Generics: Generic Programming – Generic classes – Generic Methods – Bounded Types – Restrictions and Limitations. Strings: Basic String class, methods and String Buffer Class.

UNIT – V JAVAFX EVENT HANDLING, CONTROLS AND COMPONENTS **9**

JAVAFX Events and Controls: Event Basics – Handling Key and Mouse Events. Controls: Checkbox, ToggleButton – RadioButtons – ListView – ComboBox – ChoiceBox – Text Controls – ScrollPane. Layouts – FlowPane – HBox and VBox – BorderPane – StackPane – GridPane. Menus – Basics – Menu – Menu bars – MenuItem.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

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

CO1 Apply the concepts of classes and objects to solve simple problems.
CO2 Develop programs using inheritance, packages and interfaces.
CO3 Make use of exception handling mechanisms and multithreaded model to solve real world problems.

CO4 Build Java applications with I/O packages, string classes, Collections and generics concepts.

CO5 Integrate the concepts of event handling and JavaFX components and controls for developing GUI based applications.

TEXT BOOKS:

1. Herbert Schildt, "Java: The Complete Reference", 11th Edition, McGraw Hill Education, New Delhi, 2019.
2. Herbert Schildt, "Introducing JavaFX 8 Programming", 1st Edition, McGraw Hill Education, New Delhi, 2015.

REFERENCES:

1. Cay S. Horstmann, "Core Java Fundamentals", Volume 1, 11th Edition, Prentice Hall,2018.

COs' – PO's & PSO's MAPPING

CO's	PO's											PSO's	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	1	1	3	1	3			3	2	2	2	3	1
2	2	1	3	2	1			2	1	1	3	3	3
3	3	3	1	2	2			3	2	1	2	3	1
4	3	1	2	2	2			1	2	1	3	3	1
5	1	1	2	3	2			3	2	1	2	3	3
Low (1) ; Medium (2) ; High (3)													

COURSE COORDINATOR

BOS CHAIRMAN / HOD

SRI RANGANATHAR
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24CS3353 **SOFTWARE ENGINEERING**

L	T	P	C
3	0	0	3

COURSE OBJECTIVES:

1. To understand the phases in a software project.
2. To understand fundamental concepts of requirements engineering and Analysis Modeling.
3. To understand the various software design methodologies.
4. To learn various testing and maintenance measures.
5. To develop project schedule, estimate project cost and effort required

UNIT – I SOFTWARE PROCESS AND AGILE DEVELOPMENT **9**

Introduction to Software Engineering, Software Process, Perspective and Specialized Process Models – Introduction to Agility-Agile process-Extreme programming-XP Process.

UNIT – II REQUIREMENTS ANALYSIS AND SPECIFICATION **9**

Software Requirements: Functional and Non-Functional, User requirements, System requirements, Software Requirements Document – Requirement Engineering Process: Feasibility Studies, Requirements elicitation and analysis, requirements validation, requirements management Classical analysis: Structured system Analysis, Petri Nets- Data Dictionary.

UNIT – III SOFTWARE DESIGN **9**

Design process – Design Concepts-Design Model– Design Heuristic – Architectural Design Architectural styles, Architectural Design, Architectural Mapping using Data Flow- User Interface Design: Interface analysis, Interface Design –Component level Design: Designing Class based components, traditional Components.

UNIT – IV TESTING AND MAINTENANCE **9**

Software testing fundamentals-Internal and external views of Testing-white box testing - basis path testing-control structure testing-black box testing- Regression Testing – Unit Testing – Integration Testing – Validation Testing – System Testing and Debugging –Software Implementation Techniques: Coding practices-Refactoring-Maintenance and Reengineering- BPR model-Reengineering process model-Reverse and Forward Engineering.

UNIT – V PROJECT MANAGEMENT **9**

Software Project Management: Estimation – LOC, FP Based Estimation, Make/Buy Decision COCOMO I & II Model – Project Scheduling – Scheduling, Earned Value Analysis Planning – Project Plan, Planning Process, RFP Risk Management – Identification, Projection - Risk Management-Risk Identification-RMMM Plan-CASE TOOLS.

TOTAL:45 PERIODS

COURSE OUTCOMES:

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

CO1	Identify the key activities in managing a software project.
CO2	Concepts of requirements engineering and Analysis Modeling.
CO3	Apply systematic procedure for software design and deployment.
CO4	Compare and contrast the various testing and maintenance
CO5	Manage project schedule, estimate project cost and effort required

TEXT BOOKS:

1. Roger S. Pressman, "Software Engineering – A Practitioner"s Approach", Seventh Edition, Mc Graw-Hill International Edition, 2010.
2. Ian Sommerville, "Software Engineering", 9th Edition, Pearson Education Asia, 2011.

REFERENCES:

1. Rajib Mall, "Fundamentals of Software Engineering", Third Edition, PHI Learning PrivateLimited, 2009.
2. Pankaj Jalote, "Software Engineering, A Precise Approach", Wiley India, 2010.
3. Kelkar S.A., "Software Engineering", Prentice Hall of India Pvt Ltd, 2007
4. Stephen R.Schach, "Software Engineering", Tata McGraw-Hill Publishing Company Limited,2007.

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

CO's	PO's											PSO's	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	2	1	1									2	2
2	2	1	1									2	2
3	3	2	2									2	2
4	3	2	2									2	2
5	3	2	2									2	2
Low (1) ; Medium (2) ; High (3)													

COURSE COORDINATOR

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24CS3351 DIGITAL PRINCIPLES AND SYSTEM DESIGN

L	T	P	C
3	0	2	4

COURSE OBJECTIVES:

1. To understand and apply the fundamentals of number systems, Boolean algebra, and logic gates in the design of digital circuits.
2. To analyze and design combinational and sequential logic circuits, including adders, multiplexers, flip-flops, counters, and state machines using simplification techniques and HDL modeling.
3. To explore memory devices and implement programmable logic using PLA, PAL, and FPGA, including error detection and correction mechanisms.

UNIT – I BOOLEAN ALGEBRA AND LOGIC GATES **9**

Number Systems — Arithmetic Operations — Binary Codes- Boolean Algebra and Logic Gates — Theorems and Properties of Boolean Algebra — Boolean Functions — Canonical and Standard Forms — Simplification of Boolean Functions using Karnaugh Map — Logic Gates — NAND and NOR Implementations.

UNIT – II COMBINATIONAL LOGIC **9**

Combinational Circuits — Analysis and Design Procedures — Binary Adder-Subtractor — Decimal Adder — Binary Multiplier — Magnitude Comparator — Decoders — Encoders — Multiplexers — Introduction to HDL Models of Combinational circuits.

UNIT – III SYNCHRONOUS SEQUENTIAL LOGIC **9**

Sequential Circuits — Storage Elements: Flip-Flops — Analysis of Clocked Sequential Circuits — State Reduction— Design Procedure — Registers and Counters — Introduction to HDL Models of Sequential Circuits.

UNIT – IV ASYNCHRONOUS SEQUENTIAL LOGIC **9**

Differentiation of synchronous and Asynchronous Sequential Circuits — Analysis of Asynchronous Sequential Circuits — Design of Asynchronous Sequential Circuits — Reduction of State and Flow Tables — Cycles and Races — Hazards.

UNIT – V MEMORY AND PROGRAMMABLE LOGIC **9**

RAM — Memory Decoding — Error Detection and Correction — ROM — Programmable Logic Array — Programmable Array Logic — Programmable Logic Devices—FPGAs.

TOTAL: 45 PERIODS

PRACTICAL EXERCISES:

LIST OF EXPERIMENTS

1 Verification of Boolean Theorems using basic gates.
2. Design and implementation of combinational circuits using basic gates for arbitrary functions.
3. Implementation of 4-bit binary adder/subtractor circuits.
4. Implementation of code converters.
5. Implementation of encoder and decoder circuits.
6. Implementation of functions using Multiplexer and De-Multiplexer.
7. Implementation of the synchronous counters.
8. Implementation of Shift Register.

9. Study of combinational and sequential circuits using HDL Coding.

TOTAL: 30 PERIODS

TOTAL: 45+30=75 PERIODS

COURSE OUTCOMES:

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

CO1 Apply Boolean algebra, logic gate functions, and Karnaugh Map techniques to simplify and implement combinational logic circuits.

CO2 Analyse and design complex combinational and synchronous sequential circuits such as adders, encoders, counters, and shift registers using standard design methods and HDL modeling.

CO3 Evaluate asynchronous sequential circuits for stability by detecting and resolving race conditions, cycles, and hazards through flow table reduction and logic optimization.

CO4 Design and implement memory interfacing, error detection/correction logic, and programmable logic devices such as PLA, PAL, and FPGAs to solve real-world digital system problems.

CO5 Analyze and construct both combinational and sequential circuits using HDL, and implement them on simulation platforms or programmable devices like FPGAs and PLAs.

TEXT BOOKS:

1. "Digital Design with an Introduction to the Verilog", HDL, Pearson Education, 5th Edition M. Morris Mano and Michael D. Ciletti.
2. "Fundamentals of Digital Circuits", PHI Learning, 4th Edition, A. Anand Kumar.
3. "Digital Fundamentals", Pearson Education, 11th Edition, Thomas L. Floyd

REFERENCES:

1. "Digital Design: Principles and Practices", Pearson Education, 4th Edition, John F. Wakerly
2. "Fundamentals of Logic Design", Cengage Learning, 7th Edition Charles H. Roth Jr. and Larry L. Kinney,
3. "Digital Electronics: A Practical Approach with VHDL", Pearson, 9th Edition, William Kleitz,
4. "Digital Principles and Design", McGraw Hill, 1st Edition Donald D. Givone.

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

CO's	PO's											PSO's	
	1	2	3	4	5	6	7	8	9	10	11	1	2
CO 1	3	2	2	1								1	
CO 2	3	2	3	1								1	1
CO 3	2	3	2	1								1	
CO 4				3	3	2	2	2	2	1	1	1	
CO 5				3	3	3	2	3	3	2	2	1	

Low (1) ; Medium (2) ; High (3)

COURSE COORDINATOR

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24CS3381	OBJECT ORIENTED PROGRAMMING LABORATORY	L	T	P	C
		0	0	3	1.5

COURSE OBJECTIVES:

1. To build software development skills using java programming for real-world applications.
2. To understand and apply the concepts of classes, packages, interfaces, inheritance, exception handling and file processing.
3. To develop applications using generic programming and event handling.

LIST OF EXPERIMENTS

1. Solve problems by using sequential search, binary search, and quadratic sorting algorithms (selection, insertion)
2. Develop stack and queue data structures using classes and objects.
3. Develop a java application with an Employee class with Emp_name, Emp_id, Address, Mail_id, Mobile_no as members. Inherit the classes, Programmer, Assistant Professor, Associate Professor and Professor from employee class. Add Basic Pay (BP) as the member of all the inherited classes with 97% of BP as DA, 10 % of BP as HRA, 12% of BP as PF, 0.1% of BP for staff club funds. Generate pay slips for the employees with their gross and net salary.
4. Write a Java Program to create an abstract class named Shape that contains two integers and an empty method named printArea(). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method printArea( ) that prints the area of the given shape.
5. Solve the above problem using an interface.
6. Implement exception handling and creation of user defined exceptions.
7. Write a java program that implements a multi-threaded application that has three threads. First thread generates a random integer every 1 second and if the value is even, the second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of the cube of the number.
8. Write a program to perform file operations.
9. Develop applications to demonstrate the features of generics classes.
10. Develop applications using JavaFX controls, layouts and menus
11. Develop a mini project for any application using Java concepts.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

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

CO1 Design and develop java programs using object oriented programming concepts.
CO2 Develop simple applications using object oriented concepts such as package, exception.
CO3 Implement multithreading, and generics concepts.
CO4 Create GUIs and event driven programming applications for real world problems.
CO5 Implement and deploy web applications using Java.

COs' – PO's & PSO's MAPPING

CO's	PO's											PSO's	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	2	1	2	1				1	2	2	2	1	2
2	2	1	3	1				2	3	3	2	1	3
3	2	2	1	2	1			1	2	1	3	2	3
4	2	2	1	3				3	1	1	1	2	1
5	1	3	3	1	3			1	1	1	1	2	1
Low (1) ; Medium (2) ; High (3)													

COURSE COORDINATOR

BOS CHAIRMAN / HOD

24CS3311 DATA STRUCTURES LABORATORY

L	T	P	C
0	0	3	1.5

COURSE OBJECTIVES:

1. To demonstrate array implementation of linear data structure algorithms.
2. To implement the applications using stack.
3. To implement the applications using Linked list
4. To implement Binary search tree and AVL tree algorithms.
5. To implement the Heap algorithm.
6. To implement Dijkstra's algorithm.
7. To implement Prim's algorithm
8. To implement Sorting, Searching and Hashing algorithms.

LIST OF EXPERIMENTS

1. Array implementation of Stack, Queue and Circular Queue ADTs
2. Implementation of Singly Linked List
3. Linked list implementation of Stack and Linear Queue ADTs
4. Implementation of Polynomial Manipulation using Linked list
5. Implementation of Evaluating Postfix Expressions, Infix to Postfix conversion
6. Implementation of Binary Search Trees
7. Implementation of AVL Trees
8. Implementation of Heaps using Priority Queues
9. Implementation of Dijkstra's Algorithm
10. Implementation of Prim's Algorithm
11. Implementation of Linear Search and Binary Search
12. Implementation of Insertion Sort and Selection Sort
13. Implementation of Merge Sort
14. Implementation of Open Addressing (Linear Probing and Quadratic Probing)

TOTAL: 45 PERIODS

COURSE OUTCOMES:

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

CO1	Implement Linear data structure algorithms.
CO2	Implement applications using Stacks and Linked lists
CO3	Implement Binary Search tree and AVL tree operations.
CO4	Implement graph algorithms.
CO5	Analyse the various searching and sorting algorithms

COs' – PO's & PSO's MAPPING

CO's	PO's											PSO's	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	1	2	2	1				2	1	2	2	2	2
2	3	3	1	1				1	1	1	3	1	2
3	2	1	3	1				1	1	2	3	3	3
4	3	1	3	3				1	2	3	3	2	1
5	3	2	1	1	2			3	3	3	1	3	1
Low (1) ; Medium (2) ; High (3)													

COURSE COORDINATOR

BOS CHAIRMAN / HOD

24GE3361	ADVANCED LOGICAL THINKING	L	T	P	C
		0	0	2	1

COURSE DESCRIPTION:

This course aims to develop student's logical thinking skills to an advanced level. Students will explore various techniques and strategies to analyse, evaluate, and synthesize information effectively. Analyzing a situation or problem using a logical approach involves gathering all available information, assessing the facts and efficiently deciding the best course of action. Students strive to understand various topics deeply, enhance their memory skills and build greater understanding. They also apply their ideas effectively and thoroughly analyze any arising issues.

COURSE OBJECTIVES:

1. Enhance Critical thinking skills by solving programming logic problems involving permut and combinations.
2. Enhance the Decision making skills using different Possibilities through Probability
3. To develop the skills to analyze complex problems in Simple Solutions through Time Speed dis Concept.
4. Enhance the strategic thinking for Solving Real life problems using Mathematical Concepts.
5. Reinforce the Logical skills through Reasoning Puzzles.

UNIT – I INDUCTIVE REASONING THROUGH PERMUTATIONS & COMBINATION 6

Fundamental Principles of Counting: Permutations & Combination, Number Generation Fundamentals; Digit repeater concepts: All possible ways; Recursion and Backtracking: N step Problems, Chess oriented problems and Case Studies.

UNIT – II DECISION MAKING BASED ON PROBABILITY 6

Introduction to Probabilities, Application of Probability; Power of Compounding: Case Studies.

UNIT – III STRATEGICAL TECHNIQUES IN TIME, SPEED AND DISTANCE 6

Definition and Basics of Time, Speed and Distance; Relative speed: Problems based on T rains; Effective Speed: Problems based on Boats and Streams; Problems based on Races, Escalator problems; Case Studies.

UNIT – IV THE LOGICAL APPROACH TO MIXTURE AND ALLEGATION 6

Introduction to Mixtures: Multi variable mixing, Profit and Loss concept based on mixing; Liquid mixing concepts: Replacement problems and Repetitive iteration problems.

UNIT – V LOGICAL REASONING 6

Introduction to design of clocks; Formula creation: Speed clock and Slow clock problems; Angle calculation; Calendars design: Concept of odd days, Day of a date and Calendar repetition logic; Data Arrangements; Data Sufficiency; Directions; Number series and Puzzles.

TOTAL:30 PERIODS

REFERENCES:

1. Dr. R S Aggarwal, Quantitative Aptitude, Revised Edition, S.Chand Publishing Company Ltd(s), 2022
2. Arun Sharma, How to prepare for Quantitative Aptitude for the CAT, 10th Edition, Tata McGraw-Hill Publishing Company Ltd, 2022.

WEB REFERENCES:

1. https://www.hackerearth.com/
2. https://www.geeksforgeeks.org/
3. https://www.in
4. diabix.com/

COURSE COORDINATOR **BOS CHAIRMAN / HOD**

24CS3451 **OPERATING SYSTEMS**

L	T	P	C
3	0	0	3

COURSE OBJECTIVES:

1. To understand the basics and functions of operating systems.
2. To understand processes and threads
3. To analyze concept of deadlock and various memory management schemes
4. To be familiar with I/O management and file systems.
5. To be familiar with the basics of virtual machines and Mobile OS like iOS and Android.

UNIT – I INTRODUCTION **7**

Computer System - Elements and organization; Operating System Overview - Objectives and Functions - Evolution of Operating System; Operating System Structures – Operating System Services - User Operating System Interface - System Calls – System Programs - Design and Implementation - Structuring methods.

UNIT – II PROCESS MANAGEMENT **11**

Processes - Process Concept - Process Scheduling - Operations on Processes - Inter-process Communication; CPU Scheduling - Scheduling criteria - Scheduling algorithms: Threads - Multithread Models – Threading issues; Process Synchronization - The Critical-Section problem - Synchronization hardware – Semaphores – Mutex - Classical problems of synchronization - Monitors; Deadlock - Methods for handling deadlocks, Deadlock prevention, Deadlock avoidance, Deadlock detection, Recovery from deadlock.

UNIT – III MEMORY MANAGEMENT **10**

Main Memory - Swapping - Contiguous Memory Allocation – Paging - Structure of the Page Table - Segmentation, Segmentation with paging; Virtual Memory - Demand Paging – Copy on Write - Page Replacement - Allocation of Frames –Thrashing.

UNIT – IV STORAGE MANAGEMENT **10**

Mass Storage system – Disk Structure - Disk Scheduling and Management; File-System Interface - File concept - Access methods - Directory Structure - Directory organization - File system mounting - File Sharing and Protection; File System Implementation - File System Structure - Directory implementation - Allocation Methods - Free Space Management; I/O Systems – I/O Hardware, Application I/O interface, Kernel I/O subsystem.

UNIT – V VIRTUAL MACHINES AND MOBILE OS **7**

Virtual Machines – History, Benefits and Features, Building Blocks, Types of Virtual Machines and their Implementations, Virtualization and Operating-System Components; Mobile OS - iOS and Android.

TOTAL:45 PERIODS

COURSE OUTCOMES:

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

CO1 Analyze various scheduling algorithms and process synchronization.
CO2 Explain deadlock prevention and avoidance algorithms.
CO3 Compare and contrast various memory management schemes.
CO4 Explain the functionality of file systems, I/O systems, and Virtualization
CO5 Compare iOS and Android Operating Systems.

TEXT BOOKS:

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, "Operating System Concepts"l, 10th Edition, John Wiley and Sons Inc., 2018
2. Andrew S Tanenbaum, "Modern Operating Systems", Pearson, 5th Edition, 2022 New Delhi.

REFERENCES:

1. Achyut S.Godbole, Atul Kahate, "Operating Systems", McGraw Hill Education, 2016.
2. Ramaz Elmasri, A. Gil Carrick, David Levine, "Operating Systems – A Spiral Approach", Tata McGraw Hill Edition, 2010
3. William Stallings, "Operating Systems: Internals and Design Principles", 7th Edition, Prentice Hall, 2018.

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

CO's	PO's											PSO's	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	3	1	2	2				3	2	3	1	1	2
2	2	2	3	1	1			2	1	1	2	2	1
3	1	3	2	2	1			2	2	1	1	1	2
4	1	3	3	3				1	2	1	2	1	3
5	3	1	2	1	1			3	2	3	2	2	2
Low (1) ; Medium (2) ; High (3)													

COURSE COORDINATOR

BOS CHAIRMAN / HOD

24CS3452 **THEORY OF COMPUTATION**

L	T	P	C
3	0	0	3

COURSE OBJECTIVES:

1. To understand foundations of computation including automata theory
2. To construct models of regular expressions and languages.
3. To design context free grammar and push down automata
4. To understand Turing machines and their capability
5. To understand Undecidability and NP class problems

UNIT – I AUTOMATA AND REGULAR EXPRESSIONS **9**

Need for automata theory - Introduction to formal proof – Finite Automata (FA) Deterministic Finite Automata (DFA) – Non-deterministic Finite Automata (NFA) – Equivalence between NFA and DFA – Finite Automata with Epsilon transitions – Equivalence of NFA and DFA- Equivalence of NFAs with and without ε-moves- Conversion of NFA into DFA – Minimization of DFAs.

UNIT – II REGULAR EXPRESSIONS AND LANGUAGES **9**

Regular expression – Regular Languages- Equivalence of Finite Automata and regular expressions – Proving languages to be not regular (Pumping Lemma) – Closure properties of regular languages.

UNIT – III CONTEXT FREE GRAMMAR AND PUSH DOWN AUTOMATA **9**

Types of Grammar - Chomsky's hierarchy of languages -Context-Free Grammar (CFG) and Languages – Derivations and Parse trees – Ambiguity in grammars and languages – Push Down Automata (PDA): Definition – Moves - Instantaneous descriptions -Languages of pushdown automata – Equivalence of pushdown automata and CFG-CFG to PDA-PDA to CFG – Deterministic Pushdown Automata.

UNIT – IV NORMAL FORMS AND TURING MACHINE **9**

Normal forms for CFG – Simplification of CFG- Chomsky Normal Form (CNF) and Greibach Normal Form (GNF) – Pumping lemma for CFL – Closure properties of Context Free Languages –Turing Machine: Basic model – definition and representation – Instantaneous Description – Language acceptance by TM – TM as Computer of Integer functions – Programming techniques for Turing machines (subroutines).

UNIT – V UNDECIDABILITY **9**

Unsolvable Problems and Computable Functions –PCP-MPCP- Recursive and recursively enumerable languages – Properties - Universal Turing machine Tractable and Intractable problems - P and NP completeness – Kruskal's algorithm – Travelling Salesman Problem- 3-CNF SAT problems.

TOTAL:45 PERIODS

COURSE OUTCOMES:

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

CO1 Construct automata theory using Finite Automata
CO2 Write regular expressions for any pattern
CO3 Design context free grammar and Pushdown Automata
CO4 Design Turing machine for computational functions
CO5 Differentiate between decidable and undecidable problems

TEXT BOOKS:

1. Hopcroft J.E., Motwani R. & Ullman J.D., "Introduction to Automata Theory, Languages and Computations", 3rd Edition, Pearson Education, 2008.
2. John C Martin, "Introduction to Languages and the Theory of Computation", 4th Edition, Tata McGraw Hill, 2011.

REFERENCES:

1. Harry R Lewis and Christos H Papadimitriou, "Elements of the Theory of Computation", 2nd Edition, Prentice Hall of India, 2015.
2. Peter Linz, "An Introduction to Formal Language and Automata", 6th Edition, Jones & Bartlett, 2016.
3. K.L.P.Mishra and N.Chandrasekaran, "Theory of Computer Science: Automata Languages and Computation", 3rd Edition, Prentice Hall of India, 2006.

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

CO's	PO's											PSO's	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	1	3	2	3				1	1	2	3	1	3
2	2	2	3	2	1			3	3	2	3	3	1
3	2	2	3	2	1			1	3	1	2	1	2
4	2	2	2	1				1	3	3	2	1	3
5	2	2	2	1	1			1	1	3	2	3	1
Low (1) ; Medium (2) ; High (3)													

COURSE COORDINATOR **BOS CHAIRMAN / HOD**

24CS3492	DATABASE MANAGEMENT SYSTEMS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

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

UNIT – I RELATIONAL DATABASE 9

Purpose of Database System – Views of data – Data Models – Database System Architecture – Introduction to relational databases – Relational Model – Keys – Relational Algebra – SQL-fundamentals – Advanced SQL features – Embedded SQL– Dynamic SQL.

UNIT – II DATABASE DESIGN 9

Entity-Relationship model – E-R Diagrams – Enhanced-ER Model – ER-to-Relational Mapping – Functional Dependencies – Non-loss Decomposition – First, Second, Third Normal Forms, Dependency Preservation – Boyce/Codd Normal Form – Multi-valued Dependencies and Fourth Normal Form – Join Dependencies and Fifth Normal Form.

UNIT – III TRANSACTIONS 9

Transaction Concepts – ACID Properties – Schedules – Serializability – Transaction support in SQL– Need for Concurrency – Concurrency control –Two Phase Locking- Timestamp – Multiversion – Validation and Snapshot isolation– Multiple Granularity locking – Deadlock Handling – Recovery Concepts – Recovery based on deferred and immediate update – Shadow paging – ARIES Algorithm

UNIT – IV IMPLEMENTATION TECHNIQUES 9

RAID – File Organization – Organization of Records in Files – Data dictionary Storage – Column Oriented Storage– Indexing and Hashing –Ordered Indices – B+ tree Index Files – B tree Index Files – Static Hashing – Dynamic Hashing – Query Processing Overview – Algorithms for Selection, Sorting and join operations – Query optimization using Heuristics - Cost Estimation.

UNIT – V IMPLEMENTATION TECHNIQUES AND NoSQL DATABASE 9

Distributed Databases: Architecture, Data Storage, Transaction Processing, Query processing and Optimization – NOSQL Databases: Introduction – CAP Theorem – Document Based systems – Key value Stores – Column Based Systems – Graph Databases. Database Security: Security issues –Access control based on privileges – Role Based access control – SQL Injection – Statistical Database security – Flow control – Encryption and Public Key infrastructures – Challenges.

TOTAL:45 PERIODS

COURSE OUTCOMES:

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

CO1 Construct SQL Queries using relational algebra

CO2 Design database using ER model and normalize the database

CO3 Construct queries to handle transaction processing and maintain consistency of the database

CO4 Compare and contrast various indexing strategies and apply the knowledge to tune the performance of the database

CO5 Appraise how advanced databases differ from Relational Databases and find a suitable database for the given requirement.

TEXT BOOKS:

1. Abraham Silberschatz, Henry F. Korth and S. Sudarshan, "Database System Concepts", 7th Edition, McGraw Hill, 2020.
2. Ramez Elmasri, Shamkant B. Navathe, "Fundamentals of Database Systems", 7th Edition, Pearson, 2017.

REFERENCES:

1. C.J.Date, A.Kannan, S.Swamynathan, "An Introduction to Database Systems", Eighth Edition, Pearson Education, 2006.

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

CO's	PO's											PSO's	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	2	2	3	2	1			2	1	1	1	2	1
2	3	1	1	1	1			2	3	3	3	3	1
3	3	2	3	2	1			2	1	1	2	2	3
4	1	2	3	2				3	2	3	3	1	2
5	1	1	3	3	2			1	3	3	1	2	2

Low (1) ; Medium (2) ; High (3)

COURSE COORDINATOR **BOS CHAIRMAN / HOD**

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24GE3451	ENVIRONMENTAL SCIENCE AND SUSTAINABILITY	L	T	P	C
		2	0	0	2

COURSE OBJECTIVES:

1. To introduce the basic concepts of environment, ecosystems and biodiversity and emphasize on the biodiversity of India and its conservation.
2. To impart knowledge on the causes, effects and control or prevention measures of environmental pollution and natural disasters.
3. To facilitate the understanding of global and Indian scenario of renewable and nonrenewable resources, causes of their degradation and measures to preserve them.
4. To familiarize the concept of sustainable development goals and appreciate the interdependence of economic and social aspects of sustainability, recognize and analyze climate changes.
5. To inculcate and embrace sustainability practices and develop a broader understanding on green materials, energy cycles and analyze the role of sustainable urbanization.

UNIT I ENVIRONMENT AND BIODIVERSITY 6

Definition, scope and importance of environment-need for public awareness. Eco-system and Energy flow- Types of biodiversity: genetic, species and ecosystem diversity-values of biodiversity, India as a mega-diversity nation-hot-spots of biodiversity-threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts -conservation of biodiversity: In-situ and ex-situ.

UNIT – II ENVIRONMENTAL POLLUTION 6

Causes, Effects and Preventive measures of Water, Soil, Air and Noise Pollutions. Solid and E-Waste management. Case studies on Occupational Health and Safety Management system (OHASMS). Environmental protection, Environmental protection acts.

UNIT – III RENEWABLE SOURCES OF ENERGY 6

Energy management and conservation, New Energy Sources: Need of new sources. Different types new energy sources. Applications of-Hydrogen energy, Ocean energy resources, Tidal energy conversion. Concept, origin and power plants of geothermal energy.

UNIT – IV SUSTAINABILITY AND MANAGEMENT 6

Development, GDP ,Sustainability-concept, needs and challenges-economic, social and aspects of sustainability-from unsustainability to sustainability-millennium development goals, and protocols-Sustainable Development Goals-targets, indicators and intervention areas Climate change-Global, Regional and local environmental issues and possible solutions-case studies.

UNIT – V SUSTAINABILITY PRACTICES 6

Zero waste and R concept, Circular economies ISO:14000 Series, Material Life cycle assessment, Environmental Impact Assessment. Sustainable habitat: Green buildings, Green materials, Energy efficiency, Sustainable transports. Sustainable energy: Green Engineering: Sustainable urbanization.

TOTAL: 30 PERIODS

COURSE OUTCOMES:

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

CO1 To recognize and understand the functions of environment, ecosystems and biodiversity and their conservation.

CO2 To identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society.

CO3 To identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations.

CO4 To recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development.

CO5 To demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization.

TEXT BOOKS:

1. Anubha Kaushik and C. P. Kaushik's "Perspectives in Environmental Studies", 6th Edition, New Age International Publishers, 2018.
2. Benny Joseph, 'Environmental Science and Engineering', Tata McGraw-Hill, New Delhi, 2016.
3. Gilbert M.Masters, 'Introduction to Environmental Engineering and Science', 2nd edition, Pearson Education, 2004.
4. Allen, D. T. and Shonnard, D. R., Sustainability Engineering: Concepts, Design and Case Studies, Prentice Hall.
5. Bradley. A.S; Adebayo, A.O., Maria, P. Engineering applications in sustainable design and development, Cengage learning.
6. Environment Impact Assessment Guidelines, Notification of Government of India, 2006.
7. Mackenthun, K.M., Basic Concepts in Environmental Management, Lewis Publication, London, 1998.

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1. R.K. Trivedi, 'Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards', Vol. I and II, Enviro Media. 38. Edition 2010.
2. Cunningham, W.P. Cooper, T.H. Gorhani, 'Environmental Encyclopedia', Jaico Publ., House, Mumbai, 2001.
3. Dharmendra S. Sengar, 'Environmental law', Prentice hall of India PVT. LTD, New Delhi, 2007.
4. Rajagopalan, R, 'Environmental Studies-From Crisis to Cure', Oxford University Press, Third Edition, 2015.
5. Erach Bharucha "Textbook of Environmental Studies for Undergraduate Courses" Orient Blackswan Pvt. Ltd. 2013.
6. S.Pream Kumar, K.Vijay Sankar, A. Suresh Kumar, M.Priyanka, "Environmental Science and Sustainability", Charulatha Publications.2025

COs' – PO's & PSO's MAPPING

CO's	PO's											PSO's	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	2	2	2	2	2	2	1	2	1		1	2	1
2	2	2	2	2	2	2	1	2	1		1	2	1

3	2	2	2	2	2	2	1	2	1	1	2	2	1
4	2	2	2	2	2	2	1	2	1	2	2	2	1
5	2	2	2	2	2	2	1	2	1	1	2	2	1
Low (1) ; Medium (2) ; High (3)													

Course Instructor

HoD

24CS3401 DESIGN AND ANALYSIS OF ALGORITHMS

L	T	P	C
3	0	2	4

COURSE OBJECTIVES:

1. To understand and apply the algorithm analysis techniques on searching and sorting algorithms
2. To critically analyze the efficiency of graph algorithms.
3. To understand different algorithm design techniques.
4. To solve programming problems using state space tree.
5. To understand the concepts behind NP Completeness, Approximation algorithms and randomized algorithms.

UNIT – I INTRODUCTION **9**

Algorithm analysis: Time and space complexity - Asymptotic Notations and its properties Best case, Worst case and average case analysis – Recurrence relation: substitution method - Lower bounds – Searching: linear search, binary search and Interpolation Search, Pattern search: The naïve string- matching algorithm - Rabin-Karp algorithm - Knuth-Morris-Pratt algorithm. Sorting: Insertion sort – heap sort

UNIT – II GRAPH ALGORITHMS **9**

Graph algorithms: Representations of graphs - Graph traversal: DFS – BFS - applications - Connectivity, strong connectivity, bi-connectivity - Minimum spanning tree: Kruskal's and Prim's algorithm- Shortest path: Bellman-Ford algorithm - Dijkstra's algorithm - Floyd-Warshall algorithm Network flow: Flow networks - Ford-Fulkerson method – Matching: Maximum bipartite matching

UNIT – III ALGORITHM DESIGN TECHNIQUES **9**

Divide and Conquer methodology: Finding maximum and minimum - Merge sort - Quick sort Dynamic programming: Elements of dynamic programming — Matrix-chain multiplication - Multi stage graph — Optimal Binary Search Trees. Greedy Technique: Elements of the greedy strategy - Activity-selection problem — Optimal Merge pattern — Huffman Trees.

UNIT – IV STATE SPACE SEARCH ALGORITHMS **9**

Backtracking: n-Queens problem - Hamiltonian Circuit Problem - Subset Sum Problem – Graph colouring problem Branch and Bound: Solving 15-Puzzle problem - Assignment problem - Knapsack Problem - Travelling Salesman Problem.

UNIT – V NP-COMPLETE AND APPROXIMATION ALGORITHM **9**

Tractable and intractable problems: Polynomial time algorithms – Venn diagram representation - NP- algorithms - NP-hardness and NP-completeness – Bin Packing Problem - Problem reduction: TSP – 3-CNF problem. Approximation Algorithms: TSP - Randomized Algorithms: concept and application - primality testing - randomized quick sort - Finding kth smallest number.

TOTAL: 45 PERIODS

PRACTICAL EXERCISES: **30 PERIODS**

Searching and Sorting Algorithms:

1. Implement Linear Search. Determine the time required to search for an element. Repeat the experiment for different values of *n*, the number of elements in the list to be searched and plot a graph of the time taken versus *n*.
2. Implement recursive Binary Search. Determine the time required to search an element. Repeat the experiment for different values of *n*, the number of elements in the list to be searched and plot a graph of the time taken versus *n*.
3. Given a text txt [0...n-1] and a pattern pat [0...m-1], write a function search (char pat [ ], char txt [ ]) that prints all occurrences of pat [ ] in txt [ ]. You may assume that n > m.
4. Sort a given set of elements using the Insertion sort and Heap sort methods and determine the time required to sort the elements. Repeat the experiment for different values of *n*, the number of elements in the list to be sorted and plot a graph of the time taken versus *n*.

Graph Algorithms:

1. Develop a program to implement graph traversal using Breadth First Search
2. Develop a program to implement graph traversal using Depth First Search
3. From a given vertex in a weighted connected graph, develop a program to find the shortest paths to other vertices using Dijkstra's algorithm.
4. Find the minimum cost spanning tree of a given undirected graph using Prim's algorithm.
5. Implement Floyd's algorithm for the All-Pairs- Shortest-Paths problem.
6. Compute the transitive closure of a given directed graph using Warshall's algorithm.

Algorithm Design Techniques:

1. Develop a program to find out the maximum and minimum numbers in a given list of *n* numbers using the divide and conquer technique.
2. Implement Merge sort and Quick sort methods to sort an array of elements and determine the time required to sort. Repeat the experiment for different values of *n*, the number of elements in the list to be sorted and plot a graph of the time taken versus *n*.

State Space Search Algorithms

1. Implement N Queens problem using Backtracking.

Approximation Algorithms Randomized Algorithms

1. Implement any scheme to find the optimal solution for the Traveling Salesperson problem and then solve the same problem instance using any approximation algorithm and determine the error in the approximation.
2. Implement randomized algorithms for finding the k^{th} smallest number. The programs can be implemented in C/C++/JAVA/ Python.

TOTAL: 45+30 =75 PERIODS

COURSE OUTCOMES:

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

CO1 Analyze the efficiency of algorithms using various frameworks
CO2 Apply graph algorithms to solve problems and analyze their efficiency.
CO3 Make use of algorithm design techniques like divide and conquer, dynamic programming and greedy techniques to solve problems.
CO4 Use the state space tree method for solving problems.
CO5 Solve problems using approximation algorithms and randomized algorithms

TEXT BOOKS:

1. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein, "Introduction to Algorithms", 3rd Edition, Prentice Hall of India, 2009.
2. Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran "Computer Algorithms / C++" Orient Blackswan, 2nd Edition, 2019.

REFERENCES:

1. Anany Levitin, "Introduction to the Design and Analysis of Algorithms", 3rd Edition, Pearson Education, 2012.
2. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, "Data Structures and Algorithms", Reprint Edition, Pearson Education, 2006.
3. S.Sridhar, "Design and Analysis of Algorithms", Oxford university press, 2014.

COs' – PO's & PSO's MAPPING

CO's	PO's											PSO's	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	3	2				1					1		1
2	2	3				1					1		1
3	1	2	3	1		2							1
4	1	1											
5	1	1											
Low (1) ; Medium (2) ; High (3)													

COURSE COORDINATOR

BOS CHAIRMAN / HOD

24CS3461	OPERATING SYSTEMS LABORATORY	L	T	P	C
		0	0	3	1.5

COURSE OBJECTIVES:

1. To install windows operating systems.
2. To understand the basics of Unix command and shell programming.
3. To implement various CPU scheduling algorithms.
4. To implement Deadlock Avoidance and Deadlock Detection Algorithms
5. To implement Page Replacement Algorithms
6. To implement various memory allocation methods.
7. To be familiar with File Organization and File Allocation Strategies

LIST OF EXPERIMENTS:

1. Installation of windows operating system
2. Illustrate UNIX commands and Shell Programming
3. Process Management using System Calls : Fork, Exit, Getpid, Wait, Close
4. Write C programs to implement the various CPU Scheduling Algorithms
5. Illustrate the inter process communication strategy
6. Implement mutual exclusion by Semaphore
7. Write C programs to avoid Deadlock using Banker's Algorithm
8. Write a C program to Implement Deadlock Detection Algorithm
9. Write C program to implement Threading
10. Implement the paging Technique using C program
11. Write C programs to implement the following Memory Allocation Methods
    a. First Fit b. Worst Fit c. Best Fit
12. Write C programs to implement the various Page Replacement Algorithms
13. Write C programs to Implement the various File Organization Techniques
14. Implement the following File Allocation Strategies using C programs
    a. Sequential b. Indexed c. Linked
15. Write C programs for the implementation of various disk scheduling algorithms
16. Install any guest operating system like Linux using VMware.

TOTAL:60 PERIODS

COURSE OUTCOMES:

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

CO1 Define and implement UNIX Commands
CO2 Compare the performance of various CPU Scheduling Algorithms.
CO3 Compare and contrast various Memory Allocation Methods
CO4 Define File Organization and File Allocation Strategies.
CO5 Implement various Disk Scheduling Algorithms.

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

CO's	PO's											PSO's	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	3	1	3	1	1			1	3	3	3	2	1
2	3	1	1	2	2			3	2	1	1	3	1
3	3	3	2	1	2			3	3	1	2	2	2
4	1	2	2	3	2			3	1	3	1	1	2
5	2	2	1	1	3			1	2	2	3	1	3
Low (1) ; Medium (2) ; High (3)													

COURSE COORDINATOR

BOS CHAIRMAN / HOD

SRI RANGANATHAR
INSTITUTE OF ENGINEERING AND TECHNOLOGY
(An Autonomous Institution)
(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai)
Athipalayam, Coimbatore - 641 110. website: sriet.ac.in, Ph: 0422 - 2697792

24CS3481	DATABASE MANAGEMENT SYSTEMS LABORATORY	L	T	P	C
		0	0	3	1.5

COURSE OBJECTIVES:

1. To learn and implement important commands in SQL.
2. To learn the usage of nested and joint queries.
3. To understand functions, procedures and procedural extensions of databases.
4. To understand design and implementation of typical database applications.
5. To be familiar with the use of a front end tool for GUI based application development

LIST OF EXPERIMENTS:

1. Create a database table, add constraints (primary key, unique, check, Not null), insert rows, update and delete rows using SQL DDL and DML commands.
2. Create a set of tables, add foreign key constraints and incorporate referential integrity.
3. Query the database tables using different 'where' clause conditions and also implement aggregate functions.
4. Query the database tables and explore sub queries and simple join operations.
5. Query the database tables and explore natural, equi and outer joins.
6. Write user defined functions and stored procedures in SQL.
7. Execute complex transactions and realize DCL and TCL commands.
8. Write SQL Triggers for insert, delete, and update operations in a database table.
9. Create View and index for database tables with a large number of records.
10. Create an XML database and validate it using XML schema.
11. Create Document, column and graph based data using NOSQL database tools.
12. Develop a simple GUI based database application and incorporate all the above mentioned features Case Study using any of the real life database applications from the following list
    a) Inventory Management for a E Mart Grocery Shop
    b) Society Financial Management
    c) Cop Friendly App – E seva
    d) Property Management – e Mall
    e) Star Small and Medium Banking and Finance
    - Build Entity Model diagram. The diagram should align with the business and functional goals stated in the application.
    - Apply Normalization rules in designing the tables in scope.
    - Prepared applicable views, triggers (for auditing purposes), functions for enabling enterprise grade features.
    - Build PL SQL / Stored Procedures for Complex Functionalities, ex EOD Batch Processing for calculating the EMI for Gold Loan for each eligible Customer.
    - Ability to showcase ACID Properties with sample queries with appropriate settings.

COURSE OUTCOMES:

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

CO1 Create databases with different types of key constraints.

CO2 Construct simple and complex SQL queries using DML and DCL commands.

CO3 Use advanced features such as stored procedures and triggers and incorporate in GUI based application development.

CO4 Create an XML database and validate with meta-data (XML schema).

CO5 Create and manipulate data using NOSQL database.

TOTAL:45 PERIODS

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

CO's	PO's											PSO's	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	3	3	3	3				3	1	3	2	2	3
2	2	2	3	2	2			1	2	3	3	2	1
3	3	3	2	1	1			1	1	1	3	2	3
4	1	3	3	3	1			1	1	3	2	3	1
5	3	2	1	1	1			2	2	3	1	3	1
Low (1) ; Medium (2) ; High (3)													

COURSE COORDINATOR

BOS CHAIRMAN / HOD

SRI RANGANATHAR
INSTITUTE OF ENGINEERING AND TECHNOLOGY
(An Autonomous Institution)
(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai)
Athipalayam, Coimbatore - 641 110. website: sriet.ac.in, Ph: 0422 - 2697792

24CS3491	PROJECT WITH DESIGN THINKING (PRODUCT/SOFTWARE DEVELOPMENT LIFE CYCLE)	L	T	P	C
		0	0	2	1

COURSE DESCRIPTION:

1. The Project with Design Thinking (Product/Software Development Life Cycle) course Integrates design thinking principles into the product or software development lifecycle, Fostering innovation and user-centricity throughout the project. Students learn to empathize With end-users, define problem statements (TRL 2), ideate potential solutions (TRL 4),
2. Prototype designs (TRL 5), and conduct iterative testing to gather feedback and refine their Creations (TRL 6). The course emphasizes multidisciplinary approach (SDG 11), encouraging
3. Collaboration between designers, developers, and stakeholders to ensure that the final product
4. Meets user needs and business objectives (SDG 12) effectively. Through hands-on projects, Students gain practical experience in applying design thinking methodologies within the context of the product or software development process, preparing them to address complex Challenges and create impactful solutions in diverse industries

COURSE OBJECTIVES:

1. Identify current problems in computer and communication engineering through Literature.
2. Survey. (TRL 1-2: Basic principles observed, Technology formulation)
3. Design and analyse solutions for identified problems using modern engineering tools. (TRL 3-4: Experimental proof of concept, Technology development, SDG 8: Decent Work and Economic Growth)
4. Create innovative methodologies and develop working models to solve existing Problems.
5. (TRL 4-5: Technology development and validation in a relevant environment, Prototype development, SDG 11: Sustainable Cities and Communities)
6. Apply appropriate software development methods to implement and deploy solutions.
7. Computer and communication-related issues. (TRL 5-6: Prototype development and Demonstration in a relevant environment, Technology demonstration, SDG 12: Responsible Consumption and Production)
8. Evaluate teamwork's role in project execution and estimate financial requirements for Project success. (TRL 6-7: System prototype demonstration in an operational Environment, Technology readiness for deployment).

GUIDELINES:

The student identifies the problems in the computer and communication engineering field by conducting a literature or industry survey (TRL 2). After that, the student finds the Solution (TRL 4) to solve those problems by applying modern engineering tools. Continuous Review will be conducted based on approved rubrics to ensure ongoing progress and quality. After finding the solution, the student develops the working model (TRL 5, SDG 11), design, or simulation for evaluation. Each student shall finally submit a report covering background Information, literature survey, problem statement, methodology, and use of modern tools Within the stipulated date. Every project work must be guided by the institute faculty members.

COURSE OUTCOMES:

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

CO1 Identify the problems in computer and communication engineering field by literature Survey.

CO2 Design, analyse and solve the identified problems by using modern engineering tools

CO3 Create innovative methodologies to solve the existing problems and developing the working models.

CO4 Apply appropriate software development methods, to implement and deploy Solutions for the computer and communication related problems.

CO5 Implement the role of team work in a project to find the solution and estimate the financial requirement of a project.

COURSE COORDINATOR **BOS CHAIRMAN / HOD**

24CS3411	SUMMER INTERNSHIP	L	T	P	C
		0	0	0	1

COURSE OBJECTIVES:

1. Get connected with reputed industry/ laboratory/academia / research institute
2. Get practical knowledge on Product Development / Services and operations / Software Design and Development / Testing / Analytics/ research/ start-ups/ professionalism / business processes and insights / domain knowledge/ Industry Practices/ and other related aspects and develop skills to solve related problems
3. Develop technical, soft, team skills to cater to the needs of the industry / academia / businesses / research / organizations in the core aspects of Automation, Digitalization
4. The students individually undergo training in reputed firms/ research institutes / laboratories for the specified duration. After the completion of training, a detailed report should be submitted within ten days from the commencement of next semester. The students will be evaluated as per the Regulations.

No. of Weeks: 04

COURSE OUTCOMES:

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

CO1 Industry Practices, Processes, Techniques, technology, automation and other core aspects of software industry

CO2 Analyze, Design solutions to complex business problems

CO3 Build and deploy solutions for target platform

CO4 Preparation of Technical reports and presentation.

COURSE COORDINATOR **BOS CHAIRMAN / HOD**

NCC Credit Course Level 2*

24NX3451	(ARMY WING) NCC Credit Course Level - II	L T P C 3 0 0 3

PERSONALITY DEVELOPMENT		**9**
PD 3	Group Discussion: Change your mindset, Time Management, Social Skills	6
PD 5	Public Speaking	3
LEADERSHIP		**7**
L 2	Case Studies: APJ Abdul Kalam, Deepa Malik, Maharana Pratap, N Narayan Murty, Ratan Tata, Rabindra Nath Tagore, Role of NCC cadets in 1965	7
DISASTER MANAGEMENT		**13**
DM 1	Disaster Management Capsule: Organisation, Types of Disasters, Essential Services, Assistance, Civil Defence Organisation	3
DM 2	Initiative Training, Organising Skills, Do's & Don't's, Natural Disasters, Man Made Disasters	9
DM 3	Fire Service & Fire Fighting	1
ENVIRONMENTAL AWARENESS & CONSERVATION		**3**
EA 1	Environmental Awareness and Conservation	3
GENERAL AWARENESS		**4**
GA 1	General Knowledge	4
ARMED FORCES		**6**
AF 1	Armed Forces, Army, CAPF, Police	6
ADVENTURE		**1**
AD 1	Introduction to Adventure Activities	1
BORDER & COASTAL AREAS		**2**
BCA 1	History, Geography & Topography of Border/Coastal areas	2

TOTAL: 45 PERIODS

COURSE COORDINATOR

BOS CHAIRMAN

NCC Credit Course Level 2*

24NX3452	(NAVAL WING) NCC Credit Course Level - II	L T P C 3 0 0 3
PERSONALITY DEVELOPMENT		**9**
PD 3	Group Discussion: Change your mindset, Time Management, Social Skills	6
PD 5	Public Speaking	3
LEADERSHIP		**7**
L 2	Case Studies: APJ Abdul Kalam, Deepa Malik, Maharana Pratap, N Narayan Murty, Ratan Tata, Rabindra Nath Tagore, Role of NCC cadets in 1965	7
DISASTER MANAGEMENT		**13**
DM 1	Disaster Management Capsule: Organisation, Types of Disasters, Essential Services, Assistance, Civil Defence Organisation	3
DM 2	Initiative Training, Organising Skills, Do's & Don't's, Natural Disasters, Man Made Disasters	9
DM 3	Fire Service & Fire Fighting	1
ENVIRONMENTAL AWARENESS & CONSERVATION		**3**
EA 1	Environmental Awareness and Conservation	3
GENERAL AWARENESS		**4**
GA 1	General Knowledge	4
NAVAL ORIENTATION		**6**
AF 1	Armed Forces and Navy Capsule	3
EEZ 1	EEZ Maritime Security and ICG	3
ADVENTURE		**1**
AD 1	Introduction to Adventure Activities	1
BORDER & COASTAL AREAS		**2**
BCA 1	History, Geography & Topography of Border/Coastal areas	2

TOTAL: 45 PERIODS

COURSE COORDINATOR

BOS CHAIRMAN

NCC Credit Course Level 2*

24NX3453	(AIR FORCE WING) NCC Credit Course Level - II	L T P C 3 0 0 3
PERSONALITY DEVELOPMENT		**9**
PD 3	Group Discussion: Change your mindset, Time Management, Social Skills	6
PD 5	Public Speaking	3
LEADERSHIP		**7**
L 2	Case Studies: APJ Abdul Kalam, Deepa Malik, Maharana Pratap, N Narayan Murty, Ratan Tata, Rabindra Nath Tagore, Role of NCC cadets in 1965	7
DISASTER MANAGEMENT		**13**
DM 1	Disaster Management Capsule: Organisation, Types of Disasters, Essential Services, Assistance, Civil Defence Organisation	3
DM 2	Initiative Training, Organising Skills, Do's & Don't's, Natural Disasters, Man Made Disasters	9
DM 3	Fire Service & Fire Fighting	1
ENVIRONMENTAL AWARENESS & CONSERVATION		**3**
EA 1	Environmental Awareness and Conservation	3
GENERAL AWARENESS		**4**
GA 1	General Knowledge	4
GENERAL SERVICE KNOWLEDGE		**6**
GSK 1	Armed Forces & IAF Capsule	2
GSK 2	Modes of Entry in IAF, Civil Aviation	2
GSK 3	Aircrafts - Types, Capabilities & Role	2
ADVENTURE		**1**
AD 1	Introduction to Adventure Activities	1
BORDER & COASTAL AREAS		**2**
BCA 1	History, Geography & Topography of Border/Coastal areas	2

TOTAL: 45 PERIODS

COURSE COORDINATOR

BOS CHAIRMAN