

Curriculum and Syllabi Regulation 2023

B.E Computer Science and Engineering

Applicable for 2023 Admitted students



www.nehruinstitute,com

Vision

To be leading Institution in Academic excellence, Multidisciplinary Research, Innovation, Entrepreneurship and Industry relation in order to mould true citizens of the country

Mission

- To create innovative and vibrant young leaders in Engineering and Technology field for building India as a knowledge power by improving the teaching-learning process
- To enhance employability, entrepreneurship and to improve the research competence to address Societal needs.
- To generate engineering graduates who use knowledge as a powerful tool to drive societal transformation and inculcate in them ethical and moral values.

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Vision

To become a School of Computing excellence in research and innovation by imparting industry driven Teaching Learning Process.

Mission

- To inculcate an innovator by adopting student-centric, activity and outcome-based teaching learning process in diversified areas of Computer Science and Engineering.
- To achieve global standards with technical transformations in education and value based living through a social and scientific approach.
- **4** To groom graduates with all-round leadership qualities, team spirit to meet the requirements of industry, business and society.

Program Educational Objectives (PEOs)

The Computer Science and Engineering graduate can

PEO 1: Apply their technical competence in computer science to solve real world problems, with technical and people leadership.

PEO 2: Conduct cutting edge research and develop solutions on problems of social relevance.

PEO 3: Work in a business environment, exhibiting team skills, work ethics, adaptability and lifelong learning.

Program Outcomes

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

PO2 : Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3 : Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4 : Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5 :Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6 : The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7 : Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8 : Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Specific Outcomes (PSOs)

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

PSO 2: Strong theoretical foundation leading to excellence and excitement towards research, to provide elegant solutions to complex problems

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

SEMESTER-I										
S.No.	COURSE CODE	COURSE TITLE	CATEGORY	PE V	RIO PER VEE	DS K	TOTAL CONTACT	CREDITS		
				L	Т	Р	PERIODS			
	U23IP101	Induction Program	МС	-	-	-	-	0		
THEO	THEORY									
1	U23EN101	English for Engineers	HSMC	3	0	0	3	3		
2	U23MA101	Calculus And Differential Equations	BSC	3	1	0	4	4		
3	U23PH101	Engineering Physics	BSC	3	0	0	3	3		
4	U23CY101	Engineering Chemistry	BSC	3	0	0	3	3		
5	U23CS101	C- Programming	ESC	3	0	0	3	3		
6	U23HS101	Heritage of Tamil	HSMC	1	0	0	1	1		
7	U23EE101	Career Enhancement Training I	EEC	3	0	0	3	1		
PRAC	TICAL									
8	U23BS111	Basic Science Laboratory	BSC	0	0	4	4	2		
9	U23EN111	Communicative English Laboratory	HSMC	0	0	2	2	1		
10	U23CS111	C- Programming Laboratory	ESC	0	0	4	4	2		
11		Vocational Enhancement Training-I	VEC	0	0	2	2	1*		
	Total					12	32	23		

Computer Science and Engineering

SEMESTER-II										
S.No.	COURSE	COURSE TITLE	CATEGORY	PE V	RIO PER VEE	DS K	TOTAL CONTACT	CREDITS		
	CODE	IIILE		L	Т	Р	PERIODS			
THEO	DRY									
1	U23PH203	Physics for Information Science	BSC	3	0	0	3	3		
2	U23HS202	Tamil & Technology	HSMC	1	0	0	1	1		
3	U23CS201	Python Programming and Practices	ESC	3	0	0	3	3		
THEORY WITH LAB COMPONENT										
	U23EN202	Proficiency of English	HSMC	2	0	2	4	3		
5	U23CS202	Digital Logic Circuits	ESC	2	0	2	4	3		
6	U23MA202	Advanced calculus and Statistics	BSC	3	0	2	5	4		
PRAC	TICAL									
7	U23CS211	Python Programming Lab	ESC	0	0	2	2	1		
8	U23GE212	Engineering Practices Lab	ESC	0	0	2	2	1		
9	U23GE213	Engineering Graphics Lab	ESC	0	0	2	2	1		
10	U23EE202	Career Enhancement Training II	EEC	0	0	2	2	1		
11		Vocational Enhancement Training-II	VEC	0	0	2	2	1*		
	Total					16	30	21		

SEMESTER-III										
S.No.	COURSE CODE	COURSE TITLE	CATEGORY	PE	RIO PER VEE	DS K	TOTAL CONTACT BEBIODS	CREDITS		
				L	Т	Р	PERIODS			
THEO	RY									
1	U23MA306	Probability and Linear Algebra	BSC	3	1	0	4	4		
2	U23CS301	Data Structures and Algorithms	PCC	3	1	0	4	4		
3	U23CS302	Object Oriented Programming using JAVA	PCC	3	0	0	3	3		
4	U23CS303	Computer Organization and Architecture	ESC	3	0	0	3	3		
THEORY WITH LAB COMPONENT										
5	U23CS304	Foundations of Data Science	PCC	3	0	2	5	4		
PRAC	TICAL									
6	U23CS311	Data Structures Lab	PCC	0	0	2	2	1		
7	U23CS312	JAVA Programming lab	PCC	0	0	2	2	1		
8	U23EE313	Aptitude and communication for Engineers -I	EEC	0	0	2	2	1		
9 Vocational 9 Enhancement Training-III		VEC	0	0	2	2	1*			
MANI	MANDATORY COURSE									
10		Universal Human Values	МС	2	0	0	2	0		
	Total					10	29	21		

	SEMESTER-IV										
S.No.	COURSE CODE	COURSE TITLE	CATEGORY	PE	RIO PER VEE	DS K	TOTAL CONTACT PERIODS	CREDITS			
				L	Т	Р	FERIODS				
THEO	RY										
1	U23MA408	Discrete Mathematics	BSC	3	0	0	3	3			
2	U23CS401	Database Management systems	PCC	3	0	0	3	3			
3	U23CS402	Introduction to Operating Systems	PCC	3	0	0	3	3			
4	U23CS403	Internet of Things	PCC	3	0	0	3	3			
5	U23CS404	Theory of Computation	PCC	3	1	0	4	4			
THEORY WITH LAB COMPONENT											
6	U23CS405	Object Oriented Software Engineering	PCC	3	0	2	5	4			
PRAC	TICAL										
7	U23CS411	Database Management Systems Lab	PCC	0	0	2	2	1			
8	U23CS412	Introduction to Operating Systems Lab	PCC	0	0	2	2	1			
9	U23EE413	Aptitude and communication for Engineers -II	EEC	0	0	2	2	1			
10		Vocational Enhancement Training-IV	VEC	0	0	2	2	1*			
MANI	DATORY COU	URSE									
11		Constitution of India/ Environmental Science and Climatic Changes	МС	2	0	0	2	0			
	Total					10	32	23			

	SEMESTER-V										
S.No.	COURSE CODE	COURSE TITLE	CATEGORY	PE	RIO PER VEE	DS K	TOTAL CONTACT	CREDITS			
				L	Т	Р	PERIODS				
THEO	RY										
1		Artificial Intelligence and Machine Learning	PCC	3	1	0	4	4			
2		Computer Networks	РСС	3	0	0	3	3			
3		Professional Elective-I	PEC	-	-	-	-	3			
4		Open Elective-I	OEC	3 0 0		0	3	3			
5	5 Open Elective-II OEC		OEC	3	0	0	3	3			
THEO	THEORY WITH LAB COMPONENT										
6		Web Design	РСС	3	0	2	5	4			
PRAC	TICAL										
7		Computer Networks	PCC	0	0	2	2	1			
8		Soft skills- Reasoning	EEC	0	0	2	2	1			
9		Internship	EEC	0	0	0	0	1			
10Vocational Enhancement Training-V		VEC	0	0	2	2	1*				
MANDATORY COURSE											
11		Entrepreneurship and Innovation	МС	1	0	0	1	0			
	Total						28	23			

SEMESTER-VI										
S.No.	COURSE CODE	COURSE TITLE	CATEGORY	PE] W	RIO PER /EE	DS R K	TOTAL CONTACT PERIODS	CREDITS		
				L T P		Р	I ERIODS			
THEO	ORY									
1		Compiler Design	PCC	3	0	0	3	3		
2		Professional Elective-II	PEC	-	-	-	-	3		
3		Professional Elective-III	PEC	-	-	-	-	3		
4		Open Elective-III	OEC	3	3 0 0		3	3		
5		Open Elective-IV	OEC	3 0 0		0	3	3		
THEO	ORY WITH LA	B COMPONENT								
6		Cryptography and Cyber Security	РСС	3	0	2	5	4		
PRAC	TICAL									
7		Compiler Design Lab	PCC	0	0	4	4	2		
8		Soft skills –Verbal / Non Verbal	EEC	0	0	2	2	1		
9	9 Vocational Enhancement VEC Training-VI		VEC	0	0	2	2	1*		
MANI	MANDATORY COURSE									
10		Intellectual Property Rights	МС	1	0	0	1	0		
	Total						29	22		

	SEMESTER-VII										
S.No.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS			
THEO	RY		L		<u> </u>						
1		Software Project Management	PCC	3	0	0	3	3			
2		Professional Elective-IV	PEC	-	-	-	-	3			
3		Professional Elective-V	PEC			-	-	3			
4		Professional Elective-VI	PEC	-	-	-	-	3			
5		Management Elective	HSMC	3	0	0	3	3			
THEO	ORY WITH LA	B COMPONENT									
6		Cloud Computing Virtualization	PCC	3	0	2	5	4			
PRAC	TICAL										
7		Project Phase-I	EEC	0	0	2	2	1			
8		Internship	EEC	0	0	0	0	1			
	Total 18 0 4 22 21										

	SEMESTER-VIII											
S.No.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK		DDS R K	TOTAL CONTACT PERIODS	CREDITS				
						Р	I ERIODS					
PRAC	TICAL											
1Project Phase- II/InternshipEEC002020												
	Total 0 0 20 20 10											

*Indicated courses have not been included for Total credits and CGPA calculation of individual semesters, it can be provided additionally as special credits.

S.	Category					Total				
No.	Category	Ι	Π	III	IV	v	VI	VII	VIII	Credits
1.	Humanities and Management Courses(HSMC)	5	4					3		12
2.	Basic Science Course (BSC)	12	7	4	3					26
3.	Engineering Science Course(ESC)	5	9	3						17
4.	Professional Core Course(PCC)			13	20	12	9	7		61
5.	Professional Elective Course(PEC)					3	6	9		18
6.	Open Elective Course(OEC)					6	6			12
7.	Employability Enhancement Skills	1	1	1	1	1	1	2	10	18
8.	Mandatory Course(MC)			~	~	~	~			
Total		23	21	21	24	22	22	21	10	164

Scheme of Credit Distribution- Summary

PROFESSIONAL ELECTIVE COURSES: VERTICALS

S.NO.	COURSE TITLE	CATEGORY	P	PERI PER V	ODS VEEK	TOTAL CONTACT	CREDITS
			L	Т	Р	PERIODS	
1.	Exploratory Data Analysis	PEC	2	0	2	4	3
2.	Recommender Systems	PEC	2	0	2	4	3
3.	Neural Networks and Deep Learning	PEC	2	0	2	4	3
4.	Text and Speech Analysis	PEC	2	0	2	4	3
5.	Business Analytics	PEC	2	0	2	4	3
6.	Image and Video Analytics	PEC	2	0	2	4	3
7.	Computer Vision	PEC	2	0	2	4	3
8.	Big Data Analytics	PEC	2	0	2	4	3

VERTICAL 1: DATA SCIENCE

VERTICAL 2: FULL STACK DEVELOPMENT

S.NO.	COURSE TITLE	CATEGORY	P	PERI PER V	ODS /EEK	TOTAL CONTACT	CREDITS
			L	Т	Р	PERIODS	
1.	Web Technologies	PEC	2	0	2	4	3
2.	App Development	PEC	2	0	2	4	3
3.	Cloud Services Management	PEC	2	0	2	4	3
4.	UI and UX Design	PEC	2	0	2	4	3
5.	Software Testing and Automation	PEC	2	0	2	4	3
6.	Web Application Security	PEC	2	0	2	4	3
7.	DevOps	PEC	2	0	2	4	3
8.	Principles of Programming Languages	PEC	3	0	0	3	3

S.NO	COURSE TITLE	CATEGORY	P	PERI PER V	ODS VEEK	TOTAL CONTACT	CREDITS
			L	Т	Р	PERIODS	
1.	Cloud Computing	PEC	2	0	2	4	3
2.	Virtualization	PEC	2	0	2	4	3
3.	Cloud Services Management	PEC	2	0	2	4	3
4.	Data Warehousing	PEC	2	0	2	4	3
5.	Storage Technologies	PEC	3	0	0	3	3
6.	Software Defined Networks	PEC	2	0	2	4	3
7.	Stream Processing	PEC	2	0	2	4	3
8.	Security and Privacy in Cloud	PEC	2	0	2	4	3

VERTICAL 3: CLOUD COMPUTING AND DATA CENTER TECHNOLOGIES

VERTICAL 4: CYBER SECURITY AND DATA PRIVACY

S.NO.	COURSE TITLE	CATEGORY	Р	PERI ER V	ODS VEEK	TOTAL CONTACT	CREDITS
			L	Т	Ρ	PERIODS	
1.	Ethical Hacking	PEC	2	0	2	4	3
2.	Digital and Mobile Forensics	PEC	2	0	2	4	3
3.	Social Network Security	PEC	2	0	2	4	3
4.	Modern Cryptography	PEC	2	0	2	4	3
5.	Engineering Secure Software Systems	PEC	2	0	2	4	3
6.	Cryptocurrency and Blockchain Technologies	PEC	2	0	2	4	3
7.	Network Security	PEC	2	0	2	4	3
8.	Security and Privacy in Cloud	PEC	2	0	2	4	3

VERTICAL 5: CREATIVE MEDIA

S.NO	COURSE TITLE	CATEGORY	Р	PERI ER V	ODS VEEK	TOTAL CONTACT	CREDITS	
			L	Т	Р	PERIODS		
1.	Augmented Reality/Virtual Reality	PEC	2	0	2	4	3	
2.	Multimedia and Animation	PEC	2	0	2	4	3	
3.	Video Creation and Editing	PEC	2	0	2	4	3	
4.	UI and UX Design	PEC	2	0	2	4	3	
5.	Digital marketing	PEC	2	0	2	4	3	
6.	Visual Effects	PEC	2	0	2	4	3	
7.	Game Development	PEC	2	0	2	4	3	
8.	Multimedia Data Compression and Storage	PEC	2	0	2	4	3	

VERTICAL 6: EMERGING TECHNOLOGIES

S.NO	COURSE TITLE	CATEGORY	P	PERI PER V	ODS VEEK	TOTAL CONTACT	CREDITS
			L	Т	Ρ	PERIODS	
1.	Augmented Reality/Virtual Reality	PEC	2	0	2	4	3
2.	Robotic Process Automation	PEC	2	0	2	4	3
3.	Neural Networks and Deep Learning	PEC	2	0	2	4	3
4.	Cyber security	PEC	2	0	2	4	3
5.	Quantum Computing	PEC	2	0	2	4	3
6.	Cryptocurrency and Blockchain Technologies	PEC	2	0	2	4	3
7.	Game Development	PEC	2	0	2	4	3
8.	3D Printing and Design	PEC	2	0	2	4	3

S.NO.	COURSE TITLE	CATEGORY	RY PERIODS PER WEEK			TOTAL CONTACT	CREDITS
			L	Т	Р	PERIODS	
1.	Knowledge Engineering	PEC	2	0	2	4	3
2.	Soft Computing	PEC	2	0	2	4	3
3.	Neural Networks and Deep Learning	PEC	2	0	2	4	3
4.	Text and Speech Analysis	PEC	2	0	2	4	3
5.	Optimization Techniques	PEC	2	0	2	4	3
6.	Game Theory	PEC	2	0	2	4	3
7.	Cognitive Science	PEC	2	0	2	4	3
8.	Ethics And Al	PEC	2	0	2	4	3

VERTICAL 7: ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

Nehru Institute of Technology

Version 1.0

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).

S.		CATE GORY	PE		S EV	TOTAL	
NO.	COURSE IIILE					PERIODS	CREDITS
1.	Introduction to Industrial		-	•	-		
	Engineering	OEC	3	0	0	3	3
2.	Food, Nutrition and Health	OEC	3	0	0	3	3
3.	Environmental and Social Impact Assessment	OEC	3	0	0	3	3
4.	Renewable Energy System	OEC	3	0	0	3	3
5.	Introduction to Industrial Instrumentation and Control	OEC	3	0	0	3	3
6.	Holistic Nutrition	OEC	3	0	0	3	3
7.	IT in Agricultural System	OEC	3	0	0	3	3
8.	Introduction to Control Engineering	OEC	3	0	0	3	3
9.	English for Competitive Examinations	OEC	3	0	0	3	3
10.	NGOs and Sustainable Development	OEC	3	0	0	3	3
11.	Democracy and Good Governance	OEC	3	0	0	3	3
12.	Applied Design Thinking	OEC	3	0	0	3	3
13.	Electric and Hybrid Vehicles	OEC	3	0	0	3	3
14.	Industrial Management	OEC	3	0	0	3	3
15.	Quality Engineering	OEC	3	0	0	3	3
16.	Introduction to Non-destructive Testing	OEC	3	0	0	3	3
17.	Foundation of Robotics	OEC	3	0	0	3	3
18.	Urban Agriculture	OEC	3	0	0	3	3
19.	Drinking Water Supply and Treatment	OEC	3	0	0	3	3
20.	Electric Vehicle Technology	OEC	3	0	0	3	3
21.	Traditional Indian Foods	OEC	3	0	0	3	3
22.	Introduction to food processing	OEC	3	0	0	3	3
23.	Foundation Skills in Integrated Product Development	OEC	3	0	0	3	3

24.	Assistive Technology	OEC	3	0	0	3	3
25.	Lean Concepts, Tools and Practices	OEC	3	0	0	3	3
26.	Project Report Writing	OEC	3	0	0	3	3
27.	New Product Development	OEC	3	0	0	3	3
28.	Industrial Design & Rapid Prototyping Techniques	OEC	3	0	0	3	3
29.	Production Planning and Control	OEC	3	0	0	3	3
30.	Industrial Hygiene	OEC	3	0	0	3	3
31.	Geographical Information System	OEC	3	0	0	3	3
32.	Agriculture Entrepreneurship Development	OEC	3	0	0	3	3
33.	Fundamentals of Food Engineering	OEC	3	0	0	3	3
34.	Industrial safety	OEC	3	0	0	3	3
35.	Concepts in Mobile Robots	OEC	3	0	0	3	3

SEMESTER I

1123EN1101	ENCI ISH EOD ENCINEEDS	Cat	egory	y : HS	MC
SDC: 4	(Common to all Bronchog)	\mathbf{L}	Т	Р	С
5DG: 4	(Common to all Branches)	3	0	0	3

COURSE OBJECTIVE:

1. To enable learners of engineering and technology to develop their basic communication skills in English.

2. To acquire, command in both the respective skills (listening and reading) and the productive skills (writing and speaking) of the English language.

3. To understand the key concepts of values, life skills and business communication and motivate students to look within and create a better version of themselves.

4. To focus on the development of basic fluency in English, usage of vocabulary in the technical field, and strengthening reading and official written communication skills.

5. To use language efficiently in expressing their opinions via various media.

UNIT 1 INTRODUCTION TO FUNDAMENTALS OF COMMUNICATION 9

Listening- listening to Audio/video(formal & informal);Telephonic conversation (Activity) Speaking-Self Introduction; Introducing a friend (Activity);Conversation-politeness strategies; Reading - Reading brochures (technical context), telephone messages / social media messages relevant to technical contexts-Writing-Writing on self, Writing Definition; Jumbled sentence Grammar – Simple present tense, Present continuous, Present perfect, Present perfect continuous; Question types: Wh/ Yes or No/ and Tags; Word formation, One-word substitution.

UNIT 2 NARRATION AND SUMMATION

Listening- Listening to the podcast, anecdotes/stories/event narration; documentaries and interviews with celebrities (Activity). Speaking-Narrating personal experiences/events; interviewing a celebrity (Activity). Reading- Reading biographies, travelogues, newspaper reports, Writing- Guided Writing-Paragraph writing, Short Report on an event (field trip etc.) - Grammar– Simple past tense, Past continuous, Past perfect, Past perfect continuous; Subject-Verb Agreement; Prepositions, Word forms (prefixes & suffixes); Error Correction.

UNIT 3 DESCRIPTION OF PROCESS/PRODUCT

Listening – Listening to specific audio tracks (Activity) Speaking – Picture description; giving instruction to use the product; presenting a product; Role play (Activity) -Reading – Reading advertisements, gadget reviews; finding key information from a given text- Writing - Instructions; Process description; Grammar - Simple future tense, Future continuous, Future perfect, Future perfect continuous; Imperatives; Adjectives; Degrees of comparison; Compound Words.

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UNIT 4 CLASSIFICATION AND RECOMMENDATIONS

Listening – watching videos/ documentaries and responding to the questions based on them, Scientific lectures; and educational videos. Speaking – Small Talk; Mini presentations (Activity) -Reading – Journal reports, predicting content of reading habits, Reading articles (Activity)- Writing –Memos to colleagues or friends; Opinion Blogs; Grammar – Articles; Pronouns - Possessive & Relative pronouns, Cause and Effect.

UNIT 5 EXPRESSION

Listening – Listening to different accent, Listening to speeches or presentation- Speaking – Debates and Expressing opinions through Simulations, exchanging personal information - (Activity)- Reading – Reading editorials; Poster making (Activity)- Writing – Creative Writing, Checklist- Grammar – Punctuation; Compound Nouns, Homonyms; and Homophones, Simple, Compound & Complex Sentences.

COURSE OUTCOMES:

At the end of the course, students would

CO1: Listen and comprehend complex academic texts.

CO2: Understand the denotative and connotative meanings of technical texts.

CO3: Identify definitions, descriptions, narrations and essays on various topics.

CO4: Apply different methods of integration in solving practical problems.

CO5: Express their opinions effectively in both oral and written medium of communication.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. English for Engineers & Technologists Orient Blackswan Private Ltd. Department of English, Anna University (2020 edition).

2. English for Science & Technology Cambridge University Press, 2021. Authored by Dr.VeenaSelvam, Dr.Sujatha Priyadarshini, Dr.Deepa Mary Francis, Dr.KN.Shoba and Dr.Lourdes Joevani, Department of English, Anna University.

REFERENCES:

1. Technical Communication – Principles and Practices By Meenakshi Raman & Sangeeta Sharma, Oxford Univ. Press, 2016, New Delhi.

2. A Course Book on Technical English by Lakshmi Narayanan, Scitech Publications (India) Pvt.Ltd.

3.English for Technical Communication (with CD) by Aysha Viswamohan, Mc-graw Hill Education, ISBN:0070264244

4. Effective Communication Skill, KulbhusanKumar, RS Salaria, Khanna Publishing House.

5. Learning to Communicate–Dr.V.Chellammal, Allied Publishing House, NewDelhi, 2003.

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CO's-PO's & PSO's MAPPING															
СО	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO3
CO1	-	-	-	-	-	1	1	-	3	1	-	2	-	-	-
CO2	-	-	-	-	-	1	1	-	3	-	-	2	-	-	-
CO3	-	-	-	-	-	1	1	-	3	2	-	3	-	-	-
CO4	-	-	-	-	-	1	2	-	3	1	_	2	-	-	-
CO5	-	-	-	-	-	1	2	-	3	2	_	3	-	-	-
Correlation levels: 1 – low				2 – me	edium		3 – h	igh	"_"	- no co	orrelat	tion			

COURSE DESIGNED BY	APPROVED BY
Dr.T.Saranaya- AP/ English & Prof. J.Brindha Devi- AP/ English	Dr.M.Kumaresan – Professor & Head/ S&H
Name and Department	Name and Department of BoS Chairman

LI23MA 101	CALCULUS AND DIFFEDENTIAL FOUATIONS	Category : BSC								
SDC 4	(Common to all Pronches)	L	Т	Р	С					
SDG: 4	(Common to an Dranches)	3	1	0	4					

1. To develop the use of matrix algebra techniques that is needed by engineers for practical applications.

2. To familiarize the students with differential calculus.

3. To enlighten the students with functions of several variables. This is needed in many branches of engineering.

4. To make the students acquire sound knowledge of techniques in solving ordinary differential equations that model engineering problems.

5. To acquaint the students with mathematical tools needed in evaluating multiple integrals and their applications.

UNIT 1

MATRICES

Characteristic equation – Eigen values and Eigen vectors of a real matrix – Properties of Eigen values and Eigen vectors (without proof) – Cayley – Hamilton theorem (Statement and applications

only) - Orthogonal matrices – Orthogonal transformation of a symmetric matrix to diagonal form – Quadratic form – Nature of Quadratic forms - Reduction of quadratic form to canonical form by orthogonal transformation.

UNIT 2 DIFFERENTIAL CALCULUS 9 + 3

Representation of functions - Limit of a function - Continuity - Derivatives -Differentiation rules (sum, product, quotient, chain rules) - Implicit differentiation - Logarithmic differentiation - Applications: Maxima and Minima of functions of one variable.

UNIT 3MULTIVARIABLE CALCULUS9 + 3

Functions of two variables – Partial derivatives – Total differential – Taylor's series for functions of two variables – Jacobian's – Constrained maxima and minima – Lagrange's multiplier and its applications

UNIT 4 ORDINARY DIFFERENTIAL EQUATIONS OF SECOND 9+3 ORDER 9+3

Linear differential equations of second order with constant coefficients. Linear differential Equations of second order with variable coefficients: Cauchy's linear differential equation - Method of variation of parameters for second order differential equations

UNIT 5MULTIPLE INTEGRALS9 + 3

Double integration with constant and variable limits - Region of integration - Area as double integral in Cartesian coordinates. Triple integral in Cartesian coordinates. Application of integration - Volume of Solids

COURSE OUTCOMES:

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

CO1: Comprehend the concepts of Eigen values, Eigen vectors, limits, continuity, functions of several variables, double integration and region of integration for solving complex problems.

CO2: Use rules of differentiation to solve maxima and minima problems.

CO3: Apply various techniques in solving ordinary and partial differential equations for practical applications.

CO4: Apply differential and integral calculus tools in modeling problems.

CO5: Evaluate integrals to compute area, volume and other practical problems.

TOTAL: 60 PERIODS

TEXT BOOKS:

1. Grewal.B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 44th Edition 2018.

2. James Stewart, "Calculus : Early Transcendentals", Cengage Learning, 8th Edition, New Delhi,2015.

3. Kreyszig.E, "Advanced Engineering Mathematics", John Wiley and Sons, 10th Edition, New delhi,2016.

REFERENCES:

1. Bali. N., Goyal. M. and Watkins. C., "Advanced Engineering Mathematics", Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.,), New Delhi, 7th Edition, 2009

2. Ramana. B.V., "Higher Engineering Mathematics", McGraw Hill Education Pvt. Ltd, New delhi,2016

3. Anton. H, Bivens. I and Davis. S, " Calculus ", Wiley, 10th Edition, 2016

4. Narayanan. S. and Manicavachagom Pillai. T. K., "Calculus" Volume I and II, S.Viswanathan Publishers Pvt. Ltd., Chennai, 2009.

5. Jain. R.K. and Iyengar. S.R.K., "Advanced Engineering Mathematics", Narosa Publications, New Delhi, 5th Edition, 2016.

6. Srimantha Pal and Bhunia. S.C, "Engineering Mathematics "Oxford University Press, 2015

CO's	CO's-PO's & PSO's MAPPING														
со	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	3	3	1	1	3	-	-	-	-	-	-	-	-	-
CO2	3	3	1	-	-	3	-	-	-	-	-	-	-	-	-
CO3	3	3	2	-	1	3	-	-	-	-	-	-	-	-	-
CO4	3	3	3	-	-	3	-	-	-	-	-	-	-	-	-
CO5	3	3	2	1	-	3	-	-	-	-	-	-	-	-	-
Correlation levels: 1 – low				2 –	mediu	ım	3 -	– high	"	"- no c	correla	ation			

COURSE DESIGNED BY	APPROVED BY
Dr. N. Vithya- ASP/ Mathematics	Dr.M.Kumaresan – Professor & Head/ S&H
Name and Department	Name and Department of BoS Chairman

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11 23PH101	ENCINEEDINC DUVSICS	Category : BSC						
SDC: 4	$\frac{1}{2} \frac{1}{2} \frac{1}$	\mathbf{L}	Т	Р	С			
SDG: 4	(Common to CSE & II)	3	0	0	3			

COURSE OBJECTIVE:

- 1. Understand the basics of Properties of Matter and apply them to Engineering.
- 2. Explore the applications of Lasers and Fiber optics in engineering contexts.
- 3. Apply principles of Ultrasonics and Thermal Physics to Engineering challenges.
- 4. Grasp foundational Quantum Physics concepts and their modern applications.
- 5. Analyze Crystal systems and their structures in Engineering and Technology.

UNIT 1 PROPERTIES OF MATTER

Elasticity – Stress-strain diagram and its uses - Factors affecting elastic modulus – Torsional stress and deformations –Torsion pendulum: theory and experiment - Bending of beams - Bending moment – Cantilever: theory and experiment – Uniform and non-uniform bending: theory and experiment - I-shaped girders - Applications. – Basic Solved Problems.

UNIT 2 LASER AND FIBER OPTICS

Introduction – Principle of Spontaneous emission and stimulated emission. Population inversion, pumping- Einstein's A and B coefficients: derivation. Types of lasers – Nd-YAG, CO₂-Industrial Applications of Lasers –Fiber Optics: Principle and propagation of light – Numerical aperture and Acceptance angle - Types of optical fibres (material, refractive index, mode) – Temperature and displacement sensors.

UNIT 3 ULTRASONICS AND THERMAL PHYSICS

Introduction – Piezoelectric effect - piezoelectric generator - Velocity measurement – Acoustic grating – Ultrasonic Medical applications - Introduction to heat - Transfer of heat energy :Thermal conduction, convection and radiation –Thermal conductivity - Forbe's and Lee's disc method: theory and experiment – Applications: heat exchangers, refrigerators, ovens and solar water heaters.

UNIT 4

QUANTUM PHYSICS

Black body radiation – Planck's theory (derivation) – Deduction of Wien's displacement law and Rayleigh-Jeans' Law from Planck's theory – Compton effect :Theory and experimental verification – Matter waves – Schrödinger's wave equation: Time independent and time dependent equations – Physical significance of wave function – Particle in a one-dimensional box - Microscope: Scanning Tunnelling microscope.

UNIT 5

CRYSTAL PHYSICS

Lattice – Unit cell – Bravais lattice – Lattice planes – Miller indices – 'd' spacing in cubic lattice – Calculation of number of atoms per unit cell – Atomic radius – Coordination number – Packing factor for SC, BCC, FCC and HCP structures – Diamond and graphite structures – Polymorphism and allotropy - Crystal defects – Point, line and surface defects- Burger vector.

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COURSE OUTCOMES:

At the end of the course, students would

CO1: Realize the fundamental engineering ideas of matter, optics, heat, sound, and quantum theory.

CO2: Demonstrate a solid understanding of fundamental matter properties, Laser and Fiber optics classification, Quantum concepts and apply them successfully to solve practical engineering problems.

CO3: Apply the elastic modulus theory, Fiber Optic Sensors, Ultrasonics and thermal applications to integrate knowledge and problem solve at an advanced level.

CO4: Categorize the Elastic moduli concepts, Fiber optic lasers and Crystal structures to implement in Engineer problems in Material Science and electronics.

CO5: Analyze the foundational Quantum and Crystal Physics concepts to implement solutions for modern engineering problems.

TOTAL: 45 PERIODS

TEXT BOOKS:

- 1. Bhattacharya, D.K. & Poonam, T. "Engineering Physics". Oxford University Press, 2015.
- 2. Gaur, R.K. & Gupta, S.L. "Engineering Physics". Dhanpat Rai Publishers, 2012.
- 3. Pandey, B.K. & Chaturvedi, S. "Engineering Physics". Cengage Learning India, 2012

REFERENCES:

- 1. Halliday, D., Resnick, R. & Walker, J. "Principles of Physics". Wiley, 2015.
- 2. Serway, R.A. & Jewett, J.W. "Physics for Scientists and Engineers". Cengage Learning, 2010.
- 3. Palanisamy P.K. Engineering Physics. SCITECH Publications, 2011.
- 4. Kittle,C,: Introduction to solid state Physics:, Wiley, 2005.
- 5. Mani P. Engineering Physics I. Dhanam Publications, 2011.
- 6. Senthilkumar G. Engineering Physics I. VRB Publishers, 2011.

CO's-l	CO's-PO's & PSO's MAPPING														
СО	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO3
CO1	3	3	1	-	1	-	1	-	-	1	-	1	-	-	-
CO2	3	3	1	-	1	-	1	-	1	-	-	1	-	-	-
CO3	3	3	1	-	1	-	1	-	1	-	-	1	-	-	-
CO4	3	2	1	-	1	-	-	-	-	1	-	1	-	-	-

CO5	3	3	1	-	-	-	1	-	1	-	-	1	-	-	-
Correlation levels:			:	1 – lo	W	2	2 – me	dium		3 – hig	gh	"_	"- no o	correla	ation

COURSE DESIGNED BY	APPROVED BY
Dr. T.Jayaprakash- Professor / Physics	Dr.M.Kumaresan – Professor & Head/ S&H
Name and Department	Name and Department of BoS Chairman

1123CV101	ENCINEEDING CHEMISTDV	Category : BSC							
		\mathbf{L}	Т	Р	С				
SDG: 9	(Common to all Branches)	3	0	0	3				

- 1. Learn boiler feed water requirements, and water treatment techniques.
- 2. To acquire knowledge about the preparation, properties and applications of polymers.
- 3. Understand the basic concepts of electrochemistry and its applications.
- 4. Learn corrosion control and protective techniques.
- 5. Acquire the knowledge about the fuels and properties of energy storage devices.

UNIT 1

WATER TECHNOLOGY

Introduction - Sources of water - Impurities in water - Types of water -Hardness of water -Expression of hardness - Units of hardness - Estimation of hardness of water by EDTA method -Disadvantages of using hard water - Boiler troubles - Scale and sludge - Softening of water -External treatment method - Demineralization process - Internal treatment process - Carbonate, Phosphate and Calgon conditioning - Desalination by reverse osmosis method.

UNIT 2

POLYMERS

Introduction: Classification of polymers – Natural and synthetic; Thermoplastic and Thermosetting. Functionality – Degree of polymerization. Types: Addition, condensation and copolymerization and mechanism of Addition polymerization (Free Radical); Techniques of polymerization: Bulk, emulsion, solution and suspension. Preparation, properties and uses of Nylon (6,6 and 11) and Epoxy resin. Engineering application of plastics- PVC, PTFE and Bakelite. Types of compounding of plastics- Moulding, injection moulding.

UNIT 3

ELECTRO CHEMISTRY

Electrochemistry: Introduction - Cells - Representation of a galvanic cell - Reversible and irreversible cells - Electrode potential - Nernst equation - Reference electrode (Calomel electrode) - Standard hydrogen electrode - Glass electrode - Electrochemical series and its applications – Battery: Introduction, Types of batteries- alkaline battery- lead storage battery - H_2 - O_2 fuel cell-

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applications. Construction of solar cells and E-Vehicle.

UNIT 4 CORROSION AND ITS CONTROL

Introduction - Chemical corrosion and Wet corrosion - Galvanic and differential aeration (Pitting, Crevice and Pipeline) - Factors influencing rate of corrosion - Corrosion - causes - factors - corrosion control - material selection and design aspects - electrochemical protection – sacrificial anode method and impressed current cathodic method - Cathodic protection method.

UNIT 5 FUELS AND COMBUSTION

Introduction - Classification of fuels - Requirements of a good fuel – Combustion: Principle of combustion - Calorific value - Gross and net calorific values - Explosive range - Spontaneous ignition temperature. Fuels: Solid fuels - Coal and its varieties - Proximate analysis - Significance - Metallurgical coke - Otto-Hoffman byproduct method - Liquid fuel: Manufacture of synthetic petrol - Bergius method - Knocking - Octane number - Cetane number - Gaseous fuel: Liquefied petroleum gas (LPG), Compressed natural gas (CNG).

COURSE OUTCOMES:

At the end of the course, students would

CO1: Recall the concept about water technology, engineering polymers, electrodes, corrosion and combustion of fuels.

CO2: Understand the boiler problems and categorize the polymers.

CO3: Classify plastics, batteries, corrosion, and the calorific value of fuels.

CO4: Apply enough knowledge of contemporary water softening, polymerization, fuel cell, electrochemical protection, and fuel manufacturing procedures.

CO5: Analyze the hardness of water using the EDTA technique and characterization of coal.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Jain P C and Monica Jain, "Engineering Chemistry", 17th Edition, Dhanpat Rai Publishing Co., 2018.

2. Sivasankar B., "Engineering Chemistry", Tata McGraw-Hill Publishing Company Ltd, New Delhi, 2017.

REFERENCES:

1. B. S. Murty, P. Shankar, Baldev Raj, B. B. Rath and James Murday, "Textbook of nanoscience and nanotechnology", Universities Press-IIM Series in Metallurgy and Materials Science, 2018.

2. O.G. Palanna, "Engineering Chemistry" McGraw Hill Education (India) Private Limited, 2nd Edition, 2017.

3. Friedrich Emich, "Engineering Chemistry", Scientific International Pvt, Ltd, New Delhi, 2017.

4. Shikha Agarwal, "Engineering Chemistry-Fundamentals and Applications", Cambridge University Press, Delhi, Second Edition, 2019.

5. R.D. Madan, "Modern Inorganic Chemistry", S. Chand, New Delhi, 2012

6. S.S. Dara, "A Textbook of Engineering Chemistry", S. Chand Publishing, 12th Edition, 2018.

CO's-PO's & PSO's MAPPING															
СО	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CO1	3	-	-	2	-	-	2	-	-	-	-	1	-	-	-
CO2	3	-	-	2	2	-	2	-	-	-	-	2	-	-	-
CO3	3	-	-	2	2	-	2	-	-	-	-	2	-	-	-
CO4	3	-	-	2	3	-	2	-	-	-	-	3	-	-	-
CO5	3	-	-	2	3	-	2	-	-	-	-	3	-	-	-
Correlation levels: 1 – lov				low		2-1	mediu	m	3 -	high	•	'-"- no	correla	ation	

COURSE DESIGNED BY	APPROVED BY
Dr.M.Kumaresan – Professor & Head/ S&H	Dr.M.Kumaresan – Professor & Head/ S&H
Name and Department	Name and Department of BoS Chairman

1123CS101		Category : ESC							
		LTPC							
SDG:8	(Common to CSE & IT)	3 0 0 3							

- 1. To acquire knowledge about the concept of C programming, keywords and operators.
- 2. To classify the data types, structure of C program, looping statements, arrays and strings.
- 3. To identify the basics of functions, structures, nested structure and Union.
- 4. To the concept of searching, recursion and array of structure with dynamic memory allocation
- 5. To defund the pointers, file fundamentals of sequential, random access file and command line arguments.

UNIT 1 BASICS OF C PROGRAMMING

Introduction to Computer and programming paradigms – Applications of C Language - Structure of C program - C programming: Data Types - Constants – Enumeration Constants - Keywords –

Operators: Precedence and Associativity - Expressions - Input/Output statements, Assignment statements –Decision making statements - Switch statement - Looping statements – Preprocessor directives -Compilation process.

UNIT 2

ARRAYS AND STRINGS

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

UNIT 3 FUNCTIONS AND POINTERS

Modular programming - Function prototype, function definition, function call, Built-in functions (string functions, math functions) – Recursion, Binary Search using recursive functions –Pointers – Pointer operators – Pointer arithmetic – Arrays and pointers – Array of pointers – Parameter passing: Pass by value, Pass by reference.

UNIT 4

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

STRUCTURES AND UNION

UNIT 5 FILE PROCESSING

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

COURSE OUTCOMES:

At the end of the course, students would

CO1: Remember the concept of C programming to understand the functional knowledge about operators and the keywords used.

CO2: Demonstrate C program for data types, looping & array.

CO3: Illustrate the basics for functions, structures, pointers and union.

CO4: Make use of the concept to perform the operations dynamic memory allocation, searching and recursion.

CO5: Examine the file processing for sequential, random access and command line arguments.

TOTAL: 45 PERIODS

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-Hill Education, 1996.

4. Pradip Dey, Manas Ghosh, "Computer Fundamentals and Programming in C", Second Edition, Oxford University Press, 2013.

5. Anita Goel and Ajay Mittal, "Computer Fundamentals and Programming in C", 1st Edition, Pearson Education, 2013

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CO's	CO's-PO's & PSO's MAPPING														
со	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO3
CO1	1	2	2	-	2	-	-	-	2	-	-	2	1	2	-
CO2	2	2	2	-	2	-	-	-	2	-	-	3	2	2	-
CO3	3	3	2	-	2	-	-	-	2	-	-	2	2	2	-
CO4	2	2	2	-	3	_	-	-	2	_	-	3	2	2	-
CO5	2	3	3	-	2	_	-	-	2	_	-	2	2	3	-
Correlation levels:				1 – low 2 – medium						3 – high "-"- no correlation				ion	

COURSE DESIGNED BY	APPROVED BY
Dr.S.Pathur Nisha, Professor & Head/ CSE & Prof. Evance Leethail , AP/CSE	Dr.S.Pathur Nisha, Professor & Head/ CSE
Name and Department	Name and Department of BoS Chairman

	ΠΕΡΙΤΑ CE ΔΕ ΤΑ ΜΠ	Cat	tegory	y : HS	MC
U23HS101	(Common to all Branches)	L	Т	Р	С
	(Common to an Drancnes)	1	0	0	1

1.To learn the extensive literature of classical tamil

2.To review the fine arts heritage of tamil culture

3.To realize the contribution in Indian freedom struggle

UNIT 1 LANGUAGE AND LITERATURE

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

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UNIT 2 HERITAGE - ROCK ART PAINTINGS TO MODERN ART – SCULPTURE

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

UNIT 3FOLK AND MARTIAL ARTS3

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

UNIT 4 THINAI CONCEPT OF TAMILS

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

UNIT 5 CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE 3

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

COURSE OUTCOMES:

At the end of the course, students would

CO1: Remember the extensive literature of tamil and its classical nature, musical instruments, Folk, thinai concept, Indian Freedom Struggle& Aham, Puram and Aram Concept.

CO2: Remember the principles in Thirukural, Bakthi Literature Azhwars and Nayanmars , heritage of sculpture, painting and musical instruments of ancient people, victory of chozha dynasty.

CO3: Understand on folk and martial arts of tamil people, Justice in Sangam Literature, Development of Modern literature in Tamil, Making of musical instruments.

CO4: Understand the role of Temples in Social and Economic Life of Tamils, Ancient Cities and Ports of Sangam Age, Conquest of Cholas.

CO5: Understand the Cultural Influence of Tamils over the other parts of India, contribution of tamils self-esteem movement and siddha medicine, Print History of Tamil Books.

TOTAL: 15 PERIODS

TEXT BOOKS:

1.தமிழக வரலாறு – மக்களும் பண்பாடும் – .கே. கே பிள்ளை (வெளியீடு): தமிழ்நாடு

பாடநூல் மற்றும் கல்வியியல் பணிகள்கழகம்

2.கணினித்தமிழ் – முனைவர் இல. சுந்தரம் . (விகடன்பிரசுரம்).

3.கீழடி – வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை (வெளியீடு)

REFERENCES:

1.Social Life of Tamils (Dr. K. K. Pillay) A joint publication of TNTB & ESC and RMRL – (in print)

2.Historical Heritage of the Tamils (Dr .S. V. Subaramanian, Dr .K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).

3. The Contributions of the Tamils to Indian Culture (Dr. M. Valarmathi) (Published by: International Institute of Tamil Studies)

4. 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)

5.Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)

CO's-PO's & PSO's MAPPING															
СО	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	-	-	-	-	-	-	3	3	-	2	-	3	-	-	-
CO2	-	-	-	-	-	-	3	3	-	2	-	3	-	-	-
СО3	-	-	-	-	-	-	3	3	-	2	-	3	-	-	-
CO4	-	-	-	-	-	-	3	3	-	2	-	3	-	-	-
CO5	-	-	-	-	-	-	3	3	-	2	-	3	-	-	-
Correlation levels: 1				-low		2 –	mediu	ım	3 -	- high	"_"	'- no c	orrela	tion	

COURSE DESIGNED BY	APPROVED BY
Prof. A.Prabhakaran – AP/ Tamil	Dr.M.Kumaresan - Professor & Head / S&H
Name and Department	Name and Department of BoS Chairman

Regulations 2023

Category : EEC

U23EE101	CAREER ENHANCEMENT TRAINING I				
SDG: 17	(Common to all Branches)	L	Т	Р	С
		3	0	0	1

COURSE OBJECTIVE:

1. To improve mathematical and analytical abilities of students, particularly in the context of comprehending engineering concepts and making data-driven decision.

2. To develop critical thinking skills including problem solving, logic, patterns, and reasoning.

3. To Comprehend and appreciate mathematical terminologies and concepts in order to understand, interpret, and represent science and technology.

UNIT 1	FUNDAMENTALS	6
Divisibility Test	- Square root and Cube roots – HCF & LCM - problems on	Numbers
UNIT 2	ALGEBRA	5
Simplification – S	Surds & Indices – Linear & Quadratic Equations	
UNIT 3	BANKING ESSENTIALS	8
Average – Percent	tage – Profit & Loss – Simple Interest – Compound Interest	
UNIT 4	TIME AND EFFICIENCY	8
Time Speed Dista	nce – Problems on Trains – Boats & Streams – Time & Work	– Pipes & Cisterns
UNIT 5	LOGICAL REASONING	3

Number & letter series – Analogy– Pattern classification – Coding & Decoding

COURSE OUTCOMES:

At the end of the course, students would

CO1: Exhibit a clear understanding of fundamental concepts of aptitude for engineering.

CO2: Demonstrate problem-solving skills and critical thinking abilities in the context of recruitment aptitude tests.

CO3: To use appropriate strategies and shortcuts to improve speed and accuracy in solving aptitude problems during recruitment processes.

CO4: Evaluate and interpret aptitude test results to identify areas of improvement and develop a personalized study plan for further enhancement.

TOTAL: 30 PERIODS

TEXT BOOKS:

1. The Pearson Guide to Quantitative Aptitude For Competitive Examinations, Dinesh Khattar. Pearson

2. Quantitative Aptitude Dr. R.S. Aggarwal S. Chand Publication.

3. A modern Approach to Verbal and Non-Verbal Reasoning R.s. Aggarwal.

REFERENCES:

1. Quantitative Aptitude for CAT, Arun Sharma.

2. Fast Track Objective Arithmetic, Rajesh Verma, Arihant Publication.

3. Quantitative Aptitude Quantum CAT Common Admission Tests for Admission into IIMs, Sarvesh K. Verma.

4. Effective Communication Skill,Kulbhusan Kumar,R S Salaria,Khanna Publishing House.

5. Wiley's Exam Expert Quantitative Ability for CAT, 2ed, Ashu Jain.

CO's	CO's-PO's & PSO's MAPPING														
со	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO3
CO1	3	3	3	3	-	-	-	-	-	-	-	-			
CO2	3	2	1	3	-	-	-	-	-	-	-	-			
CO3	3	1	1	2	-	-	-	-	-	-	-	-			
CO4	1	1	1	1	-	-	-	-	-	-	-	-			
CO5	-	-	-	-	-	-	-	-	-	-	-	-			
Correlation levels: 1 – low				2 -	- medi	um	3	– hig	h ʻ	'-"- no	o corre	elation			

COURSE DESIGNED BY	APPROVED BY
Prof. Ramesh Raja – Head/ NCPIR	Dr.M.Kumaresan – Professor & Head/ S&H
Name and Department	Name and Department of BoS Chairman

1123CS111	C - PROCRAMMING LABORATORY	Category : ESC						
SDC · A	(Common to CSE & IT)	L	Т	Р	С			
5DG. 4		0	0	4	2			

- 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. Writing algorithms, flow charts and pseudo codes for simple problems.
- 2. Programs on expressions and conversions.
- 3. Programs using if, if-else, switch and nested if statements.
- 4. Programs using while, do-while, for loops.
- 5. Programs on one dimensional array, passing arrays to functions and array operations.
- 6. Programs using two dimensional arrays, passing 2D arrays to functions.
- 7. Programs using String functions.
- 8. Programs using function calls, recursion, call by value.
- 9. Programs on pointer operators, call by reference, pointers with arrays
- 10. Programs using structures and unions.
- 11. Programs on file operations and modes.
- 12. Working with text files, random files and binary files.

COURSE OUTCOMES:

At the end of the course, students would

CO1: Demonstrate knowledge on C programming constructs.

CO2: Develop programs in C using arrays.

CO3: Develop applications in C using strings, pointers, functions.

CO4: Develop applications in C using structures.

CO5: Develop applications in C using file processing.

CO's-PO's & PSO's MAPPING PO PO РО PSO PSO PSO **PO9** CO **PO1 PO2** PO3 **PO4** PO5 **PO6 PO7 PO8** 10 11 12 1 2 3 2 2 CO1 3 2 3 1 1 1 _ _ _ 2 2 2 _

TOTAL: 60 PERIODS

CO2	3	2	2	2	1	1	-	-	2	-	2	2	3	3	-
CO3	3	2	3	2	1	2	-	-	2	-	2	2	2	2	-
CO4	3	2	2	2	1	2	-	-	3	-	2	3	3	3	-
CO5	3	2	3	1	1	2	-	-	3	_	2	3	2	3	-
Correlation levels: 1 – low						2 – medium			3 – high			"-"- no correlation			

COURSE DESIGNED BY	APPROVED BY
Dr.S.Pathur Nisha, Professor & Head/ CSE & Prof. Evance Leethail, AP/CSE	Dr.S.Pathur Nisha, Professor & Head/ CSE
Name and Department	Name and Department of BoS Chairman

U22DC111		Category : BSC						
025D5111	BASIC SCIENCE LABORATORY	L	Т	Р	С			
5DG:4		0	0	2	2			

B.E

- 1. Realize the fundamental engineering ideas of matter, optics, heat, sound, and quantum theory.
- 2. Demonstrate a solid understanding of fundamental matter properties, Laser and Fiber optics classification, Quantum concepts and apply them successfully to solve practical engineering problems.
- 3. Apply the elastic modulus theory, Fiber Optic Sensors, Ultrasonics and thermal applications to integrate knowledge and problem solve at an advanced level.
- 4. Categorize the Elastic moduli concepts, Fiber optic lasers and Crystal structures to implement in Engineer problems in Material Science and electronics.
- 5. Analyse the foundational Quantum and Crystal Physics concepts to implement solutions for modern engineering problems.

PHYSICS - LIST OF EXPERIMENTS (Any 5 Experiments)

- 1. Determination of rigidity modulus Torsion pendulum
- 2. Determination of Young's modulus Non uniform bending method.
- 3. Determination of Young's modulus Uniform bending method.
- 4. Determination of thickness of a thin wire Air wedge method.
- 5. Determination of the wavelength of the laser using grating .
- 6. Determination of Numerical Aperture and acceptance angle using Optical fibre.
- 7. Determination of velocity of sound and compressibility of liquid Ultrasonic interferometer.
- 8. Determination of thermal conductivity of a bad conductor Lee's Disc method.
- 9. Melde's string experiment.
- 10. Determination of Band gap of a semiconductor.

CHEMISTRY- LIST OF EXPERIMENTS (Any 5 Experiments)

- 1. Estimation of total, temporary and permanent hardness of water by EDTA method.
- 2. Estimation of alkalinity of the given water sample.
- 3. Determination of chloride content of water sample by Argentometric method.
- 4. Determination of strength of given hydrochloride acid using pH meter
- 5. Determination of DO content of water sample by Winkler's method.
- 6. Conduct metric titration strong acid Vs Strong Base.
- 7. Estimation of BOD of the given water sample.
- 8. Estimation of iron content of the given solution using potentiometer.
- 9. Estimation of Iron content by spectrophotometer.
- 10. Estimation of sodium present in water using flame photometer.

COURSE OUTCOMES:

At the end of the course, students would

CO1: Apply Physics principles of elasticity to evaluate engineering properties of materials.

CO2: Analyze the physical principle involved in various instruments in acoustics, optics and thermal physics.

CO3: Characterize the quality of water samples with respect to their acidity, alkalinity and hardness.

CO4: Apply chemistry principles to evaluate DO, BOD, Iron content of the given samples.

CO5: Analyze the strength and amount of acids using pH, potentiometer, conductivity meter and the amount of chloride, sodium iron using Argentometric method and flame photometer for the given solution.

CO's	PO's	& PSO	's MA	PPING	ī										
со	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	2	1	1	-	-	1	-	1	I	-	-			
CO2	3	2	1	1	-	-	1	-	1	-	-	1			
CO3	3	2	1	1	-	-	1	-	1	-	-	-			
CO4	3	2	1	1	-	-	1	-	1	-	-	1			
CO5	3	2	-	1	-	-	1	-	1	-	-	1			
C	orrela	ation l	evels:		1 – lo)W		2 – me	edium		3 – h	igh		"-"- n	0
							corre	lation							

TOTAL: 60 PERIODS

COURSE DESIGNED BY	APPROVED BY
Dr.M.Kumaresan – Professor & Head/ S&H & Dr.T.Jayaprakash - Professor / Physics	Dr.M.Kumaresan – Professor & Head / S&H
Name and Department	Name and Department of BoS Chairman

11 32 EN1111	23EN111 COMMUNICATIVE ENGLISH LABORATORY	Ca	tegory	y : HSI	MC
SDC · A	(Common to all Pronchos)	\mathbf{L}	Т	Р	С
SDG . 4	(Common to an Drancnes)	0	0	2	1

1. To enable learners of engineering and technology to develop their basic communication skills in English.

2. To acquire, command in both the respective skills (listening and reading) and the productive skills (writing and speaking) of the English language.

3. To understand the key concepts of values, life skills and business communication and motivate students to look within and create a better version of themselves.

4. To focus on the development of basic fluency in English, usage of vocabulary in the technical field, and strengthening reading and official written communication skills.

5. To use language efficiently in expressing their opinions via various media.

LIST OF EXPERIMENTS

- 1. Conversation: Introduction to Classmates-Audio/Video (formal & informal)
- 2. Self-Introduction
- 3. Telephone Conversation
- 4. Listening to voicemail & messages
- 5. Listening and filling a form
- 6. Debate
- 7. Group Discussion
- 8. Exchanging personal Information
- 9. Introducing a friend politeness strategy
- 10. Essay Writing

COURSE OUTCOMES:

At the end of the course, students would

CO1 : To improve the communicative competence of learners

CO2 : To help learners use language effectively in academic /work contexts

CO3 : To develop various listening strategies to comprehend various types of audio materials like lectures, discussions, videos etc.

CO4 : To build on students' English language skills by engaging them in listening, speaking and grammar learning activities that are relevant to authentic contexts.

CO5 : To use language efficiently in expressing their opinions via various media.

30 Periods

CO's	-PO's	& PSO	's MA	PPING	F										
со	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	2	3	1	1	1	-	I	2	-	2	2	2	2	-
CO2	3	2	2	2	1	1	-	I	2	-	2	2	3	3	-
CO3	3	2	3	2	1	2	-	-	2	-	2	2	2	2	-
CO4	3	2	2	2	1	2	-	-	3	-	2	3	3	3	-
CO5	3	2	3	1	1	2	-	-	3	-	2	3	2	3	-
Corr	Correlation levels:1 - low2 - medium3 - high"-"- no correlation													ation	

COURSE DESIGNED BY	APPROVED BY
Dr.T.Saranaya- AP/ English & Prof. J.Brindha Devi- AP/ English	Dr.M.Kumaresan – Professor & Head/ S&H
Name and Department	Name and Department of BoS Chairman

SEMESTER II

U23EN202 PROFIC SDG: 4 PROFIC		Cate	egory	: HS	MC
SDC · A	PROFICIENCY IN ENGLISH	\mathbf{L}	Т	Р	С
5DG. 4		2	0	2	3

COURSE OBJECTIVE:

- 1. To improve the communicative competence of learners.
- 2. To help learners use language effectively in academic /work contexts.
- 3. To develop various listening strategies to comprehend various types of audio materials like lectures, discussions, videos, etc.
- 4. To build on students' English language skills by engaging them in listening, speaking, and grammar learning activities that are relevant to authentic contexts.
- 5. To use language efficiently in expressing their opinions via various media.

UNIT 1 INTRODUCTION TO FUNDAMENTALS OF COMMUNICATION

Listening -conversation: Introduction to classmates - Audio / video (formal & informal), Speaking - making telephone calls-Self Introduction; Introducing a friend; - politeness strategies.

UNIT 2

NARRATION AND SUMMATION

Listening - Listening to podcasts, anecdotes / stories / event narration; documentaries and interviews with celebrities. Speaking - Narrating personal experiences describing experiences and feelings-engaging in small talk- describing requirements and abilities.

UNIT 3 DESCRIPTION OF A PROCESS / PRODUCT

Listening - Listen to product and process descriptions; a classroom lecture; and advertisements about products. Speaking – Picture description- describing locations in workplaces- Giving instruction to use the product- explaining uses and purposes- Presenting a product.

UNIT 4 CLASSIFICATION AND RECOMMENDATIONS

Listening –Listening to lectures - and educational videos. Speaking – Small Talk; discussing and making plans-talking about tasks-talking about progress talking about travel preparations.

UNIT 5

EXPRESSION

Listening – Listening to debates/ discussions; panel discussions. Speaking –making predictions- talking about a given topic-giving opinions.

LIST OF EXPERIMENTS

1. Conversation: Introduction to Classmates-Audio/video (formal & informal).

- 2. Self-Introduction.
- 3. Telephone Conversation.
- 4. Listening to voicemail & messages.
- 5. Listening and filling a form.
- 6. Debate.
- 7. Group Discussion.

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6

8. Exchanging personal Information.
9. Introducing a friend politeness strategy.

10. Essay Writing.

COURSE OUTCOMES:

At the end of the course, students would

CO1: To listen and comprehend general as well as complex academic information

CO2: To listen to and understand different points of view in a discussion.

CO3: To speak fluently and accurately in formal and informal communicative contexts.

CO4: To describe products and processes and explain their uses and purposes clearly and accurately. **CO5:** To express their opinions effectively in both formal and informal discussions.

TOTAL: 60 PERIODS

TEXT BOOKS:

1.English for Engineers & Technologists, Orient Blackswan Private Ltd. Department of English, Anna University, 2020

2. English for Science & Technology Cambridge University Press, 2021. Authored by Dr. Veena Selvam, Dr. Sujatha Priyadarshini, Dr. Deepa Mary Francis, Dr. KN. Shoba, and Dr. Lourdes Joevani, Department of English, Anna University.

3. A Handbook for English Language Laboratories, E. Suresh Kumar, Department of English, College of

Engineering, Osmania University, P. Sreehari, Department of English, College of Engineering, Osmania

University. 2011.

REFERENCES:

1. Technical Communication – Principles And Practices By Meenakshi Raman & Sangeeta Sharma, Oxford Univ. Press, 2016, New Delhi.

2. A Course Book on Technical English By Lakshmi Narayanan, Scitech Publications (India) Pvt. Ltd.

3. English For Technical Communication (With CD) By Aysha Viswamohan Mcgraw Hill Education, ISBN : 0070264244.

4. Effective Communication Skill, Kulbhusan Kumar, R S Salaria, Khanna Publishing House.

5. Learning to Communicate - Dr. V. Chellammal, Allied Publishing House, New Delhi, 2003.

6. A Manual For English Language Laboratory, D. Sudha Rani, Pearson Education India, 2009.

CO's-PO's	CO's-PO's & PSO's MAPPING														
СО	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	РО 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	-	-	-	-	-	-	1	2	2	2	-	3	-	-	-

CO2	-	-	-	-	-	-	-	3	3	1	-	2	-	-	-
CO3	-	-	-	-	-	-	-	2	-	2	-	3	-	-	-
CO4	-	-	-	-	-	-	2	3	3	1	-	3	-	-	-
CO5	-	-	-	-	-	-	1	3	2	1	-	3	-	-	-
Correlati	ion leve	els:	1	- low		2 –	mediu	m	3 –	high		"_"	- no co	orrela	tion

COURSE DESIGNED BY	APPROVED BY
Dr. Alice Evangalin Jebaselvi - Professor / English	Dr.M.Kumaresan – Professor & Head/ S&H
Name and Department	Name and Department of BoS Chairman

112211 4 202	A DVANCED CALCULUS AND STATISTICS	Ca	tegor	y : B	SC
U25IVIA2U2	ADVANCED CALCULUS AND STATISTICS (Emboddod Theory and Lab)	\mathbf{L}	Т	Р	С
5DG:4	(Embedded Theory and Lab)	3	0	2	4

1. Familiarize the student with vector calculus ideas in order to find line, surface and volume integrals in basic coordinate systems.

2. Understand and demonstrate basic conclusions by using Gauss, Stokes and Greens theorems.

3. Provide the required skill to apply the statistical tools in engineering problems.

4. Learn the theory of hypothesis testing for both small as well as large samples, which is an essential skill for solving real life problems

5. Introduce the basic concepts of classifications of design of experiments which plays very important roles in the field of statistical quality control.

UNIT 1 VECTOR DIFFERENTIAL CALCULUS

Differentiation of Vectors– Scalar and Vector Point Functions–Gradient, divergence and curl– Directional derivative–Irrotational and Solenoidal vector fields– Application: Decision Review System in Cricket and Hit Distance Using Differentiation of Vectors.

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UNIT 2 VECTOR INTEGRAL CALCULUS

Vector integration – Green's theorem in a plane, Gauss divergence theorem and Stokes' theorem (excluding proofs). Simple applications involving cubes and rectangular parallelepipeds.

Nehru Institute of Technology

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UNIT 3 CORRELATION AND LINEAR REGRESSION

Correlation–Karl Pearson's correlation coefficients–Spearman's Rank Correlation– Regression–Estimation of Regression line–Application: Measuring the influences between factors- Estimation of association among the variables.

UNIT 4 HYPOTHESIS TESTING

Small sample tests: Student t-test - Single mean and difference of two means – F Test for Variance - Chi square test for goodness of fit –Independence of attributes. Application: Performance analysis- Comparative analysis–Quality testing.

UNIT 5 DESIGN OF EXPERIMENTS

Analysis of Variance: One way and two –way Classifications-Completely randomized design–Randomized block design– Latin square design. Application: Response Surface Methodology.

COURSE OUTCOMES:

At the end of the course, students would

CO1: Determine the identities that link grad, div and curl in Cartesian and other basic coordinate systems

CO2: Apply the Gauss, Stokes and Greens theorems to stream line integral computations and demonstrate basic outcomes.

CO3: Compute correlation between variables and use regression to predict unknown values using R-studio.

CO4 Apply the idea of hypothesis testing for both small and large samples in practical problems utilizing R- studio.

CO5: Construct the design of experiments modeling and analysis of variance using R- studio.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Erwin Kreyszig," Advanced Engineering Mathematics ", John Wiley and Sons, 10th Edition, New Delhi, 2016.

2.Grewal B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 41st Edition,2011.

3. Veerarajan T., Probability, Statistics and Random Processes, Tata McGraw Hill, 3rd edition, 2008.

CO's	CO's-PO's & PSO's MAPPING														
со	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	РО 11	PO 12	PSO 1	PSO 2	PSO3
C01	3	3	3	-	2	-	-	-	1	-	-	1	-	-	-

CO2	3	3	3	-	2	-	-	-	1	-	-	1	-	-	-	
CO3	3	3	3	-	2	-	-	-	1	-	-	2	-	-	-	
CO4	3	3	3	-	2	-	-	-	1	-	-	2	-	-	-	
CO5	3	3	3	-	2	-	-	-	1	-	-	2	-	-	-	
Corr	elatio	n leve	ls:	1 – lov	v	2	– meo	lium		3 – hig	nigh "-"- no correlatio					

COURSE DESIGNED BY	APPROVED BY
Dr. N.Vithya – Associate Professor / Mathematics	Dr.M.Kumaresan – Professor & Head/ S&H
Name and Department	Name and Department of BoS Chairman

U23PH203	DEVOICS FOD INFORMATION SCIENCE	С	atego	ry : B	SC
	(Common to CSE & IT)	L	Т	Р	С
SDG:4		3	0	0	3

1. Make the students understand the importance in studying electrical properties of materials.

2. Enable the students to gain knowledge in semiconductor physics.

3. Make the students to learn the origin of magnetism in magnetic materials and their classifications; to learn the physics of superconductivity and various properties exhibited by superconductors.

4. Make the students to learn the mechanisms of polarization in dielectric materials, and about classification and properties of dielectric materials; familiarize with the optical properties of materials.

5. Inculcate an idea of significance of Nano structures, quantum confinement, ensuing Nano materials preparation and applications.

UNIT 1 ELECTRICAL PROPERTIES OF MATERIALS

Introduction - Classical free electron theory - Expressions for Electrical and Thermal conductivity -Wiedemann-Franz law – Lorentz Number - Quantum free electron theory – Fermi distribution function – Effect of temperature on fermi function-Density of energy states – Carrier concentration in metals - Electron effective mass- concept of hole.

UNIT 2 SEMICONDUCTOR PHYSICS

Elemental and compound semiconductors - Intrinsic semiconductor - carrier concentration derivation

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Regulations 2023

- Fermi level - Variation of Fermi level with temperature - electrical conductivity - band gap determination – Extrinsic semiconductor - Derivation of carrier concentration in n-type and p-type semiconductor – variation of Fermi level with temperature and impurity concentration — Hall effect -Determination of Hall coefficient - Applications.

UNIT 3 MAGNETISM AND SUPERCONDUCTIVITY

Origin of magnetic moment - Bohr magneton - Comparison of Dia, Para and Ferro magnetism -Domain theory - Hysteresis - soft and hard magnetic materials - anti-ferromagnetic materials -Ferrites and its applications. Superconductivity: properties – Type I and Type II superconductors – High Tc superconductors – Applications of superconductors – SQUID, cryotron, magnetic levitation.

UNIT 4 DIELECTRIC AND OPTICAL PROPERTIES OF MATERIALS

Electrical susceptibility – Dielectric constant – Electronic, ionic, orientational and space charge polarization – Frequency and temperature dependence of polarisation – Internal field – Claussius – Mosotti relation (derivation) – Dielectric loss - Light absorption - Luminescence, Phosphors and white LEDs -Birefringence, Dichroism - Electro-optic effect and amplitude modulators.

UNIT 5 NANO DEVICES

Introduction - Quantum confinement – Quantum structures: quantum wells, wires and dots — Band gap of nano-materials - Classification of nanomaterials - Thin Film Growth, Ball Milling, Sol-Gel -Properties and applications – Carbon nanotubes: types and applications.

COURSE OUTCOMES:

At the end of the course, students would

CO1: Grasp the fundamental principles of classical and quantum mechanics, semiconductor physics, magnetic properties of materials, dielectric materials, superconducting materials, optical and nano materials and acquire insights into the essentials of emerging engineering materials.

CO2: Demonstrate a comprehensive understanding of classical and quantum mechanics, semiconductor physics, magnetic properties of materials, dielectric materials, and superconducting materials optical and nano materials, enabling the adept resolution of practical engineering challenges.

CO3: Apply the foundational theories of classical and quantum mechanics, semiconductor physics, and the properties of magnetic, dielectric, superconducting materials, optical and nano materials to seamlessly integrate knowledge into diverse engineering applications.

CO4: Classify the semiconductor, magnetic, dielectric, and superconducting properties of materials, utilizing this systematic categorization to effectively address engineering problems in Material Science.

CO5: Analyze the foundational knowledge of conductors, semiconductors, magnetic, dielectric, superconducting materials, optical and nano materials to formulate and implement solutions for contemporary engineering issues.

TOTAL: 45 PERIODS

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TEXT BOOKS:

1. Arumugam M., Materials Science. Anuradha publishers, 2010.

2. S.O. Kasap. Principles of Electronic Materials and Devices, McGraw Hill Education (Indian Edition), 2020.

3. The Physics and Chemistry of NanoSolids by Frank J. Owens and Charles P. Poole Jr, Wiley-Interscience, 2008.

REFERENCES:

1. Palanisamy P.K. Materials Science. SCITECH Publishers, 2011.

2. Senthilkumar G. Engineering Physics II. VRB Publishers, 2011

3. Handbook of nanoscience, Eng. & Technology by W. Gaddand, D. Bernner, S.L. Solnki& G.J. Infrate (Eds), CRC press 2002.

4. Charles Kittel, Introduction to Solid State Physics, Wiley India Edition, 2019.

5. Amnon Yariv and P.Yeh, Photonics: Optical Electronics in Modern Communications, Oxford Univ.Press, 2007

6. Nanostructure and Nanomaterials: Synthesis , Properties and Application by G. Cao, Imperial College Press, 2004.

CO's	CO's-PO's & PSO's MAPPING														
со	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	РО 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	2	1	I	-	-	1	-	-	I	-	1	-	-	-
CO2	3	2	-	-	1	-	1	-	-	-	-	-	-	-	-
CO3	3	2	1	-	1	-	1	-	-	1	-	1	-	-	-
CO4	3	2	1	-	1	-	1	-	-	1	-	1	-	-	-
CO5	3	2	1	-	1	-	1	-	-	1	-	1	-	-	-
Correlation levels: 1 – low						2 -	medi	um	3	– higł	ı	•د_٥	"- no c	correla	ation

COURSE DESIGNED BY	APPROVED BY
Dr. T.Jayaprakash- Professor / Physics	Dr.M.Kumaresan – Professor & Head/ S&H
Name and Department	Name and Department of BoS
Name and Department	Chairman

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U23CS201 PYTHON PROGRAMMING AND PRACTICES SDG:4

COURSE OBJECTIVE:

- 1. To understand and develop programs using Python.
- 2. To use the concepts of strings, control flow, data types in python programs.
- 3. To create programs using list, tuples, dictionaries, and files concept in Python.
- 4. To analyze image processing, networking and object-oriented programming in Python.
- 5. To create new ideas for problems in real world application using python.

UNIT 1 INTRODUCTION TO PYTHON PROGRAMMING

Introduction to Python Programming- Python Interpreter and Interactive Mode -Variables-Numerical types- Arithmetic operators and Expressions- Psuedo Code - Values and types: int, float, Boolean - Variables, Expressions, Statements -Illustrative Problems.

UNIT 2 DATA TYPES, CONTROL FLOW, STRINGS

Control Flow -conditional (if), Alternative (if-else), Chained conditional (if-else if-else)- Iteration: state, while, for, break, continue, pass - Strings: string slices, immutability, string functions and methods, string module, Regular expression, Pattern matching. - Illustrative Problems.

UNIT 3 LISTS, TUPLES DICTIONARIES AND FUNCTIONS 10

Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters- Tuples: tuple assignment, tuple as return value- Dictionaries: operations and methods, advanced list processing – list comprehension. Functions and User Defined Functions: Simple and Mathematical Built–in Functions, Recursion -Illustrative Problems.

UNIT 4 FILES AND OOPS CONCEPT IN PYTHON

Files, Text files, reading and writing files-format operator; Files and exception handling - Introduction to Object Oriented Programming – Basic principles of Object Oriented Programming in Python – Class Definition-Object Creation - Inheritance, Composition, Operator Overloading.

UNIT 5 IMAGE PROCESSING & NETWORKING WITH PYTHON AND APPLICATIONS

Basics of Image processing- Image File Formats – Introduction to Classic Image Processing Algorithm- Image Processing Tools-Fundamentals of Networking- Introduction to Python Sockets- Simple Client/Server Programming-Python Applications.

COURSE OUTCOMES:

At the end of the course, students would

CO1: Explain the concepts of Python.

CO2: Use appropriate constructs to represent data.

CO3: Write programs using different constructs in Python.

С	Category : ESC										
L	Т	Р	С								
3	0	0	3								

CO4: Develop real world applications in image processing and networking.

CO5: Develop various simple programs for real world application using python.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Python Programming for Beginners: Skyrocket Your Code and Master Python in Less than a Week. Discover the Foolproof, Practical Route to Uncover Insider Hacks, Unlock New Opportunities, and Revolution Kindle Edition by Kit Jackson (Author), 31 May 2023 2. Introducing Python, 2nd Edition, by Bill Lubanovic, O'Reilly Media, Inc., 2019.

REFERENCES:

1.Python Programming for Beginners, ISBN-13-979-8870875248, Narry Prince, 2023.

2.Python Programming, West McKinney, ISBN-13-979-8870534817, 2023.

3. Python Quick Start Guide: The Simplified Beginner's Guide to Python Programming Using Hands-On Projects and Real-World Applications, by Robert Oliver, ISBN-13-978-163610037, 2023.

4. Mastering Python Networking: Utilize Python packages and frameworks for network automation, monitoring, cloud, and management by Eric Chou, 2023.

CO's-	CO's-PO's & PSO's MAPPING														
со	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO 12	PSO 1	PSO 2	PSO3
CO1	2	-	1	-	-	-	-	-	1	1	-	3	1	1	-
CO2	2	-	1	-	-	-	-	-	1	1	-	3	1	1	-
CO3	2	-	1	-	-	-	-	-	1	1	-	3	1	1	-
CO4	2	3	1	-	3	-	-	1	1	1	3	3	1	1	-
CO5	2	3	1	1	3	-	-	1	3	1	3	3	1	1	-
Corr	relatio	on leve	els: 1	– lov	V	2	– me	dium		3 – higł	1	"_"	'- no (correl	ation

COURSE DESIGNED BY	APPROVED BY
Dr.S.Pathur Nisha – Professor & Head/ CSE & Prof. Evance Leethail – AP/CSE	Dr.S.Pathur Nisha – Professor & Head/ CSE
Name and Department	Name and Department of BoS Chairman

B.**E**

112208202		(Catego	ory : E	SC
U25C52U2	DIGITAL LOGIC CIRCUITS	\mathbf{L}	Т	Р	С
SDG:4		2	0	2	3

1. To represent information in various number systems.

- 2. To introduce different methods to simplify Boolean function and realize the logic circuits.
- 3. To analyze logic systems and able to design combinational circuit using Karnaugh Map.
- 4. To analyze synchronous sequential circuits.
- 5. To understand A/D and D/A converters.

UNIT 1 MINIMIZATION TECHNIQUES AND LOGIC GATES

Number Systems and their conversions - Complements – Signed Binary Numbers – Binary Codes (BCD, Gray) – Binary Logic -Boolean Algebra: Definitions – Basic and Axiomatic –Theorems of Boolean Algebra – Boolean functions: Realization of functions using Logic gates.

UNIT 2 GATE LEVEL MINIMIZATION

Canonical and Standard Forms of Boolean functions – Minimization of functions using Karnaugh Map – Don't–Care Conditions – NAND and NOR Implementation– Exclusive- OR function – Minimization of functions using Quine- McCluskey method.

UNIT 3COMBINATIONAL CIRCUITS6Analysis procedure – Design procedure –Half Adder – Full Adder - Half Subtractor – Full5Subtractor – Magnitude Comparator – Decoders – Encoders – Multiplexers – Demultiplexers.6

UNIT 4 SEQUENTIAL CIRCUITS

Introduction to Sequential Circuits – Flip-Flops – operation and excitation tables, Triggering of FF, Analysis and design of clocked sequential circuits - Registers – Counters.

UNIT 5

Ladder type D/A converter - Dual slope A/D converter - Successive approximation A/D converter-Case study of DAC0800 and ADC0809 chips.

D/A AND A/D CONVERTERS

PRACTICAL EXERCISES:

- 1. Verification of Boolean functions using basic gates.
- 2. Implement Half Adder and Full Adder using logic gates.
- 3. Implement Half Subtractor and Full Subtractor using logic gates.
- 4. Design and Implementation of 4-bit Adder and Subtractor circuit.
- 5. Design and Implementation of 4-bit binary to gray code converters.
- 6. Design of Multiplexer and Demultiplexer circuits using Verilog HDL.
- 7. Design and implementation of decoders and encoders using Verilog HDL.
- 8. Implementation of 2-bit Magnitude Comparator using logic gates.
- 9. Design and implement various Shift Registers.

6

4

7

COURSE OUTCOMES:

At the end of the course, students would

CO1: Recall the number systems and their conversions and complements, Boolean algebra and theorems.

CO2: Interpret the realization of Boolean functions using logic gates, signed binary numbers and binary codes.

CO3: Explain the analysis and design procedure of combinational and sequential circuits and various A/D and D/A converters.

CO4: Solve the canonical and standard forms of Boolean functions using K-map, Quine-McCluskey method.

CO5: Analyze NAND, NOR and Ex-OR implementation using logic gates, DAC and ADC chips.

CO6: Design half and full adder/Subtractor, magnitude comparator, encoder and decoder, multiplexer and demultiplexer, flip flops, registers and counters.

TOTAL: 60 PERIODS

TEXT BOOKS:

1. Thomas.L.Floyd, "Digital Fundamentals", 11 Edition, Prentice Hall, 2021

2. M. Morris Mano, Michael D. Ciletti, "Digital Design : With an Introduction to the Verilog HDL, VHDL, and System Verilog", Sixth Edition, Pearson Education, 2018.

3. Salivahanan S. & Arivazhagan S., "Digital Circuits and Design", 5th Edition, Oxford University Press, New Delhi, 2018.

REFERENCES:

1. G. K. Kharate, Digital Electronics, Oxford University Press, Donald D.Givone, "Digital Principles and Design", Tata McGraw-Hill, 2017

2. John F. Wakerly, Digital Design Principles and Practices, Fifth Edition, PearsonEducation, 2017. 3. https://nptel.ac.in/courses/117/105/117105080/

4.https://www.oreilly.com/library/view/fundamentals of digital/9781118969304 /9781118969304c01.xhtml.

CO's	CO's-PO's & PSO's MAPPING														
со	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	РО 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	3	2	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	2	-	-	-	-	-	-	-	-	-	-	-	-
CO3	3	3	3	2	-	-	-	-	-	2	-	-	1	-	1
CO4	3	3	2	2	-	-	-	-	-	-	-	-	-	-	-
CO5	3	3	3	-	-	-	-	-	-	2	-	-	1	-	1

Nehru Institute of Technology

Cori	relatio	n leve	ls: 1	– low	<u> </u>	2 -	medi	um	3	– higł		د_۱	"- no (correla	ation
CO6	3	3	3	3	-	-	-	-	-	2	-	-	1	-	1

COURSE DESIGNED BY	APPROVED BY
Dr.S.Pathur Nisha – Professor & Head/ CSE & Prof. V Satheeswaran – AP/ESE	Dr.S.Pathur Nisha – Professor & Head/ CSE
Name and Department	Name and Department of BoS Chairman

		Cat	tegoi	ry : H	ISMC
U23HS202	TAMIL AND TECHNOLOGY	L	Т	Р	С
		1	0	0	1

- 1. To learn the extensive literature of classical Tamil.
- 2. To review the fine arts heritage of Tamil culture.
- 3. To realize the contribution in Indian freedom struggle.

UNIT 1 TAMIL AND TECHNOLOGY

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

UNIT 2 DESIGN AND CONSTRUCTION TECHNOLOGY

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

UNIT 3 MANUFACTURING TECHNOLOGY

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

UNIT 4 AGRICULTURE AND IRRIGATION TECHNOLOGY

Dam, Tank, ponds, Sluice, Significance of KumizhiThoompu of Chola Period, Animal Husbandry -Wells designed for cattle use - Agriculture and Agro Processing - Knowledge of Sea - Fisheries – Pearl -Conche diving - Ancient Knowledge of Ocean - Knowledge Specific Society.

3

3

3

UNIT 5 SCIENTIFIC TAMIL & TAMIL COMPUTING

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

COURSE OUTCOMES:

At the end of the course, students would

CO1: Understand the extensive literature of Tamil and its classical nature (understand).

CO2: Understand the heritage of sculpture, painting and musical instruments of ancient people (understand).

CO3: Review on folk and martial arts of Tamil people (understand).

CO4: Realization of thinai concepts, trade and victory of chozha dynasty (understand).

CO5: Understand the contribution of Tamils in Indian freedom struggle, self-esteem movement and siddha medicine (understand).

TOTAL: 15 PERIODS

TEXT BOOKS:

1.தமிழகவரலாறு – மக்களும்பண்பாடும்– .கே.கேபிள்ளை (வெளியீடு):

தமிழ்நாடுபாடநூல்மற்றும்கல்வியியல்பணிகள்கழகம்.

2.கணினித்தமிழ் – முனைவர்இல. சுந்தரம் . (விகடன்பிரசுரம்).

3.கீழடி – வைகைநதிக்கரையில்சங்ககாலநகரநாகரிகம் (தொல்லியல்துறை (வெளியீடு).

REFERENCES:

1.Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL - (in print)

2.Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).

3.National The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: Interl Institute of Tamil Studies).

4.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.

5.Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu).

6. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) - Reference Book.

CO's	CO's-PO's & PSO's MAPPING														
со	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CO1	-	Ι	I	I	Ι	I	3	3	I	2	_	3	-	-	-
CO2	-	Ι	I	I	Ι	I	3	3	I	2	-	3	-	-	-

CO5	-	-	-	-	-	-	3	3	-	2	-	3	-	-	-
Corr	rrelation levels: 1 – low				2	2 – me	dium		3 – hi	gh	"-	-"- no c	correla	tion	

COURSE DESIGNED BY	APPROVED BY
Prof. A.Prabhakaran – AP/ Tamil	Dr.M.Kumaresan – Professor & Head/ S&H
Name and Department	Name and Department of BoS Chairman

LINGEROAD		С	atego	ry : E	EC
U25EE2U2 SDC-17	CAREER ENHANCEMENT TRAINING II	L	Т	Р	С
SDG.17		2	0	0	1

1. To help students demonstrate various principles involved in solving mathematical problems and thereby reducing the time taken for performing job functions.

2. To enable students critically evaluate various real-life situations by resorting to an analysis of key issues and factors.

3. To help them improve their communicative English for Interview and corporate readiness.

UNIT 1	NUMERICAL REASONING	6
Problems on Ages – Arithmetic	Reasoning - Ratio & Proportion – Alligation & Mixtures	
UNIT 2	GEOMETRY & SHAPES	6
Mensuration 2D – Mensuration	3D – Height – Distance - Perimeter – Area – Volume	
UNIT 3	COMBINATIONS & CALENDARS	6
Permutation and Combination -	- Probability-Circular Permutation - Clocks and Calendars	
UNIT 4	CLASSIC REASONING	6
Blood Relation – Direction Sen	se – Seating Arrangement – Syllogism – Statement & Conclusion	
UNIT 5	VERBAL APTITUDE	6
Synonyms Antonyms – Spottin	g Error - Sentence Correction - Change of Voice - Change of Spe	ech –

Spelling - Reading Comprehension - Select Words - Closet Test.

COURSE OUTCOMES:

At the end of the course, students would

CO1: Demonstrate problem-solving skills and critical thinking abilities in the context of Engineering Aptitude.

CO2: To use appropriate strategies and shortcuts to improve speed and accuracy in solving aptitude problems during recruitment processes.

CO3: Evaluate and interpret aptitude test results to identify areas of improvement and develop a personalized study plan for further enhancement.

CO4: Use the correct Grammar, Vocabulary, Spelling and Comprehension ensuring the enhancement their language skills and the ability to use the skills for effective Communication

TOTAL: 30 PERIODS

TEXT BOOKS:

1. The Pearson Guide to Quantitative Aptitude For Competitive Examinations, Dinesh Khattar. Pearson

2. Quantitative Aptitude Dr. R.S. Aggarwal S. Chand Publication

3. A modern Approach to Verbal and Non-Verbal Reasoning R.s. Aggarwal

REFERENCES:

1. Quantitative Aptitude for CAT, Arun Sharma.

2. Fast Track Objective Arithmetic, Rajesh Verma, Arihant Publication.

3. Quantitative Aptitude Quantum CAT Common Admission Tests for Admission into IIMs, Sarvesh K. Verma.

4. Wiley's Exam Expert Quantitative Ability for CAT, 2ed, Ashu Jain.

CO's-F	CO's-PO's & PSO's MAPPING														
со	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	3	3	3	-	-	-	-	-	1	-	-			
CO2	3	2	1	3	-	-	-	-	-	1	-	-			
CO3	3	1	1	2	-	-	-	-	-	1	-	-			
CO4	1	1	1	1	-	-	-	-	-	3	-	-			
CO5	-	-	-	-	-	-	-	-	-	-	-	-			
Correlation level: 1 – low					V Ž	2 – me	edium	<u>.</u>	3 – h	igh	<u>.</u>	"-"- n	o corr	elatio	n

COURSE DESIGNED BY	APPROVED BY
Prof. Ramesh Raja – Head/ NCPIR	Dr.S.Pathur Nisha – Professor & Head/ CSE
Name and Department	Name and Department of BoS Chairman

1123CE212	ENCINEEDING DDA CTICES I ARODATODV	С	Category : ESC							
SDC-4	Common for CSE & IT)	L	Т	Р	С					
5DG:4	(Common for CSE & 11)	0	0	2	1					

1. Connecting various pipe fittings used in common household plumbing work; Planning; making joints in wood materials used in common household wood work.

2. Welding various joints in steel plates using arc welding work; Machining various simple processes like turning and drilling in parts.

3. Assembling simple mechanical assembly of common household equipments; Making a tray out of metal sheet using sheet metal work.

4. Wiring various electrical joints in common household electrical wire work.

5. Soldering and testing simple electronic circuits; Assembling and testing simple electronic components.

LIST OF EXPERIMENTS

GROUP A (CIVIL & MECHANICAL)

PART I-CIVIL ENGINEERING PRACTICES

Plumbing Work:

1. Connecting various basic pipe fittings like valves, taps and other components which are commonly used in household.

Wood Work:

- 2. Planning
- 3. Making T- Joint.

PART II-MECHAINICAL ENGINEERING PRACTICES

Welding Work:

- 4. Welding of Butt Joints using arc welding.
- **5.** Practicing gas welding

Basic Machining Work:

- 6. (Simple)Turning.
- 7. (Simple)Drilling.

Machine Assembly Practice:

- 8. Study of Centrifugal pump.
- 9. Study of Air conditioner.

Sheet Metal Work:

10. Making of a square tray.

GROUP B (ELECTRICAL & ELECTRONICS)

PART I- ELECTRICAL ENGINEERING PRACTICES

- 1. Introduction to switches, fuses, indicators and lamps Basic switch board wiring with lamp, fan and three pin sockets.
- 2. Staircase wiring.
- 3. Fluorescent Lamp wiring with introduction LED types.

PART II- ELECTRONICS ENGINEERING PRACTICES

- 4. Study of Electronic components and equipments Resistor, color coding measurement of AC signal parameter (peak-peak, rms period, frequency) using CRO.
- 5. Soldering simple electronic circuits and checking continuity.
- 6. Assembly and dismantle of LED TV.

COURSE OUTCOMES:

At the end of the course, students would

CO1: Fabricate carpentry components and pipe connections including plumbing works.

CO2: Use welding equipments to join the structures.

CO3: Carry out the basic assembling and machining operations; Make the models using sheet metal.

CO4: Carry out basic home electrical works and appliances and to measure the electrical quantities.

CO5: Soldering the simple electronic circuits; Assemble the simple electronic devices.

TOTAL: 30 PERIODS

<i>CO's</i> -	PO's &	k PSO	's MAF	PPING											
СО	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO3
CO1	2	2	2	2	0	0	0	0	1	2	2	1	0	0	0
CO2	2	2	2	2	0	0	0	0	1	2	2	1	0	0	0
CO3	2	2	2	2	0	0	0	0	1	2	2	1	0	0	0

Nehru Institute of Technology

CO4	2	2	2	2	0	0	0	0	1	2	2	1	0	0	0
CO5	2	2	2	2	0	0	0	0	1	2	2	1	0	0	0
Cor	relatio	on leve	els:	1 – lov	V	2	– mec	lium		3 – high "-"- no correlatio					lation

COURSE DESIGNED BY	APPROVED BY
Prof. S.Satheeshkumar – AP/Mechanical & Prof. V. Satheeswaran – AP/ECE	Dr.S.Pathur Nisha – Professor & Head/ CSE
Name and Department	Name and Department of BoS Chairman

U23GE213 SDG:4		Ca	atego	ry : E	SC
	ENGINEERING GRAPHICS LABORATORY	\mathbf{L}	Т	Р	С
		0	0	2	1

1. To improve imagination skills.

2. To develop graphic skills for communication of concepts, ideas and design of Engineering products.

- 3. To learn drafting & modeling packages in orthographic and isometric drawings.
- 4. To train the usage of 2D and 3D modeling.
- 5. To learn graphical representation of machine components.

INTRODUCTION TO CAD

Basic drawing and editing commands: line, circle, rectangle, erase, view, undo, redo, snap, object editing, moving, copying, rotating, scaling, mirroring, layers, templates, polylines, trimming, extending, stretching, fillets, arrays, dimensions. Dimensioning principles and conventional representations.

ORTHOGRAPHIC PROJECTIONS

Systems of projections, conventions and application to orthographic projections - simple objects. Lines, planes, simple solids.

ISOMETRIC PROJECTIONS

Principles of isometric projection- Isometric scale; Isometric views

- 1. Introduction to Computer Aided Drafting software packages.
- 2. Practice on features of a Computer Aided Drafting package.
- 3. Practice Sheet -Title Block.

- 4. Loci of Points.
- 5. Engineering curves.
- 6. Projection of Lines.
- 7. Projection of Planes.
- 8. Projection of Solids.
- 9. Drafting of Isometric Projection.
- 10. Drafting of Orthographic views of simple parts.

COURSE OUTCOMES:

At the end of the course, students would

CO1: Understand the standards and common cases as well as dimensioning in technical drawings development

CO2: Communicate the technical ideas in the form of drawings.

CO3: Apply the drawing skills in representing various geometrical features.

CO4: Develop orthographic projections and isometric views of various objects.

CO5: Sketch simple objects and their pictorial views using CAD.

TOTAL: 30 PERIODS

TEXT BOOKS:

1. K. Venugopal, V.Prabhu Raja, Engineering Drawing + Auto Cad, New Age International Publishers.

2.Kulkarni D.M, AP Rastogi and AK Sarkar, Engineering Graphics with Auto Cad, PHILearning, Eastern Economy editions.

CO's	CO's-PO's & PSO's MAPPING														
со	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	РО 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	1	-	2	-	2	-	-	-	1	-	-	1	2	2	1
CO2	1	-	2	-	2	-	-	-	1	-	-	1	2	2	1
CO3	1	-	2	-	2	-	-	-	1	-	-	1	2	2	1
CO4	1	-	2	-	2	-	-	-	1	-	-	1	2	2	1
CO5	1	-	2	-	2	-	-	-	1	-	-	1	2	2	1
Correlation levels: 1 – low 2 – 1						medi	um	3	– higł	1	"_"	"- no c	orrela	ation	

COURSE DESIGNED BY	APPROVED BY
Prof. A. Balthilak – AP/Mechanical	Dr.S.Pathur Nisha – Professor & Head/ CSE
Name and Department	Name and Department of BoS Chairman

SEMESTER III

1122111 206		C	Catego	ory : B	SC
UZSMIASUO	PROBABILITY AND LINEAR ALGEBRA	\mathbf{L}	Т	Р	С
SDG:4		3	1	0	4

COURSE OBJECTIVE:

1. To acquire the basic concept of discrete and continuous random variables.

2. To measure uncertainty using various probability distributions.

3. To describe the fundamental ideas behind random variables in two dimensions.

4. To understand postulates of vector spaces and linear transformations.

5. To comprehend the ideas behind inner product spaces.

UNIT 1 RANDOM VARIABLES

Random Variables – Discrete and Continuous random variables – Probability mass and Probability density functions – Mean and Variance. Application of Random Variables in Data Handling in Engineering Filed.

UNIT 2PROBABILITY DISTRIBUTIONS9+3

Discrete Distributions: Binomial distribution – Poisson distribution – Continuous Distributions: Uniform distribution – Exponential distribution – Normal distribution. Application in Broadcasting and Cloud Computing Problems.

UNIT 3TWO DIMENSIONAL RANDOM VARIABLES9+3

Introduction – Joint probability distributions – Marginal and conditional distributions – Covariance – Correlation and linear regression. Application: Medical imaging.

UNIT 4VECTOR SPACES9+3Vectors Selection of the selection

Vector spaces – Subspaces – Linear combination, span, linear independence and dependence – Null space, Column space and row space – Basis and dimension of a vector space – Rank and nullity. Application: Digital Image Enhancement Using Transformations.

UNIT 5

INNER PRODUCT SPACES

Inner product, length, angle and orthogonality – orthogonal sets – orthogonal projections – Inner product spaces – orthonormal basis; Gram-Schmidt process. Application: Designing the Movement of Robotic Arms.

COURSE OUTCOMES:

At the end of the course, students would

CO1: Understand the fundamental knowledge of the concepts of discrete and continuous random variables.

CO2: Classify the problems using probability distributions and apply appropriate distributions.

CO3: Comprehend the basic concepts of two-dimensional random variables and apply in engineering

9+3

9+3

applications.

CO4: Analyze the essential subspace properties of a vector space to get its basis and dimension.

CO5: Compute inner products on a real vector space and compute angle and orthogonality in inner product spaces to solve application problems

TOTAL: 60 PERIODS

TEXT BOOKS:

1. Steven J. Leon., "Linear Algebra with Application" Ninth Edition, Pearson, 2015.

2. Gilbert Strang, Linear Algebra, 5th Edison, ANE Books, 2016.

3. Ross. S.M., "Introduction to Probability and Statistics for Engineers and Scientists", Elsevier, New Delhi, 5th Edition, 2014.

REFERENCES:

1. Friedberg, A.H., Insel, A.J. and Spence, L., Linear Algebral, Prentice Hall of India, New Delhi, 2004.

2. David C.Lay., "Linear Algebra And Its Applications" 5th Edition, 2015.

3. Kumaresan, S., —Linear Algebra – A Geometric Approach^I, Prentice – Hall of India, New Delhi, Reprint, 2010.

4. Douglas C. Montgomery & George C. Runger, "Applied Statistics and Probability for Engineers ", 7th Edition, John Wiley and Sons, USA, 2018.

5. Devore. J.L., "Probability and Statistics for Engineering and the Sciences, Cengage Learning, New Delhi, 8th Edition, 2014.

CO's	CO's-PO's & PSO's MAPPING														
со	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	3	1	1	-	-	-	-	1	-	-	1	-	-	-
CO2	3	3	1	1	-	-	-	-	1	-	-	1	-	-	-
CO3	3	3	1	1	-	-	-	-	1	-	-	1	-	-	-
CO4	3	2	1	1	-	-	-	-	1	-	-	1	-	-	-
CO5	3	2	1	1	-	-	-	-	1	-	-	1	-	-	-
Correlation levels: 1 – low						2 -	medi	um	3	– higł	1	•د_ه	"- no c	correla	ation

COURSE DESIGNED BY	APPROVED BY
Dr. N. Vithya- ASP/ Mathematics	Dr. K.Parimala Gandhi – Professor & Head/ S&H
Name and Department	Name and Department of BoS Chairman

112208201		C	Catego	ory : P	CC
023C5301	DATA STRUCTURES AND ALGORITHMS	L	Т	Р	С
SDG:4		3	0	0	3

1. To introduce and learn about the concepts of linear data structures.

- 2. To introduce and learn about the concept of non-linear data structures.
- 3. To learn about the concepts of the graph and graph traversal structures.
- 4. To understand the concept of sorting and searching.
- 5. To get exposure on various algorithm design and analysis techniques.

UNIT 1 LINEAR DATA STRUCTURE

Abstract Data types (ADT) - List ADT - Array based implantation - Linked Lists implementation - Singly Linked Lists - Doubly Linked Lists - Stacks ADT : Operations - Application of stack - Queues ADT : Operations - Circular Queue - Applications of Queues.

UNIT 2NON LINEAR DATA STRUCTURE : TREES9+3

Tree ADT – Tree Traversal: In-order, Pre-order, Post order – Binary Search Tree ADT – Application of Trees : AVL Trees – B+ trees – B- Trees – Heap Data structure : Operations – Binary heap

UNIT 3GRAPH ALGORITHMS9+3

Graph: Terminologies – Representation of Graph - Graph traversal – Breadth-first traversal – Depthfirst traversal - Topological sort – Shortest path algorithm - Dijkstra's algorithm- Minimum Spanning Tree Algorithm: Prim's , Kruskal algorithm

UNIT 4SORTING AND SEARCHING ALGORITHMS9+3

Searching – Types of Searching : Linear Search , Binary Search – Sorting : Insertion Sort – Selection Sort – Bubble Sort – Quick Sort – Analysis and Comparison of Sorting Algorithms – Hashing: Hash table – Hash functions –Resolving Collision Techniques: Separate chaining – Open addressing – Rehashing – Extendible Hashing

UNIT 5 FUNDAMENTALS OF ALGORITHMS AND ITS ANALYSIS 9+3

Algorithm, Notation of Algorithm, Performance Analysis of Algorithm : Space complexity, Time

9+3

complexity, Asymptotic Notation - Big (O) Notation, Omega Notation, Theta Notation and Little (o) notation, Recurrences, Probabilistic Analysis, Disjoint Set Operations, Union And Find Algorithms, Amortized Analysis

COURSE OUTCOMES:

At the end of the course, students would

CO1: Design and implement linear data structures, such as lists, queues, and stacks, according to the needs of different applications.

CO2: Design and analyze tree structures and Heap.

CO3: Apply graph algorithms to solve problems and analyze their efficiency.

CO4: Critically analyze and implement various searching, sorting algorithms with its competence.

CO5: Analyze the performance of algorithms, time and space complexity of algorithms.

TOTAL: 60 PERIODS

TEXT BOOKS:

1."Data Structures and Algorithm Analysis in C++" by Mark Allen Weiss (4th Edition, 2020)

2."Data Structures And Algorithms In C++" by Michael T. Goodrich (2nd Edition, 2011)

REFERENCES:

1."Data structures using C++" by Patil, Varsha H(2nd Edition, 2012)

2."Problem Solving with Algorithms and Data Structures Using C++" by Bradley N. Miller and David L. Ranum (2nd Edition, 2010)

CO's	CO's-PO's & PSO's MAPPING														
со	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	2	3	1	2	1	-	-	-	1	-	2	3	2	1	1
CO2	1	2	1	2	2	-	-	-	2	-	2	2	2	2	2
CO3	2	3	1	2	3	-	-	-	2	-	1	2	2	1	1
CO4	1	2	1	2	1	-	-	-	1	-	2	3	2	2	2
CO5	2	1	I	1	1	-	-	-	1	-	2	3	2	3	2
Correlation levels: 1 – low					2 – medium			3 – high			"-"- no correlation				

COURSE DESIGNED BY	APPROVED BY
Prof. P.Aruna- AP/CSE	Dr.S.Pathur Nisha – Professor & Head / CSE
Name and Department	Name and Department of BoS Chairman

		C	Catego	ory : P	CC
U23CS302	OBJECT ORIENTED PROGRAMMING USING	\mathbf{L}	Т	Р	С
SDG:4	JAVA	3	0	0	0

1. To understand and develop programs using Java, leveraging object-oriented programming principles.

2. To create and manage Java programs utilizing constructors, destructors, member functions, static members, and nested classes.

3. To use the concepts of classes, objects, inheritance, polymorphism, and function overloading in Java programs.

4. To handle exceptions and implement multithreading in Java for efficient and robust application development.

5. To perform file operations and implement networking using Java, applying relevant classes and techniques for real-world applications.

UNIT 1 INTRODUCTION TO OOPS AND JAVA

Introduction to Java and OOP - Key Concepts of OOP - Advantages of OOP - Java Basics - Control Structures – Array.

UNIT 2

CLASSES AND OBJECTS

Defining Classes and Objects - Access Specifiers and Modifiers - Defining Member – Functions - Static Members and Methods - Constructors and Destructors - Inline Methods and Nested Classes - Object Assignment and Management - Arrays of Objects - Passing Objects to Methods - Returning Objects from Methods.

UNIT 3 INHERITANCE AND OVERLOADING

Inheritance: Introduction, purpose and benefits - Single Inheritance, Multilevel Inheritance, Hierarchical Inheritance, Multiple Inheritance using Interface and Hybrid Inheritance - Method Overriding - Use of 'super' keyword.

Polymorphism: Concept and Runtime polymorphism - Abstract Classes and Methods - Use of 'final' keyword - Protected Members - use of 'protected' keyword - Type Casting in Inheritance – Interfaces.

Function Overloading: Introduction, Syntax and Rules - Difference between overloading and overriding - Automatic Type Conversion - Overloading in Inheritance.

UNIT 4 EXCEPTION HANDLING AND MULTITHREADING

Exception Handling: Definition and Purpose - Checked Exceptions - Unchecked Exceptions - Errors - Throwable, Exception, and Error classes - try-catch Blocks - Multiple catch blocks - finally Block - Nested try-catch - Common Java Exceptions – User defined Exceptions.

Java Multithreading: Introduction - Processes vs. Threads - Creating Threads - Extending 'Thread' class - Implementing 'Runnable' interface – 'synchronized' keyword - Locks and monitors

8

10

- Thread Lifecycle.

UNIT 5 FILES AND JAVA NETWORKING

Working with Files: Input Stream, Output Stream, Reader, Writer - Creating, deleting, and inspecting file properties - Reading from and writing to text files - Renaming, moving, and copying files using Files class - EOF Detection - Updating a File - Command Line Arguments Handling. Networking with Java: TCP Sockets - Using 'ServerSocket' and 'Socket' classes - UDP Sockets -Using 'Datagram Socket' and 'Datagram Packet' - Networking Utilities - Using 'InetAddress' class.

COURSE OUTCOMES:

At the end of the course, students would

CO1: Explain the fundamental concepts of Object-Oriented Programming and Java, including key OOP principles and Java basics.

CO2: Use appropriate Java constructs such as classes, objects, to represent and manage data.

CO3: Write Java programs incorporating control structures, arrays, inheritance, and polymorphism to solve complex problems.

CO4: Handle exceptions and implement exception handling, and multithreading in Java to develop efficient and robust applications.

CO5: Perform file operations and implement networking using Java to create practical, real-world applications.

TOTAL: 45 PERIODS

TEXT BOOKS:

1.Java: The Complete Reference, Herbert Schildt, McGraw Hill Education, 12th Edition 2022 (Units 1,2, 3,4,5)

2.Java How to Program, Early Objects, Harvey Deitel & Paul J. Deitel, Pearson, 11th Edition, 2018 (Units 1,2,3,4)

3. Head First Java, Kathy Sierra, Bert Bates, Trisha Gee, O'Reilly Media, Inc.3rd Edition, May 2022 (Units 1, 2, 3).

4. Effective Java, Joshua Bloch, Addison-Wesley Professional, 3rd Edition, December 2017(Units 2, 3).

REFERENCES:

1. Java Programming: From Beginner to Expert - Durdana Siddiqui, 2022.

2. Learning Java - Marc Loy & Patrick Niemeyer & Daniel Leuck, 6th Edition O'Reilly Media, September 2023.

3. Java Network Programming - Elliotte Rusty Harold, 4th Edition, O'Reilly Media, 2013.

CO's	CO's-PO's & PSO's MAPPING														
со	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	2	1	-	2	-	-	I	-	Ι	Ι	2	2	-	-
CO2	3	2	2	-	3	-	-	-	-	-	-	3	3	-	-
CO3	3	2	1	-	2	-	-	-	-	-	-	2	2	-	-
CO4	3	3	3	-	3	-	-	_	-	_	_	3	3	_	-
CO5	3	3	3	-	3	-	-	_	-	_	-	3	3	_	-
Correlation levels: 1 – low 2 – medium 3 – high "-"- no correlation								ation							

COURSE DESIGNED BY	APPROVED BY
Prof. Dennis Ebenezer- AP/ CSE	Dr.S.Pathur Nisha – Professor & Head / CSE
Name and Department	Name and Department of BoS Chairman

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SDG:4	ARCHITECTURE	3	1	0	4

COURSE OBJECTIVE:

- 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 arithmetic unit.
- 3. To learn the basic 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 1BASIC STRUCTURE AND ARITHMETIC UNIT9+3

Functional Units – Basic Operational Concepts – Performance – Instruction Set Architecture: Instructions and Instruction sequencing – Addressing Modes – RISC and CISC – Fixed Point and Floating Point Operations.

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UNIT 2 **PROCESSING UNIT** 9+3

Fundamental Concepts – Instruction Execution – Hardware Components – Instruction Fetch and Execution Steps – Hardwired Control – Micro Programmed Control – Nano Programming.

UNIT 3 **PIPELINING EXECUTION**

Analysis procedure - Design procedure - Half Adder - Full Adder - Half Subtractor - Full Subtractor-Magnitude Comparator - Decoders - Encoders - Multiplexers - Demultiplexers.

UNIT 4 **MEMORY SYSTEM & STORAGES** 9+3

Basic Concepts – Semiconductor RAM Memories – Read Only Memories – Memory Hierarchy – Cache Memories - Performance Considerations - Virtual Memory - Memory Management Requirements - Secondary Storage Devices.

UNIT 5 **I/O ORGANIZATION** 9+3Accessing I/O Devices – Programmed I/O – Interrupt Initiated I/O – Direct Memory Access – Buses - Bus Arbitration - Interconnection Standards: SCSI - USB - SATA - I/O Devices and Processors.

COURSE OUTCOMES:

At the end of the course, students would

CO1: Identify the basics structure of computers, operations and instructions.

CO2: Outline the arithmetic operations and working of hardwired micro programmed control.

CO3: Comprehend pipelined execution and design control unit.

CO4: Recognize the hierarchical memory system including cache memory and virtual memory

CO5: Analyze the different ways of communicating with I/O devices and standard I/O interfaces.

TOTAL: 60 PERIODS

Version 1.0

TEXT BOOKS:

1. Patterson David, A. and Hennessy John L., "Computer Organization and Design: The Hardware / Software Interface", 6thedition, Harcourt Asia, Morgan Kaufmann, Singapore, 2021.

2. Carl Hamacher, Zvonko Vranesic, Safwat Zaky and Naraig Manjikian, "Computer Organization and Embedded Systems", 6thedition, McGraw Hill International Edition, New York, 2017

REFERENCES:

1. Stallings William, "Computer Organization and Architecture: Designing for Performance", 10th edition, Pearson Education, New Delhi, 2015.

2. https://onlinecourses.nptel.ac.in/noc21_cs61/preview

3. https://www.coursera.org/learn/comparch

9+3

CO's	PO's	& PSO	's MA	PPING	Ĩ										
со	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	2	-	-	-	-	-	-	-	1	-	1	1	-	-
CO2	3	-	2	-	-	-	-	-	-	1	-	1	-	1	-
CO3	3	-	2	-	-	-	-	-	-	1	-	1	-	-	1
CO4	3	2	-	-	-	_	-	_	-	1	_	1	-	_	-
CO5	3	2	-	-	-	_	-	_	-	3	-	1	1	_	-
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COURSE DESIGNED BY	APPROVED BY
Prof. V.Satheeswaran - AP/ECE	Dr.S.Pathur Nisha – Professor & Head / CSE
Name and Department	Name and Department of BoS Chairman

112205204		Category : PCC
023C5304	FOUNDATIONS OF DATA SCIENCE	L T P C
SDG:4		3 0 2 4

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

UNIT 1

INTRODUCTION

Data Science: What is Data Science -Benefits and uses - -Data Science Process: Overview -Defining research goals – Retrieving data – Data preparation - Exploratory Data analysis – building the model- Prerequisites for a Data Scientist - Tools and Skills required-presenting findings and building applications – Basics of NumPy Array.

9

UNIT 2 DESCRIBING DATA

Types of Data - Types of Variables -Describing Data with Tables and Graphs –Describing Data with Averages - Describing Variability - Normal Distributions and Standard (z) Scores, Basics – Pandas data frames. Case Study: Population (Sample Size Estimating the statistics of given population).

UNIT 3 DESCRIBING RELATIONSHIPS

Correlation –Scatter plots –correlation coefficient for quantitative data –computational formula for correlation coefficient – Regression –regression line –least squares regression line – Standard error of estimate – interpretation of r2 –multiple regression equations –regression towards the mean. Case Study: Prediction Regression Methodologies with example.

UNIT 4 PYTHON LIBRARIES FOR DATA WRANGLING

Python for Data Science –Python Libraries – Data Frame Manipulation with numpy and pandas – Exploration Data Analysis – Time Series Dataset – Clustering with Python – Dimensionality Reduction. Python integrated Development Environments (IDE) for Data Science.

UNIT 5 DATA VISUALIZATION

Importing Matplotlib – Line plots – Scatter plots – visualizing errors – density and contour plots – Histograms – legends – colors – subplots – text and annotation – customization – three-dimensional plotting - Geographic Data with Basemap - Visualization with Seaborn. Case Study: Graph of Sine and Cosine function.

PRACTICAL EXERCISES:

1. Download, install and explore the features of NumPy, SciPy, Jupyter, Stats models and Pandas packages.

- 2. Working with Numpy arrays
- 3. Working with Pandas data frames

4. Reading data from text files, Excel and the web and exploring various commands for doing descriptive analytics on the Iris data set.

5. Use the diabetes data set from UCI and Pima Indians Diabetes data set for performing the following:

a. Univariate analysis: Frequency, Mean, Median, Mode, Variance, Standard Deviation, Skewness and Kurtosis.

- b. Bivariate analysis: Linear and logistic regression modeling
- c. Multiple Regression analysis.
- d. Also compare the results of the above analysis for the two data sets.

9

9

- 6. Apply and explore various plotting functions on UCI data sets.
 - a. Normal curves
 - b. Density and contour plots
 - c. Correlation and scatter plots
 - d. Histograms
 - e. Three-dimensional plotting
- 7. Visualizing Geographic Data with Base map.

COURSE OUTCOMES:

At the end of the course, students would

CO1: Define the data science process.

CO2: Understand different types of data descriptions for data science process.

CO3: Gain knowledge on relationships between data.

CO4: Use the Python Libraries for Data Wrangling.

CO5: Apply visualization Libraries in Python to interpret and explore data.

TOTAL: 75 PERIODS

TEXT BOOKS:

1. David Cielen, Arno D. B. Meysman, and Mohamed Ali, "Introducing Data Science", Manning Publications, 2016. (Unit I)

2. Robert S. Witte and John S. Witte, "Statistics", Eleventh Edition, Wiley Publications, 2017. (Units II and III)

3. Jake VanderPlas, "Python Data Science Handbook", O'Reilly, 2016. (Units IV and V)

REFERENCES:

1. Allen B. Downey, "Think Stats: Exploratory Data Analysis in Python", Green Tea Press, 2014.

CO's	-PO's	& PSO	's MA	PPING	7										
со	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	2	2	1	2	2	-	-	-	1	1	1	2	2	2	1
CO2	2	1	-	1	1	-	-	-	2	1	1	2	2	1	-
CO3	2	2	1	2	2	1	1	-	1	2	1	3	2	2	1
CO4	3	2	2	1	2	-	-	-	1	1	2	2	3	2	2
CO5	2	2	1	2	2	-	-	-	1	1	1	2	2	2	1
Cori	elatio	n leve	ls: 1	– low		2 -	medi	um	3	– higł	ì	"_"	"- no c	correla	ation

COURSE DESIGNED BY	APPROVED BY
Prof. K.Arun Patrick - AP/CSE	Dr.S.Pathur Nisha – Professor & Head / CSE
Name and Department	Name and Department of BoS Chairman

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U25U5512	DATA STRUCTURES LABORATORY	\mathbf{L}	Т	Р	С
SDG:4 & 8		0	0	2	1

- 1. To introduce and learn about the concepts of linear data structures.
- 2. To introduce and learn about the concept of non-linear data structures.
- 3. To learn about the concept of the graph traversal structures.
- 4. To understand the concept of sorting and searching.
- 5. To get exposure on various algorithm design and analysis techniques.

LIST OF EXPERIMENTS

- 1. Stack implementations.
- 2. Queue implementations.
- 3. Singly linked list implementations.
- 4. Binary search tree implementations.
- 5. Breath first search implementation.
- 6. Depth first search implementation.
- 7. Selection sort implementation.
- 8. Bubble sort implementation.
- 9. Insertion sort implementation.
- 10. Binary and Linear Search Implementations.

11. Mini Project.

COURSE OUTCOMES:

At the end of the course, students would

CO1: Design and implement linear data structures, such as lists, queues, and stacks, according to the needs of different applications.

CO2: Design and analyze tree structures and Heap.

CO3: Apply graph algorithms to solve problems and analyze their efficiency.

- CO4: Critically analyze and implement various searching, sorting algorithms with its competence.
- **CO5:** Analyze the performance of algorithms, time and space complexity of algorithms.

TOTAL: 30 PERIODS

CO's-	PO's	& PSO	's MA	PPING	7										
со	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	2	3	1	2	1	-	-	-	1	-	2	3	2	3	1
CO2	1	2	1	2	2	-	-	-	2	-	2	2	1	2	1
CO3	2	3	1	2	3	-	-	-	2	-	1	2	2	3	1
CO4	1	2	1	2	1	-	-	-	1	_	2	3	1	2	1
CO5	2	1	-	1	1	-	-	-	1	-	2	3	2	1	-
Corr	elatio	n leve	ls: 1	– low		2 –	medi	um	3	– high	I	"_"	"- no c	orrela	ation

COURSE DESIGNED BY	APPROVED BY
Prof.P.Aruna- AP/ CSE	Dr.S.Pathur Nisha – Professor & Head / CSE
Name and Department	Name and Department of BoS Chairman

112208212		Cat	tegory	v : PC	С
U25U5512	JAVA PROGRAMMING LAB	\mathbf{L}	Т	Р	С
SDG:4 & 8		0	0	2	1

1. To understand and develop programs using Java, leveraging object-oriented programming principles

2. To create and manage Java programs utilizing constructors, destructors, member functions, static members, and nested classes.

3. To use the concepts of classes, objects, inheritance, polymorphism, and function overloading in Java programs.

4. To handle exceptions and implement multithreading in Java for efficient and robust application development.

5. To perform file operations and implement networking using Java, applying relevant classes and techniques for real-world applications.
LIST OF EXPERIMENTS

- 1. Simple program to experiment branching statements.
- 2. Simple program to experiment looping statements.
- 3. Simple program that implements array.
- 4. Simple program to implement classes and objects.
- 5. Java program that implements inheritance.
- 6. Java program that implements overloading.
- 7. Java program to handle exceptions.
- 8. Java program to implement multithreading.
- 9. Java program to perform file operations.
- 10. Java program to demonstrate basic networking using TCP sockets.
- 11. Mini Project.

COURSE OUTCOMES:

At the end of the course, students would

CO1: Explain the fundamental concepts of Object-Oriented Programming and Java, including key OOP principles and Java basics

CO2: Use appropriate Java constructs such as classes, objects, to represent and manage data.

CO3: Write Java programs incorporating control structures, arrays, inheritance, and polymorphism to solve complex problems.

CO4: Handle exceptions and implement exception handling, and multithreading in Java to develop efficient and robust applications.

CO5: Perform file operations and implement networking using Java to create practical, real-world applications.

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со	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO3
CO1	2	1	1		2	-	-	-	-	1	-	-	3	-	2
CO2	2	1	1	1	2	-	-	-	-	1	-	-	3	-	2
CO3	2	1	1	1	2	-	-	-	-	1	-	-	3	-	2
CO4	2	1	1	1	2	-	-	-	-	1	-	-	3	-	2
CO5	2	1	1	1	2	-	-	-	-	1	-	-	3	-	2
Correlation levels: 1 – low							– med	ium	-	3 – hiş	gh	•	'-"- no) corr	elation

TOTAL: 30 PERIODS

CO'S DO'S & DOO'S MADDING

COURSE DESIGNED BY	APPROVED BY
Prof. Dennis Ebenezer- AP/ CSE	Dr.S.Pathur Nisha – Professor & Head / CSE
Name and Department	Name and Department of BoS Chairman

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025EE515 SDC.98-17	APTITUDE & COMMUNICATION FOR ENGINEERS - I	L	Т	Р	С
SDG:001/		0	0	2	1

COURSE OBJECTIVE:

1. To create an awareness regarding the internal inhibitions that prevents the students from opening out in classrooms and other forums and there by overcoming the shyness to perform.

2. To make students understand the importance of English as a global language and train them for simple English communication through various speech craft activities and improve their communicative English for industry readiness.

3. To develop an awareness about making a conscious effort towards avoiding errors in daily communication.

4. To train students on clearing various placement papers with greater accuracy.

UNIT 1INTRODUCTION3Introduction about the Course -Learning expectations - Communication pre-assessment6UNIT 2SPEAKING SKILLS -NOVICE6Communication abilityShe herringFacilityCommunication abilityShe herringFacility

Communication skills – Shy barrier - Importance of English - Challenges faced in English communication - Developing a globally comprehensible accent -Speech Craft- Public Speaking – Squabble.

UNIT 3 SPEAKING SKILLS -INTERMEDIATE

Speech Craft –for and against –Debate (Ship Wreck Activity)

UNIT 4 LANGUAGE GYM - I

Tenses for various communication scenarios – Common errors in daily communication – Thought Group reading – Passage writing.

UNIT 5APTITUDE FOR PLACEMENTS - I9

Placement Paper 1 – HCF & LCM, Problems on Numbers-Placement Paper 2 – Average, Simplification – Placement Paper 3-Percentage, Simple & compound Interest - Placement Paper 4 – Time & Distance – Placement Paper 5-Trains & Boats, Placement Paper 6 – Time & Work, Pipes & Cistern.

6

COURSE OUTCOMES:

At the end of the course, students would

CO1: Students will be able to participate in any learning activity without any reservations. They shall be ready to move beyond their comfort zone to acquire new skills throughout their life.

CO2: Students shall understand and appreciate the importance of English in the current global scenario and make efforts towards up skilling the same.

CO3: Students shall be able to present their view and standpoints in any scenarios confidently.

CO4: Use the correct Grammar and Vocabulary, ensuring the enhancement their language skills and effective communication.

CO5: To use appropriate strategies and shortcuts to improve speed and accuracy in solving aptitude problems during recruitment processes.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. The Pearson Guide to Quantitative Aptitude for Competitive Examinations, Dinesh Khattar. Pearson.

2. Quantitative Aptitude Dr. R.S. Aggarwal S. Chand Publication.

3. A Modern Approach to Verbal and Non-Verbal Reasoning R.s. Aggarwal.

REFERENCES:

1. Quantitative Aptitude for CAT, Arun Sharma.

2. Fast Track Objective Arithmetic, Rajesh Verma, Arihant Publication.

3. Quantitative Aptitude Quantum CAT Common Admission Tests for Admission into IIMs, Sarvesh

K. Verma.

4. Wiley's Exam Xpert Quantitative Ability for CAT, 2ed, Ashu Jain.

CO's	-PO's	& PSO	's MA	PPING	7										
со	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	1	I	-	-	Ι	-	-	1	-	3	-	-	-	-	-
CO2	1	-	-	-	-	-	-	1	-	3	-	-	-	-	-
CO3	1	-	-	-	-	-	-	1	-	3	-	-	-	-	-
CO4	1	-	-	-	-	-	-	1	-	3	-	-	-	-	-
CO5	3	-	-	-	-	-	-	1	1	-	-	-	-	-	-
Correlation levels: 1 – low						2 – medium			3 – high			"-"- no correlation			

COURSE DESIGNED BY	APPROVED BY
Prof. Ramesh Raja – Head/NCPIR	Dr.S.Pathur Nisha – Professor & Head / CSE
Name and Department	Name and Department of BoS Chairman

11221/12/081		C	atego	ry : N	1C
U251VIAU01	UNIVERSAL HUMAN VALUES	\mathbf{L}	Т	Р	С
5DG:5,400		2	0	0	0

COURSE OBJECTIVE:

1. To help the students appreciate the essential complementarily between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.

2. To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of existence. Such a holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way.

3. To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behavior and mutually enriching interaction with Nature.

UNIT 1 INTRODUCTION TO VALUE EDUCATION

Right Understanding, Relationship and Physical Facility (Holistic Development and the Role of Education) Understanding Value Education, Self-exploration as the Process for Value Education, Continuous Happiness and Prosperity – the Basic Human Aspirations, Happiness and Prosperity – Current Scenario, Method to Fulfil the Basic Human Aspirations.

 UNIT 2
 HARMONY IN THE HUMAN BEING
 6

Understanding Human being as the Co-existence of the Self and the Body, Distinguishing between the Needs of the Self and the Body, The Body as an Instrument of the Self, Understanding Harmony in the Self, Harmony of the Self with the Body, Programme to ensure self-regulation and Health.

UNIT 3HARMONY IN THE FAMILY AND SOCIETY6

Harmony in the Family – the Basic Unit of Human Interaction, 'Trust' – the Foundational Value in Relationship, 'Respect' – as the Right Evaluation, Other Feelings, Justice in Human-to-Human Relationship, Understanding Harmony in the Society, Vision for the Universal Human Order.

UNIT 4 HARMONY IN THE NATURE/EXISTENCE

Understanding Harmony in the Nature, Interconnectedness, self-regulation and Mutual Fulfillment among the Four Orders of Nature, Realizing Existence as Co-existence at All Levels, The Holistic

6

Perception of Harmony in Existence.

UNIT 5 IMPLICATIONS OF THE HOLISTIC UNDERSTANDING – A LOOK AT PROFESSIONAL ETHICS

6

Natural Acceptance of Human Values, Definitiveness of (Ethical) Human Conduct, A Basis for Humanistic Education, Humanistic Constitution and Universal Human Order, Competence in Professional Ethics Holistic Technologies, Production Systems and Management Models-Typical Case Studies, Strategies for Transition towards Value-based Life and Profession.

COURSE OUTCOMES:

At the end of the course, students would

CO1: To become more aware of themselves, and their surroundings (family, society, nature)

CO2: To become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.

CO3: To have better critical ability.

CO4: To become sensitive to their commitment towards what they have understood (human values, human relationship and human society)

CO5: To apply what they have learnt to their own self in different day to-day settings in real life, at least a beginning would be made in this direction.

TOTAL: 30 PERIODS

TEXT BOOKS:

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

2. The Teacher"s Manual Teachers" Manual for A Foundation Course in Human Values and Professional Ethics, R R Gaur, R Asthana, G

REFERENCES:

1. JeevanVidya: EkParichaya, A Nagaraj, JeevanVidyaPrakashan, Amarkantak, 1999.

- 2. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
- 3. The Story of Stuff (Book).
- 4. The Story of My Experiments with Truth by Mohandas Karamchand Gandhi
- 5. Small is Beautiful E. F Schumacher.
- 6. Slow is Beautiful Cecile Andrews
- 7. Economy of Permanence J C Kumarappa
- 8. Bharat Mein Angreji Raj Pandit Sunderlal
- 9. Rediscovering India by Dharampal
- 10. Hind Swaraj or Indian Home Rule by Mohandas K. Gandhi
- 11. India Wins Freedom Maulana Abdul Kalam Azad
- 12. Vivekananda Romain Rolland (English)
- 13. Gandhi Romain Rolland (English)
- 14. Sussan George, 1976, How the Other Half Dies, Penguin Press. Reprinted 1986, 1991

15. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth – Club of Rome's report, Universe Books.

16. A Nagraj, 1998, Jeevan Vidya Ek Parichay, Divya Path Sansthan, Amarkantak.

17. P L Dhar, RR Gaur, 1990, Science and Humanism, Commonwealth Publishers.

18. A N Tripathy, 2003, Human Values, New Age International Publishers.

19. SubhasPalekar, 2000, How to practice Natural Farming, Pracheen (Vaidik) KrishiTantraShodh, Amravati.

20. E G Seebauer & Robert L. Berry, 2000, Fundamentals of Ethics for Scientists & Engineers , Oxford

University Press

21. M Govindrajran, S Natrajan & V.S. Senthil Kumar, Engineering Ethics (including Human Values), Eastern Economy Edition, Prentice Hall of India Ltd.

22. B P Banerjee, 2005, Foundations of Ethics and Management, Excel Books.

23. B L Bajpai, 2004, Indian Ethos and Modern Management, New Royal Book Co., Lucknow. Reprinted 2008.

CO's	PO's	& PSO	's MA	PPING	7										
со	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	1	1	1	1	1	3	3	0	0	1	1	3	2	1	1
CO2	1	1	1	1	1	2	0	2	0	1	1	3	2	1	2
CO3	1	1	1	1	1	0	2	0	0	1	1	3	2	2	1
CO4	1	1	1	1	1	3	3	3	0	1	1	3	2	3	1
CO5	1	1	1	1	1	3	3	3	0	1	1	3	2	1	2
Correlation levels: 1 – low					2 -	mediu	m	3 -	- high		"_"	- no co	orrela	tion	

COURSE DESIGNED BY	APPROVED BY
Dr.S.Pathur Nisha – Professor & Head / CSE	Dr.S.Pathur Nisha – Professor & Head / CSE
Name and Department	Name and Department of BoS Chairman

SEMESTER IV

117211 4 409		(latego	ory : B	SC
U25WIA400	DISCRETE MATHEMATICS	\mathbf{L}	Т	Р	С
SDG: 9		3	0	0	3

COURSE OBJECTIVE:

- 1. To Understand the basic concepts in sets and relations
- 2. To build problem solving skills by enhancing students logical and mathematical maturity
- 3. To acquire the knowledge of combinatorics
- 4. To familiarize the applications of algebraic structures.
- 5. To gain the knowledge of graph theory and to solve the practical problems.

UNIT 1 SET THEORY

Operations and Laws of Sets - Cartesian Product, Binary Relation - Equivalence Relation - Partial ordering - Poset - Hasse diagram. Application: Vehicle Model Catalogue

UNIT 2 LOGIC

Truth Tables, Tautology and Contradiction - Logical Equivalence: The Laws of Logic, Logical Implication, - Disjunctive and Conjunctive Normal Form. - Predicates and quantifiers. Rules of Inference. Application: Knowledge representation in artificial intelligence using Basic Connectives

UNIT 3

COMBINATORICS

Mathematical induction – Strong induction and well ordering – The basics of counting –Permutations and combinations – Solving linear recurrence relations– Inclusion and exclusion principle. Application : Pigeon hole principle

UNIT 4 ALGEBRAIC STRUCTURES

Algebraic systems – Semi groups and monoids - Groups – Subgroups – Normal subgroup and cosets – Lagrange's theorem. Application: Error detection and encoding functions

UNIT 5

GRAPH THEORY

Graphs and their Properties- Degree, Connectivity – Path – Cycle - Sub Graph, Isomorphism - Eulerian and Hamiltonian paths and circuits - Graph Coloring, Planar Graphs. Application: Map for Online Food Delivery System

COURSE OUTCOMES:

At the end of the course, students would

CO1: Solve the problems using the concepts of sets, Truth Tables, counting techniques, properties of algebraic structures and graph network techniques to solve engineering problems.

CO2: Comprehend the concepts needed to test the relations, laws of logic, Strong induction, Groups and Properties of Graphs

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CO3: Demonstrate the knowledge in functions, Logical Implication, Mathematical induction, Subgroups and Graph Coloring

CO4: Analyze the concepts and Poset, Normal Form, Permutations and combinations, Normal subgroup and Eulerian and Hamiltonian paths and circuits

CO5: Apply and Analyze Hasse diagram, Rules of Inference, linear recurrence relations, Lagrange's theorem and Matrices of Graph Isomorphism

TOTAL: 45 PERIODS

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.

3. Venkatraman M.K, Sridharan. N and Chandrasekaran N. Discrete Mathematics, The National Publishing Company, Chennai, Fourth edition, 2014.

REFERENCES:

1.Grimaldi. R.P. "Discrete and Combinatorial Mathematics: An Applied Introduction", 5th Edition, Pearson Education Asia, Delhi, 2013.

2. Lipschutz. S. and Mark Lipson., "Discrete Mathematics", Schaum's Outlines, Tata McGraw Hill Pub. Co. Ltd., New Delhi, 3rd Edition, 2010.

3. Koshy. T. "Discrete Mathematics with Applications", Elsevier Publications, 2006.

4. Kenneth. H. Rosen, Discrete Mathematics and its Applications, Tata McGraw Hill P.Co, New Delhi, Seventh Edition, 2014.

5. Bernard Kolman, Robert C. Busby, Sharan Cutler Ross, Discrete Mathematical Structures, Pearson Education Pvt Ltd ,New Delhi, Sixth Edition, 2013.

CO's	-PO's	& PSO	's MA	PPING	F										
СО	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	РО 10	РО 11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	1	-	-	-	-	1	-	-	1	-	-	-
CO2	3	3	3	1	-	-	-	-	1	-	-	1	-	-	-
CO3	3	3	3	1	-	-	-	-	1	-	-	1	-	-	-
CO4	3	3	3	1	-	-	-	-	1	-	-	1	-	-	-
CO5	3	3	3	1	-	-	-	-	1	-	-	1	-	-	-

Nehru Institute of Technology

Correlation levels: 1 – low	2 – medium	3 – high	"-"- no correlation
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COURSE DESIGNED BY	APPROVED BY				
Prof M. S. Uma Maheswari - AP/ Mathematics	Dr. K.Parimala Gandhi – Professor & Head/ S&H				
Name and Department	Name and Department of BoS Chairman				

112200401		C	Catego	ory : P	CC
U23C5401	DATABASE MANAGEMENT SYSTEMS	L	Т	Р	С
SDG:4		3	0	0	3
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COURSE OBJECTIVE:

- 1. Understand the objective of a database management system
- 2. To facilitate the creation of data structures and SQL queries
- 3. To learn the basics of transaction processing
- 4. To gain knowledge on concurrency control techniques
- 5. To Understand database storage structures and access techniques

UNIT 1 DBMS AN OVERVIEW

Introduction Overview- Database System vs File System- Database System Concept and Architecture-Data Model Schema and Instances. Data Modeling Using the Entity Relationship Model: ER Model Concepts- Notation for ER Diagram- Introduction to relational databases. UNIT 2 SQL IN DBMS 9

Introduction on SQL: Characteristics of SQL, Advantage of SQL. SQL Data Type and Literals. Types of SQL Commands. SQL Operators and their Procedure. Tables, Views and Indexes. Queries and Sub Queries. Aggregate Functions. Insert, Update and Delete Operations, Joins, Unions, Intersection, Minus, Cursors, Triggers, Procedures in SQL/PL SQL. Crystal Reports: Report generation and data visualization using SQL queries.

UNIT 3 DATABASE DESIGNING

Overview of the Design Process - Reducing E-R Diagrams to Relational Schemas - Decomposition Using Functional Dependencies - Normal Forms, first, second, third normal forms, Join Dependencies and Fifth Normal Form, BCNF, inclusion dependence, normalization using FD, MVD, and JDs, alternative approaches to database design.

UNIT 4

TRANSACTION

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Transaction Processing Concept Transaction System, Testing of Serializability, Concurrency Control, Deadlock Handling, Recoverability, Recovery from Transaction Failures, Log Based Recovery, Checkpoints. OLTP and OLAP: Overview, comparison, and use cases.

UNIT 5 IMPLEMENTATION & STORAGE

9

Distributed Database: Distributed Data Storage, Directory System. 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.

COURSE OUTCOMES:

At the end of the course, students would

CO1: Explain database concepts, architectures, data models, and ER modeling for relational database design.

CO2: Construct and execute SQL queries for data retrieval, manipulation, and report generation.

CO3: Apply normalization techniques to optimize database design and ensure data integrity.

CO4: Analyze transaction processing, concurrency control, recovery mechanisms, OLTP, and OLAP concepts.

CO5: Implement indexing, hashing, query processing, and distributed database storage techniques.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Database Management Systems, Raghurama Krishnan, Johannes Gehrke, Tata Mc Graw Hill 3rd Edition (Unit 1,3,5)

2. Database System Concepts, Silberschatz, Korth, Mc Graw hill, VII edition. (Unit 2,4)

REFERENCES:

1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition. (units 1, 3,5)

- 2. Fundamentals of Database Systems, Elmasri Navrate, Pearson Education (units 1,3,4,5)
- 3. Introduction to Database Systems, C. J. Date, Pearson Education(units 1,3,4)
- 4. Oracle for Professionals, The X Team, S.Shah and V. Shah, SPD.(units 3,5)
- 5. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL,Shah, PHI. (unit 2)

6. Fundamentals of Database Management Systems, M. L. Gillenson, Wiley Student Edition. (units 1, 3, 4)

CO's	CO's-PO's & PSO's MAPPING														
со	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	РО 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	2	-	2	-	-	-	-	-	1	-	-	2	-	1
CO2	3	3	2	3	2	-	-	-	-	1	-	2	3	2	2
CO3	3	2	3	3	2	-	-	-	-	2	1	2	3	2	3
CO4	3	2	2	3	2	3	2	3	2	3	2	2	3	2	2
CO5	2	3	3	3	3	2	-	2	-	3	3	3	2	3	3
Corr	elatio	n leve	ls:	1 – l	OW	2	– mec	lium	3 -	- high		"_"	'- no c	orrela	ation

COURSE DESIGNED BY	APPROVED BY
Prof. S. Karpaga Iswarya- AP/ CSE	Dr.S.Pathur Nisha – Professor & Head / CSE
Name and Department	Name and Department of BoS Chairman

112205402		C	latego	ory : P	CC
025C5402	INTRODUCTION TO OPERATING SYSTEM	\mathbf{L}	Т	Р	С
5DG:4		3	0	0	3

COURSE OBJECTIVE:

- 1. To understand the basics and functions of operating systems.
- 2. To understand threads and processes.
- 3.To understand concept of deadlocks and to analyze
- 4. To analyze the memory management strategies.
- 5. To be familiar with memory management and file systems.
- 6. To know the security concepts.

UNIT 1 BASICS OF OPERATING SYSTEM

9

Operating System Overview: Objective and Functions, Evolution of Operating System, Services, Interface, Structure and Operations-System Calls – Types of System Calls – System Programs. Process life cycle, Process Scheduling – Operations on Processes – Inter-process Communication.

UNIT 2 MULTITHREADING AND PROCESS MANAGEMENT

Overview of Threads- Multithreading models, Thread Libraries, Threading issues, Synchronization – The critical-section problem, Peterson's Solution, Synchronization hardware, Mutex locks, Semaphores, Classical problems of synchronization.

UNIT 3 DEADLOCK AND MEMORY MANAGEMENT

Overview of Deadlock - Deadlock prevention, Deadlock avoidance, Deadlock Detection, Recovery from Deadlock. Swapping – Contiguous Memory Allocation – Paging – Structure of the Page Table Segmentation.

UNIT 4 STORAGE MANAGEMENT

Memory management-segmentation. File System Structure – File System Implementation – Directory Implementation – Allocation Methods – Free-space Management. Disk Structure – Disk Scheduling – Disk Management – Swap-Space Management.

UNIT 5 MOBILE OS AND SECURITY

Mobile OS - iOS and Android-Architecture and SDK framework., Security, Security Threats, Protection Mechanism, Authentication.

COURSE OUTCOMES:

At the end of the course, students would

CO1: Understand the concepts of operating systems.

CO2: Compare and analyze various scheduling algorithms and Process Synchronization.

CO3: Understand Deadlock Prevention and Avoidance Algorithms.

CO4: Compare and contrast various memory management strategies and functionality of file systems.

CO5: Compare iOS and Android operating systems with security mechanism.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, "Operating System Concepts" ||, 10th Edition, John Wiley and Sons Inc., 2018.

2. Andrew S Tanenbaum, "Modern Operating Systems", Pearson, 5th Edition, 2022 New Delhi.

REFERENCES:

1. Ramaz Elmasri, A. Gil Carrick, David Levine, "Operating Systems – A Spiral Approach", Tata McGraw Hill Edition, 2010.

2. William Stallings, "Operating Systems: Internals and Design Principles", 7th Edition, Prentice Hall, 2018.

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3. Achyut S.Godbole, Atul Kahate, "Operating Systems", McGraw Hill Education, 2016.

CO's	CO's-PO's & PSO's MAPPING														
со	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	РО 11	PO 12	PSO 1	PSO2	PSO3
CO1	3	1	2	2	-	-	-	-	3	1	2	1	2	1	2
CO2	2	2	3	1	-	-	-	-	2	1	1	2	2	2	2
CO3	1	3	2	2	-	-	-	-	2	2	1	1	2	1	2
CO4	1	3	3	3	-	-	-	-	1	2	1	3	2	3	1
CO5	3	1	3	1	-	-	-	-	3	2	3	3	2	2	2
Correlation levels: 1					low	2	– mee	dium		3 – hi	igh	<u>.</u>	"-"- n	o corre	lation

COURSE DESIGNED BY	APPROVED BY
Prof. K. Arun Patrick - AP/ CSE	Dr.S.Pathur Nisha – Professor & Head / CSE
Name and Department	Name and Department of BoS Chairman

112205402		Category :					
023C3403	INTERNET OF THINGS	\mathbf{L}	Т	Р	С		
SDG:4		3	0	0	3		

COURSE OBJECTIVE:

- 1. To learn the basics of IoT.
- 2. To understand how to design IoT systems
- 3. To use Python and Raspberry Pi for IoT
- 4. To build IoT projects.
- 5. To solve real-world problems with IoT.

UNIT 1	FUNCTIONAL BLOCKS OF IoT

9

Definition and Characteristics of IoT – Physical Design: Layers and Protocols – Logical Design: IoT Functional Blocks – IoT Communication models and APIs – IoT Enabling Technologies – IoT Levels and Deployment Templates.

UNIT 2 IoT DESIGN METHODOLOGY

M2M – M2M Vs IoT – Software Defined Networks – Network function Virtualization – IoT Platform Design Methodologies – Domain Specific IoT.

UNIT 3 PYTHON PACKAGES FOR IOT AND RASPBERRY PI

JSON – XML – HTTPLib and URLLib – SMTPLib. Raspberry Pi : Pin Configurations – Interfaces : Serial, SPI, 12C Programming – Python program with Raspberry Pi– Controlling Output – Reading input from pins.

UNIT 4 IoT APPLICATIONS USING RASPBERRY PI

 $\label{eq:legendre} \begin{array}{l} \mbox{LED Controlling} - \mbox{Traffic Light controller} - \mbox{Integrating Sensors} - \mbox{Developing web application to control IoT device} & - \mbox{Uploading the sensor values onto the cloud for analysis} & - \mbox{Sending SMS} - \mbox{Sending images and video via mail.} \end{array}$

UNIT 5 IoT USE CASES

Smart and Connected Cities – An IoT Strategy for Smarter Cities – Architecture – Use Cases: Street Lighting – Smart Parking – Smart Traffic – Smart Home Automation – Smart Agriculture – Weather Monitoring.

COURSE OUTCOMES:

At the end of the course, students would

CO1: Recall IoT basics, layers and technologies

CO2: Understand IoT design and applications.

CO3: Use Python and Raspberry Pi for IoT.

CO4: Build IoT projects with Raspberry Pi.

CO5: Analyze IoT solutions for real-world problems.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. ArshdeepBahga and Vijay Madisetti, Internet of Things –A Hands-on Approach, Orient Blackswan Private Limited, New Delhi, First Edition, 2015.

2. David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Rob Barton and Jerome Henry, IoT Fundamentals: Networking Technologies, Protocols and Use Cases for Internet of Things, Pearson Education, First Edition, 2017.

REFERENCES:

1. Francis daCosta, Rethinking the Internet of Things: A Scalable Approach to Connecting Everything, Apress Publications, New York, First Edition, 2013.

2. Rajkamal, Internet of Things: Architecture, Design Principles And Applications, McGraw Hill Education, New York, First Edition, 2017.

3. Olivier Hersent, David Boswarthick, Omar Elloumi, The Internet of Things – Key Applications and Protocols, Wiley, New York, 2015.

4. https://onlinecourses.nptel.ac.in/noc22_cs53/preview

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со	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CO1	3	1	1	-	1	-	-	-	-	-	-	2	-	-	-
CO2	3	1	1	-	1	-	-	-	-	-	-	2	-	-	-
CO3	3	1	3	-	2	-	-	-	-	-	-	2	2	2	2
CO4	3	1	3	-	3	-	-	-	-	-	-	2	2	2	2
CO5	3	3	3	-	3	-	-	-	_	-	-	2	2	-	2
Correlation levels: 1 – low						2	2 – me	dium		3 – h	igh		"-"- no	correl	ation

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

COURSE DESIGNED BY	APPROVED BY
Prof. V.Satheeswaran - AP/ECE	Dr. S. Pathur Nisha – Professor & Head / CSE
Name and Department	Name and Department of BoS Chairman

U23CS404		С	atego	ory : P	CC
	THEORY OF COMPUTATION	\mathbf{L}	Т	Р	С
5DG:4		3	1	0	4

COURSE OBJECTIVE:

- 1. To understand the 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 Undesirability and NP class problems

UNIT 1 AUTOMATA AND REGULAR EXPRESSIONS 9+3

Introduction to formal proof – Basic Mathematical Notation and techniques- 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 2 **REGULAR EXPRESSIONS (RE) AND LANGUAGES** 9+3

Regular expression – Regular Languages- Equivalence of NFA and regular expressions –Direct method for Conversion: Regular Expressions to FA, Proving languages to be not regular (Pumping Lemma) – Closure properties of regular languages.

CONTEXT-FREE GRAMMAR AND PUSH DOWN UNIT 3 9+3 **AUTOMATA**

Introduction of Grammar-Types of Grammar -Context-Free Grammar (CFG) - 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 4 NORMAL FORMS AND TURING MACHINES 9+3

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 Machines: Definitions - Models - Programming Techniques for TM.

UNIT 5 UNDECIDABILITY 9+3

A language that is not Recursively Enumerable – An undecidable problem that is RE – Undecidable problems about Turing Machine - Post's Correspondence Problem - Intractable problems: The classes P and NP: The class of languages P – The class of languages NP – Travelling Salesman's Problem.

COURSE OUTCOMES:

At the end of the course, students would

CO1: Design and develop various finite-state machines

CO2: Analyze the properties of different languages.

CO3: Demonstrate the push-down automata model for a given language.

CO4: Understand and design the various types of Turing machine

CO5: Differentiate between decidable and undecidable problems

TOTAL: 60 PERIODS

TEXT BOOKS:

1. J.E.Hopcroft, R.Motwani and J.D Ullman, "Introduction to Automata Theory, Languages and Computations", Pearson Education, Third Edition, 2011.

2. J.E.Hopcroft, R.Motwani and J.D Ullman, -Introduction to Automata Theory, Languages and Computations, Second Edition, Pearson Education, 2003.

REFERENCES:

Micheal Sipser, —Introduction of the Theory and Computation^{II}, Thomson Brokecole, 1997.
 K V N Sunitha, N Kalyani: Formal Languages and Automata Theory, Tata McGraw Hill, New Delhi,2010.

3. A A Puntembekar - Theory of Computation, Technical Publication, India

CO's	CO's-PO's & PSO's MAPPING														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	1	3	2	3	-	-	-	-	1	1	2	3	1	3	2
CO2	2	2	3	2	1	-	-	-	3	3		3	2	2	3
CO3	2	2	3	2	1	-	-	-	1	3		2	2	2	3
CO4	2	2	2	1	-	-	-	-	1	3		2	2	2	2
CO5	2	2	2	1	1	-	-	-	1	1		2	2	2	2
Correlation levels:				1 – I	OW	2	– mec	lium	3 -	– high	-	"_"	'- no c	orrela	ation

COURSE DESIGNED BY	APPROVED BY
Prof. P.Aruna- AP/CSE	Dr.S.Pathur Nisha – Professor & Head / CSE
Name and Department	Name and Department of BoS Chairman

U23CS405 SDG:4		Ca	Category : PCC					
	OBJECT ORIENTED SOFTWARE ENGINEERING	L	Т	Р	С			
		3	0	2	4			

COURSE OBJECTIVE:

- 1. To understand Software Engineering Lifecycle Models
- 2. To Perform software requirements analysis
- 3. To gain knowledge of the System Analysis and Design concepts using UML
- 4. To understand software testing and maintenance approaches
- 5. To work on project management scheduling using DevOps

UNIT 1 SOFTWARE PROCESS AND AGILE DEVELOPMENT

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

UNIT 2 **REQUIREMENTS ANALYSIS AND OBJECT MODELLING**

Requirement analysis and specification - Requirements gathering and analysis - Software Requirement Specification –Data Dictionary- Petrinets – Object modeling using UML – Use case Model – Class diagrams – Interaction diagrams – Activity diagrams – State chart diagrams – Functional modelling – Data Flow Diagram- CASE TOOLS.

9 UNIT 3 SOFTWARE DESIGN AND PATTERNS

Software design – Design process – Design concepts – Coupling – Cohesion – Design patterns – Model-view-controller – Publish-subscribe – Adapter – Command – Strategy – Observer – Architectural styles – Layered - Client Server - Tiered - Pipe and filter-Case study.

9 UNIT 4 SOFTWARE TESTING AND MAINTENANCE

Testing – Unit testing – Black box testing – White box testing – Integration and System testing – Regression testing – Debugging - Program analysis – Symbolic execution – Model Checking-Case Study.

UNIT 5 **PROJECT MANAGEMENT** 9

Software Project Management- Software Configuration Management - Project Scheduling -Software Estimation - DevOps: Motivation-Cloud as a platform-Operations- Deployment -Case Study

THEROY: 45 PERIODS

LIST OF EXPERIMENTS:

1. Identify a software system that needs to be developed.

2. Document the Software Requirements Specification (SRS) for the identified system.

3. Identify use cases and develop the Use Case model.

4. Identify the conceptual classes and develop a Domain Model and also derive a Class Diagram from that.

5. Using the identified scenarios, find the interaction between objects and represent them using UML Sequence and Collaboration Diagrams

6. Draw relevant State Chart and Activity Diagrams for the same system.

7. Implement the system as per the detailed design

8. Test the software system for all the scenarios identified as per the usecase diagram

9. Improve the reusability and maintainability of the software system by applying appropriate design patterns.

10.Implement the modified system and test it for various scenarios.

SUGGESTED DOMAINS FOR MINI-PROJECT:

- 1. Passport automation system.
- 2. Book bank

- 3. Exam registration
- 4. Stock maintenance system.
- 5. Online course reservation system
- 6. Airline/Railway reservation system
- 7. Software personnel management system
- 8. Credit card processing
- 9. e-book management system
- 10. Recruitment system
- 11. Foreign trading system
- 12. Conference management system
- 13. BPO management system
- 14. Library management system
- 15. Student information system

LAB: 30 PERIODS

COURSE OUTCOMES:

At the end of the course, students would

CO1: To Understand and Compare various Software Development Lifecycle Models.

CO2: Perform Software Requirement Analysis and gain knowledge of the system analysis and design using UML

CO3: Architect and design using architectural styles and design patterns, and test the system.

CO4: To Apply software testing and maintenance approaches.

CO5: Evaluate Project management approaches, estimation strategies and to work on project management scheduling using DevOps.

TOTAL: 75 PERIODS

TEXT BOOKS:

1. Bernd Bruegge and Allen H. Dutoit, "Object-Oriented Software Engineering: Using UML, Patterns and Java", Third Edition, Pearson Education, 2009

2. Roger S. Pressman, Object-Oriented Software Engineering: An Agile Unified Methodology, First Edition, Mc Graw-Hill International Edition, 2014.

REFERENCES:

1. Carlo Ghezzi, Mehdi Jazayeri, Dino Mandrioli, Fundamentals of Software Engineering, 2nd edition, PHI Learning Pvt. Ltd., 2010.

2. Craig Larman, Applying UML and Patterns, 3rd ed, Pearson Education, 2005.

3. Len Bass, Ingo Weber and Liming Zhu, "DevOps: A Software Architect's Perspective", Pearson Education, 2016

4. Rajib Mall, Fundamentals of Software Engineering, 3rd edition, PHI Learning Pvt. Ltd., 2009.

5. Stephen Schach, Object-Oriented and Classical Software Engineering, 8th ed, McGraw-Hill, 2010.

CO's-	CO's-PO's & PSO's MAPPING														
СО	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	РО 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	2	1	2	2	-	-	-	-	1	2	1	2	1	2
CO2	2	2	3	3	2	-	-	-	2	1	3	2	2	2	2
CO3	2	3	2	1	1	-	-	-	2	2	3	1	2	3	2
CO4	2	3	1	2	3	-	-	-	2	-	2	3	2	3	1
CO5	2	1	1	1	2	-	-	-	-	2	3	3	2	2	2
Correlation levels: 1 – low 2 – medium 3 – high "-"- no correlati											tion				

COURSE DESIGNED BY	APPROVED BY
Prof. L. Nithya - AP/CSE	Dr.S.Pathur Nisha – Professor & Head / CSE
Name and Department	Name and Department of BoS Chairman

U23CS411
SDG:4 & 8Category : PCCDATABASE MANAGEMENT SYSTEM LABLTPC0021

COURSE OBJECTIVE:

1. To describe the basics of SQL and construct queries using SQL.

- 2. To demonstrate the use of constraints and relational algebra operations.
- 3. To facilitate students in Database design.

4. To familiarize issues of concurrency control and transaction management.

LIST OF EXPERIMENTS:

1. Design a Database and create required tables. For e.g. Bank, College Database

- 2. Write a SQL statement for implementing ALTER, UPDATE and DELETE
- 3. Write the query for implementing the following functions: MAX(),MIN(),AVG(),COUNT()
- 4. Practicing DDL commands

- 5. Practicing DML commands
- 6. Querying (using ANY, ALL, IN, Exists, NOT EXISTS, UNION, INTERSECT, Constraints etc.)
- 7. Write the queries to implement the joins
- 8. Usage of Cursors
- 9. Write the query for creating the users and their role.

10.Perform the following operation for demonstrating the insertion , updation and deletion using the referential integrity constraints.

COURSE OUTCOMES:

At the end of the course, students would

CO1: Explain database concepts, architectures, data models, and ER modeling for relational database design.

CO2: Construct and execute SQL queries for data retrieval, manipulation, and report generation.

CO3: Apply normalization techniques to optimize database design and ensure data integrity.

CO4: Analyse transaction processing, concurrency control, recovery mechanisms, OLTP, and

OLAP concepts.

CO5: Implement indexing, hashing, query processing, and distributed database storage techniques.

TOTAL: 30 PERIODS

CO's	CO's-PO's & PSO's MAPPING														
со	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	РО 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	3	2	2	2	-	-	-	1	1	-	2	3	2	2
CO2	3	3	3	2	3	-	-	-	2	2	-	2	3	2	3
CO3	3	2	3	3	3	2	-	2	2	2	1	3	3	3	3
CO4	3	2	2	3	2	3	2	3	2	3	2	2	3	2	2
CO5	2	3	3	3	3	2	-	2	-	3	3	3	2	3	3
Со	Correlation levels: 1 – low 2 – medium 3 – high "-"- no correlation														

COURSE DESIGNED BY	APPROVED BY
Prof. Dennis Ebenezer- AP/ CSE	Dr.S.Pathur Nisha – Professor & Head / CSE
Name and Department	Name and Department of BoS Chairman

112368412	INTRODUCTION TO OPERATING SYSTEMS	C	atego	ory : P	CC
02505412	INTRODUCTION TO OTERATING STSTEMS	Т	т	P	C
SDC-1 & 8	LABORATORV	L	1	1	U
SDU. 1 & 0	LADONATONI	Ο	Δ	2	1

COURSE OBJECTIVE:

1. To install and configure Windows operating systems.

2. To understand the basics of Unix commands and shell programming.

3. To implement various CPU scheduling algorithms, page replacement algorithms, and memory allocation methods.

4. To implement Deadlock Avoidance and Deadlock Detection algorithms.

5. 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 various Page Replacement Algorithms.
- 12. Write C programs to implement the various File Organization Techniques.

13. Write C programs for the implementation of various disk scheduling algorithms.

COURSE OUTCOMES:

At the end of the course, students would

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 AlgorithmsCO1: Define and implement UNIX commands, file organization, and file allocation strategies.

TOTAL: 30 PERIODS

CO's	CO's-PO's & PSO's MAPPING														
со	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	РО 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	1	3	1	1	-	-	-	1	3	3	3	2	1	3
CO2	3	1	1	2	2	-	-	-	3	2	1	1	3	1	2
CO3	3	3	2	1	2	I	-	-	3	3	1	2	2	2	2
CO4	1	2	2	3	2	-	-	-	3	1	3	1	1	2	1
CO5	2	2	1	1	3	-	-	-	1	2	2	3	1	3	3
Correlation levels: 1 – low 2 – medium 3 – high "-"- no correlation									ation						

COURSE DESIGNED BY	APPROVED BY
Prof. K. Arun Patrick - AP/ CSE	Dr.S.Pathur Nisha – Professor & Head / CSE
Name and Department	Name and Department of BoS Chairman

U23EE313APTITUDE & COMMUNICATION FOR ENGINEERS -
IICategory : EEC
LTPCSDG:8&17II0021

COURSE OBJECTIVE:

- 1. To enhance the students' ability to contribute effectively and confidently in classroom and other forums and thereby they can exhibit their skills and gain attention.
- 2. To further enhance and improve their communicative English for industry readiness through various speech craft activities.
- 3. To take a stock of internal strength and weakness and prepare a plan to manage external threats and opportunities
- 4. To get ready to kick start their career journey by assessing their current skills and talents.
- 5. To train students on clearing various placement papers with greater accuracy

UNIT 1	INTRODUCTION	2						
Introduction about the Course - Learning expectations.								
UNIT 2	SPEAKING SKILLS -VANTAGE	12						
Speech Craft –My buddy – UNIT 3	- Impromptu. PERSONALITY DEVELOPMENT	3						
Psychometric Assessments	s - SWOT analysis.							
UNIT 4	PLACEMENT READINESS	4						
Placement inventory Resume - Grooming.								
UNIT 5	APTITUDE FOR PLACEMENTS - II	9						

Placement Paper 7–Permutation & Combination – Probability, Placement Paper 8 – Arithmetic Reasoning – Problems on Ages, Placement Paper 9 – Ratio Proportion & Alligation Mixture, Placement Paper 10 – Clocks & Calendars.

COURSE OUTCOMES:

At the end of the course, students would

CO1: Students will be able to participate in any learning activity without any reservations. They shall be ready to move beyond their comfort zone to acquire new skills throughout their life.

CO2: Students shall understand and appreciate the importance of English in the current global scenario and make efforts towards up skilling the same.

CO3: They must be able to identify their strength and enhance the same.

CO4: They shall prepare themselves to kick start their career by taking a stock of their existing skills and plan to acquire new skills required to achieve their goals.

CO5: They shall demonstrate a good understanding of basic mathematical concepts required to learn engineering. To use appropriate strategies and shortcuts to improve speed and accuracy in solving aptitude problems during recruitment processes

TOTAL: 30 PERIODS

TEXT BOOKS:

- 1. The Pearson Guide to Quantitative Aptitude for Competitive Examinations, Dinesh Khattar. Pearson
- 2. Quantitative Aptitude Dr. R.S. Aggarwal S. Chand Publication
- 3. A modern Approach to Verbal and Non-Verbal Reasoning R.S. Aggarwal
- 4. A Modern Approach to Verbal & Non-Verbal Reasoning Aggarwal R. S

REFERENCES:

- 1. Quantitative Aptitude for CAT, Arun Sharma.
- 2. Fast Track Objective Arithmetic, Rajesh Verma, Arihant Publication.
- 3. Quantitative Aptitude Quantum CAT Common Admission Tests for Admission into IIMs, Sarvesh

K. Verma.

Nehru Institute of Technology

4. Wiley's Exam Xpert Quantitative Ability for CAT, 2ed, Ashu Jain.

со	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CO1	1	-	-	-	-	-	-	2	-	3	-	3	-	-	-
CO2	-	-	-	-	-	2	2	1	-	3	-	-	-	-	-
CO3	3	3	3	3	-	-	-	-	-	1	-	-	-	-	-
CO4	3	2	1	3	-	-	-	-	-	1	-	-	-	-	-
CO5	1	1	1	1	-	-	-	-	-	3	-	-	-	-	-
Correlation levels: 1 – low 2 – medium 3 – high "-"									"-"- no	correla	ation				

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

COURSE DESIGNED BY	APPROVED BY
Prof. Ramesh Raja – Head/NCPIR	Dr.S.Pathur Nisha – Professor & Head / CSE
Name and Department	Name and Department of BoS Chairman

U23CY403 SDG:4	ENVIDONMENTAL SCIENCE AND CLIMATE	C	Category : MC		
	ENVIRONMENTAL SCIENCE AND CLIMATE	L	Т	Р	С
	UNANGE	2	0	0	0

COURSE OBJECTIVE:

- 1. Study the interrelationship between living organism and environment
- 2. Assess the environmental pollution and its impact.
- 3. Understand the significance of natural resources and their conservation.
- 4. Identify and implement scientific, economic and political solutions to environmental problems.
- 5. Understand the influence of human population on environmental issues and role of information technology as a tool to minimize the environmental problems.

UNIT 1 ECOSYSTEMS AND BIODIVERSITY

6

Definition, Scope and importance of environment - Concept of an ecosystem - Structure and

Regulations 2023

function of an ecosystem (Grassland and River ecosystem only) - Food chains, Food webs and ecological pyramids - Introduction to biodiversity- Definition- Genetic, Species and ecosystem diversity - Value of biodiversity - Threats to biodiversity- Conservation of biodiversity. Case study of simple ecosystems -pond, river, hill slopes, etc.

UNIT 2 ENVIRONMENTAL POLLUTION

Definition - Causes, Effects and control measures of (a) Air pollution (b) Water pollution (c) Thermal pollution - Solid waste management: Causes, Effects and control measures of municipal solid wastes - Role of an individual in prevention of pollution - Pollution case studies -Disaster management - Floods, Earthquake, Cyclone and landslides. Case study of local polluted site - Urban / Rural / Industrial / Agricultural.

UNIT 3 NATURAL RESOURCES

Forest resources - Use and over-exploitation, Deforestation - Water resources - Use and overutilization of surface and ground water, Drought, Conflicts over water, dams-Benefits and problems - Food resources- Changes caused by agriculture and overgrazing, Effects of modern agriculture, Fertilizer-pesticide problems, water logging, Salinity-Role of an individual in conservation of natural resources (National and International level).

UNIT 4 SOCIAL ISSUES AND SUSTAINABILITY MANAGEMENT

Unsustainable to sustainable development- millennium development goals, and protocols-Sustainable Development Goals-targets- Zero waste and R concept - ISO 14000 Series- Material Life cycle assessment, Environmental Impact Assessment. Sustainable habitat: Green buildings, Green materials- Sustainable transports –Carbon credit, Carbon footprint.

UNIT 5 CLIMATE CHANGE AND THE ENVIRONMENT

Trends of global warming and climate change: Global Warming Potential (GWP) & climate change - Impact of climate change on atmosphere - Acid rain - Ozone layer depletion - Weather patterns -Sea level rise - Spread of human diseases - Pandemic issues and management-Role of information technology in environment and human health - Case studies.

COURSE OUTCOMES:

At the end of the course, students would

CO1: The students will able to understand the basis of ecological principles and environmental regulations which in turn helps in sustainable development and human population and environment. Use and over exploitation of forest and water and food resources.

CO2: The students will able to understand various schemes for the protection of species, role of an individual in prevention of pollution and conservation of natural resources

CO3: The students will able to understand design of pollution control structures, resettlement and rehabilitation of people, welfare about the women and child.

CO4: The students will able to apply enough knowledge of implement various Environmental ethics, regulations and schemes, Pandemic issues and management, dams-benefits and problems, conservation of biodiversity.

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6

6

CO5: The students will able to analyze the climate change and its impact on environment. Climate change, global warming, acid rain and ozone layer depletion.

TOTAL: 30 PERIODS

TEXT BOOKS:

1. Benny Joseph, "Environmental Science and Engineering", Tata McGraw-Hill, New Delhi, 2017.

2. Gilbert M. Masters, "Introduction to Environmental Engineering and Science", 2nd Edition, Pearson Education, 2016.

3.George Tchobanoglous, Frank Kreith, "Handbook of Solid Waste Management" (McGraw-Hill Handbooks), McGraw-Hill Education, 2nd Edition July 2017.

REFERENCES:

1. R.K. Trivedi, "Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards", Vol. I and II, Enviro Media. 2015.

2. ErachBharucha, "Textbook of Environmental Studies", Universities Press (I) Private Limited, Hydrabad, 2015.

3. Rajagopalan R, "Environmental Studies-From Crisis to Cure", Oxford University Press, 2005.

со	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	РО 11	PO 12	PSO 1	PSO 2	PSO 3
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CO2	3	1	1	1	-	-	1	-	1	1	-	1	-	-	-
CO3	3	1	1	1	-	-	1	-	1	1	-	1	-	-	-
CO4	3	1	1	1	-	-	1	-	1	1	-	1	-	-	-
CO5	3	1	1	1	-	-	1	-	1	1	-	1	-	-	-
Correlation levels:			1 – l	OW	2 – medium				3 – high			"-"- no correlation			

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

COURSE DESIGNED BY	APPROVED BY
Dr.M.Kumaresan- Prof / S&H	Dr.K.Parimalagandhi – Professor & Head / S&H
Name and Department	Name and Department of BoS Chairman

SDG	Short Form	Full Form				
1	No Poverty	End poverty in all its forms everywhere				
2	Zero Hunger	End hunger, achieve food security and improved nutrition,				
	Zero Hunger	And promote sustainable agriculture				
3	Good health and well being	Ensure healthy lives and promote well-being for all at all				
	Good health and wen being	Ages				
4	Quality education	Ensure inclusive and equitable quality education and				
		Promote life long learning opportunities for all				
5	Gender Equality	Achieve gender equality and empower all women and girls				
6	Clean water and sanitation	Ensure availability and sustainable management of water				
		and sanitation for all				
7	Affordable and clean energy	Ensure access to affordable, reliable, sustainable and				
	interacte and crean energy	modern energy for all				
8	Decent work and Economic	Promote sustained, inclusive and sustainable economic growth,				
	Growth	full and productive employment and decent work				
	Slowin	for all				
9	Industry, Innovation and	Build resilient infrastructure, promote inclusive and				
,	Infrastructure	sustainable industrialization and foster innovation				
10	Reducing Inequality	Reduce income inequality within and among countries				
11	Sustainable cities and	Make cities and human settlements inclusive, safe,				
	communities	Resilient and sustainable				
12	Responsible consumption	Ensure sustainable consumption and production patterns				
	and production	Ensure sustainable consumption and production patients				
		Take urgent action to combat climate change and its				
13	Climate action	impacts by regulating emissions and promoting developments				
		in renewable energy				
14	Life below water	Conserve and sustainably use the oceans, seas and marine				
11		Resources for sustainable development				
15		Protect, restore and promote sustainable use of terrestrial				
	Life on Land	ecosystems, sustainably manage forests, combat desertification,				
		and halt and reverse land degradation and				
		Halt biodiversity loss				
16	Peace, justice and string	Promote peaceful and inclusive societies for sustainable				
	Institutions	development, provide access to justice for all and build				
		effective, accountable and inclusive institutions at all levels				
17	Partnerships for the goals	Strengthen the means of implementation and revitalize the				
	Board	Global partnership for sustainable development				

SUSTAINABLE DEVELOPMENT GOALS