

NANDHA ENGINEERING COLLEGE

(An Autonomous Institution affiliated to Anna University Chennai and approved by AICTE, New Delhi)
Erode - 638 052, Tamilnadu, India, Phone: 04294 - 225585



Curriculum and Syllabi

for

B.E – COMPUTER SCIENCE AND ENGINEERING (CYBER SECURITY) [R26]

[CHOICE BASED CREDIT SYSTEM]

[This Curriculum and Syllabi are applicable to students admitted from the academic year 2026-2027 onwards]

JULY 2026

INSTITUTE VISION AND MISSION	
VISION	• To be an Institute of excellence providing quality Engineering, Technology and Management education to meet the ever-changing needs of the society
MISSION	• To provide quality education to produce ethical and competent professionals with social Responsibility • To excel in the thrust areas of Engineering, Technology and Entrepreneurship by solving real- world problems • To create a learner centric environment and improve continually to meet the changing global needs

B.E – CSE (CYBER SECURITY)	
VISION	• To develop a pool of high caliber professionals, researchers, and entrepreneurs in computing and cyber security to meet the ever-changing needs of a secured society.
MISSION	• To provide quality education to produce Computer Science and Cyber Security professionals with social responsibility • To excel in the thrust areas of Computing and Cyber Security by solving real- world challenges. • To create a learner centric environment and improve continually to meet the global secure computing needs.
PROGRAMME EDUCATIONAL OBJECTIVES (PEO)	• The graduates of Computer Science and Engineering (Cyber Security) will be • PEO1: Core Competency: To transform the graduates as experts in the computing profession and to satisfy the needs of security in the IT industry. • PEO2: Research, Innovation and Entrepreneurship: To empower the graduates with knowledge in computer systems and professional skills to prevent, investigate and condense attacks in cyberspace. • PEO3: Ethics, Human values and Life-Long Learning: To explore new paths through research and keep a breast with the latest technology in cyber security to curtail the malicious attacks ethically.
PROGRAMME SPECIFIC OUTCOMES (PSO)	• The students of Computer Science and Engineering (Cyber Security) will be • PSO1: Knowledge Proficiency: Equipped with knowledge of security in various platforms, possess computer forensic skills with secured network control and act responsibly in legal, ethical and security related issues. • PSO2: Recent Technology: Able to apply emerging appropriate technology and programming skills to find optimal solutions for complex problems by applying domain knowledge to transform innovative ideas into reality.

PROGRAM OUTCOMES:

Engineering Graduates will be able to:

a-l	GRADUATE ATTRIBUTES	PO No.	PROGRAMME OUTCOMES
a-l	GRADUATE ATTRIBUTES	PO No.	PROGRAMME OUTCOMES
a	Engineering knowledge	PO1	Apply knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to develop to the solution of complex engineering problems.
b	Problem analysis	PO2	Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions with consideration for sustainable development. (WK1 to WK4)
c	Design/development of solutions	PO3	Design creative solutions for complex engineering problems and design/develop systems/components/processes to meet identified needs with consideration for the public health and safety, whole-life cost, net zero carbon, culture, society and environment as required. (WK5)
d	Conduct investigations of complex problems	PO4	Conduct investigations of complex engineering problems using research-based knowledge including design of experiments, modelling, analysis & interpretation of data to provide valid conclusions. (WK8)
e	Engineering tool usage	PO5	Create, select and apply appropriate techniques, resources and modern engineering & IT tools, including prediction and modelling recognizing their limitations to solve complex engineering problems. (WK2 and WK6)
f	The Engineer and The World	PO6	Analyze and evaluate societal and environmental aspects while solving complex engineering problems for its impact on sustainability with reference to economy, health, safety, legal framework, culture and environment. (WK1, WK5, and WK7)
g	Ethics	PO7	Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws. (WK9)
h	Individual and Collaborative team work	PO8	Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams.
i	Communication	PO9	Communicate effectively and inclusively within the engineering community and society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations considering cultural, language, and learning differences

j	Project management and finance	PO10	Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multidisciplinary environments.
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PROGRAMME EDUCATIONAL OBJECTIVES	PROGRAMME OUTCOMES										
	A	B	C	D	E	F	G	H	I	J	K
1	3	3	2	3	3	2	2	2	2	3	3
2	3	3	3	3	3	2	1	2	1	2	1
3	3	2	2	1	2	3	3	2	2	2	2

MAPPING OF PROGRAM SPECIFIC OUTCOMES WITH PROGRAMME OUTCOMES

A broad relation between the Programme Specific Objectives and the Programme Outcomes is given in the following table

PROGRAM SPECIFIC OUTCOMES	PROGRAMME OUTCOMES										
	A	B	C	D	E	F	G	H	I	J	K
1	3	3	2	3	3	2	1	2	1	2	2
2	3	2	2	3	3	2	2	2	2	3	3

Contribution

1: Reasonable

2: Significant

3: Strong

NANDHA ENGINEERING COLLEGE (AUTONOMOUS), ERODE - 638 052

REGULATIONS - 2026 (R26)

CHOICE BASED CREDIT SYSTEM (CBCS)

B.E. CSE (CYBER SECURITY)

CURRICULUM: I - VIII SEMESTERS

S. No.	COURSE CODE	COURSE TITLE	CATEGORY	COURSE TYPE	TEACHING AND LEARNING SCHEME			CREDITS	TCP
					L	T	P		
1	26MAN01	Induction Program	M						
SEMESTER: I									
1	26MYB01	Linear Algebra and Applied Calculus	BS	T	3	1	0	4	4
2	26PYB01	Applied Physics for Computer Engineers	BS	T	3	0	0	3	3
3	26GYA01	தமிழர் மரபு / Heritage of Tamils	HUM	T	1	0	0	1	1
4	26CYB04	Climate Change and Sustainability	BS	T	2	0	0	2	2
5	26CIC01	Basics of Electronics Engineering	ES (G)	T	3	0	0	3	3
5	26CSC01	C programming	ES (G)	T	3	0	0	3	3
6	26EYP01	English Communication Lab	HUM	L	0	0	4	3	3
7	26PYP01	Applied Physics Laboratory	BS	L	0	0	2	1	2
8	26CSP01	C Programming laboratory	ES (G)	L	0	0	4	1.5	4
9	26GEP01	Foundation Lab	SD	L	0	0	4	2	4
10	26GEP03	Life Skills for Engineers	ES (G)	-	1	0	2	1	3
TOTAL					16	1	16	24.5	32

SEMESTER: II									
S. No.	COURSE CODE	COURSE TITLE	CATEGORY	COURSE TYPE	TEACHING AND LEARNING SCHEME			CREDITS	TCP
					L	T	P		
1	26EYP02	English Proficiency Lab - I	HUM	L	0	0	2	1	2
2	26MYB05	Probability and Discrete Structures	BS	T	3	1	0	4	4
3	26CIC02	Digital Logic and Computer Organization	ES (G)	T	3	0	0	3	3
4	26MYA02	தமிழரும் தொழில்நுட்பமும்/ Tamils and Technology	HUM	T	1	0	0	1	1
5	26CSC02	Data Structures	ES (G)	T	3	0	0	3	3
6	26CCC01	Foundations of cybersecurity	ES(PC)	LIT	3	0	2	4	5
7	26CCC02	Python for Cyber Security	ES(PC)	LIT	3	0	2	4	5
8	26CSP02	Data Structures Laboratory	ES (G)	L	0	0	4	1.5	2
9	26GYP01	Yoga for Youth Empowerment	HUM	L	0	0	2	1	2
10	26GEP02	Maker Space	SD	L	0	0	4	2	4
11	26GEA01	Analytical Skills - I	ES (G)	T	2	0	0	2	1
TOTAL					18	1	16	26.5	32

SEMESTER: III									
S. No.	COURSE CODE	COURSE TITLE	CATEGORY	COURSE TYPE	TEACHING AND LEARNING SCHEME			CREDITS	TCP
					L	T	P		
1	XXXX	Number Theory for Cyber Security	BS	T	3	1	0	4	4
2	XXXX	Object Oriented Programming using Java programming	ES (PC)	T	3	0	0	3	3
3	XXXX	Design Analysis of Algorithms	ES (PC)	T	3	0	0	3	3
4	XXXX	Operating Systems and Security	ES (PC)	LIT	3	0	2	4	5
5	XXXX	Computer Networks and Internet Protocol	ES (PC)	T	3	0	0	3	3
6	XXXX	Object Oriented Programming using Java programming Laboratory	ES (PC)	L	0	0	4	2	4
7	XXXX	Computer Networks and Internet Protocol Laboratory	ES (PC)	L	0	0	4	2	4
8	XXXX	English Competency Laboratory	HUM	L	0	0	2	2	1
9	XXXX	Design Thinking	ES (G)	T	2	0	0	2	2
10	XXXX	Analytical Skills - II	ES (G)	T	2	0	0	2	1
TOTAL					19	1	12	27	30

SEMESTER: IV									
S. No.	COURSE CODE	COURSE TITLE	CATEGORY	COURSE TYPE	TEACHING AND LEARNING SCHEME			CREDITS	TCP
					L	T	P		
1	XXXX	Applied Machine Learning in Cyber security	BS	T	2	0	0	2	2
2	XXXX	Cryptography and Networks Security	ES (PC)	T	3	0	0	3	3
3	XXXX	Secure Software Engineering	ES (PC)	T	3	0	0	3	3
4	XXXX	Intrusion Detection System	ES(PC)	T	3	0	0	3	3
5	XXXX	Database Management Systems	ES (PC)	T	3	0	0	3	3
6	XXXX	Cryptography and Networks Security Laboratory	ES (PC)	L	0	0	4	2	4
7	XXXX	Database Management Systems Laboratory	ES (PC)	L	0	0	4	4	2
8	XXXX	Workplace English Laboratory	HUM	L	0	0	2	1	2
9	XXXX	Disaster Management and Preparedness	M	T	2	0	0	0	2
10	XXXX	Analytical Skills - III	ES (G)	T	2	0	0	1	2
11	XXXX	Personality and Character Development	SD		0	0	1	0	1
12	XXXX	Macro Project	SD	L	0	0	4	2	2
TOTAL					18	0	15	24	29

SEMESTER: V									
S. No.	COURSE CODE	COURSE TITLE	CATEGORY	COURSE TYPE	TEACHING AND LEARNING SCHEME			CREDITS	TCP
					L	T	P		
1	XXXX	Automata Theory and Compiler Design	ES (PC)	T	4	0	0	3	0
2	XXXX	Vulnerability Assessment and Penetration Testing	ES (PC)	T	3	0	0	3	3
3	XXXX	Web Application security	ES(PC)	LIT	3	0	2	4	5
4	E1	Elective I	ES (PE)	T	3	0	0	3	3
5	E2	Elective II	ES (PE)	T	3	0	0	3	3
6	E3	Elective I(PE/OE)	ES(/PE/OE)	T	3	0	0	3	3
7	XXXX	Vulnerability Assessment and Penetration Testing Laboratory	ES (PC)	L	0	0	4	2	4
TOTAL					19	0	6	21	21

FOR HONOURS									
S. No.	COURSE CODE	COURSE TITLE	CATEGORY	COURSE TYPE	TEACHING AND LEARNING SCHEME			CREDITS	TCP
					L	T	P		
1	XXXX	Capstone Design Project – Level I	SD	GDP	0	0	12	6	12
OR									
1	XXXX	Honours Elective – I		T	3	0	0	3	3
2	XXXX	Honours Elective – II		T	3	0	0	3	3
FOR MINORS									
1	XXXX	Minor Elective – I		T	3	0	0	3	3
2	XXXX	Minor Elective – II		T	3	0	0	3	3

SEMESTER: VI									
S. No.	COURSE CODE	COURSE TITLE	CATEGORY	COURSE TYPE	TEACHING AND LEARNING SCHEME			CREDITS	TCP
					L	T	P		
1	XXXX	Entrepreneurship Development	HUM	LIT	2	0	2	3	4
2	XXXX	Cyber Forensics	ES (PC)	T	3	0	0	3	3
3	XXXX	Cloud Security	ES (PC)	T	3	0	0	3	3
4	E4	Elective III	ES (PE)	T	3	0	0	3	3
5	E5	Elective IV	ES (PE)	T	3	0	0	3	3
6	E6	Elective II (PE/OE)	ES (PE/OE)	T	3	0	0	3	3
7	XXXX	Cyber Forensics Laboratory	ES (PC)	L	0	0	4	2	4
8	XXXX	Indian Knowledge System	M	T	2	0	0	0	2
9	XXXX	Mini Project	SD	T	0	0	4	2	2
10	XXXX	Comprehension	SD	T	2	0	0	2	2
TOTAL					21	0	10	24	29

FOR HONOURS									
S. No.	COURSE CODE	COURSE TITLE	CATEGORY	COURSE TYPE	TEACHING AND LEARNING SCHEME			CREDITS	TCP
					L	T	P		
1	XXXX	Capstone Design Project – Level II	SD	GDP	0	0	12	6	12
OR									
1	XXXX	Honours Elective – III		T	3	0	0	3	3
2	XXXX	Honours Elective – IV		T	3	0	0	3	3
FOR MINORS									
1	XXXX	Minor Elective – III		T	3	0	0	3	3
2	XXXX	Minor Elective – IV		T	3	0	0	3	3

SEMESTER: VII									
S. No.	COURSE CODE	COURSE TITLE	CATEGORY	COURSE TYPE	TEACHING AND LEARNING SCHEME			CREDITS	TCP
					L	T	P		
1	XXXX	Information Security Management	ES (PC)	T	3	0	0	3	3
2	E7	Elective V	ES (PE)	T	3	0	0	3	3
3	E8	Elective VI	ES (PE)	T	3	0	0	3	3
4	E9	Elective (OE)	ES (OE)	T	3	0	0	3	3
5	XXXX	Internship / Industrial Training	SD					2	
6	XXXX	Research Paper Writing^	M						2
TOTAL					12	0	0	14	14

FOR HONOURS									
S. No.	COURSE CODE	COURSE TITLE	CATEGORY	COURSE TYPE	TEACHING AND LEARNING SCHEME			CREDITS	TCP
					L	T	P		
1	XXXX	Capstone Design Project – Level III	SD	GDP	0	0	12	6	12
OR									
1	XXXX	Honours Elective – V		T	3	0	0	3	3
2	XXXX	Honours Elective – VI		T	3	0	0	3	3
FOR MINORS									
1	XXXX	Minor Elective – V		T	3	0	0	3	3
2	XXXX	Minor Elective – VI		T	3	0	0	3	3

SEMESTER: VIII									
S. No.	COURSE CODE	COURSE TITLE	CATEGORY	COURSE TYPE	TEACHING AND LEARNING SCHEME			CREDITS	TCP
					L	T	P		
1	XXXX	Project Work / Internship cum Project	SD	PW	0	0	16	8	8

		Work							
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Humanities and Social Sciences including Management courses (HUM)

S. No.	COURSE CODE	COURSE TITLE	CATEGORY	COURSE TYPE	TEACHING AND LEARNING SCHEME			CREDITS	TCP
					L	T	P		
1	26GYA01	தமிழர் மரபு / Heritage of Tamils	HUM	T	1	0	0	1	1
2	26CYB04	Climate Change and Sustainability	HUM	T	2	0	0	2	2
3	26EYP01	English Communication Lab	HUM	L	0	0	4	3	3
4	26EYP02	English Proficiency Lab - I	HUM	L	0	0	2	1	2
5	26MYA02	தமிழரும் தொழில்நுட்பமும் / Tamils and Technology	HUM	T	1	0	0	1	1
6	26GYP01	Yoga for Youth Empowerment	HUM	L	0	0	2	1	2
7	XXXX	English Competency Laboratory	HUM	L	0	0	2	2	1
8	XXXX	Workplace English Laboratory	HUM	L	0	0	2	1	2
9	XXXX	Entrepreneurship Development	HUM	LIT	2	0	2	3	4

Basic Science Courses (BS)

S. No.	COURSE CODE	COURSE TITLE	CATEGORY	COURSE TYPE	TEACHING AND LEARNING SCHEME			CREDITS	TCP
					L	T	P		
1	26MYB01	Linear Algebra and Applied Calculus	BS	T	3	1	0	4	4
2	26PYB01	Applied Physics for Computer Engineers	BS	T	3	0	0	3	3
3	26PYP01	Applied Physics Laboratory	BS	L	0	0	2	1	2
4	26MYB05	Probability and Discrete Structures	BS	T	3	1	0	4	4
5	XXXX	Number Theory for Cyber Security	BS	T	3	1	0	4	4
6	XXXX	Applied Machine Learning in Cyber security	BS	T	2	0	0	2	2

Engineering Science General Courses - ES(G)									
S. No.	COURSE CODE	COURSE TITLE	CATEGORY	COURSE TYPE	TEACHING AND LEARNING SCHEME			CREDITS	TCP
					L	T	P		
1	26CSC01	C programming	ES (G)	T	3	0	0	3	3
2	26CSP01	C Programming laboratory	ES (G)	L	0	0	4	2	4
3	26GEP03	Life Skills for Engineers	ES (G)	-	1	0	2	1	3
4	26CIC02	Digital Logic and Computer Organization	ES (G)	T	3	0	0	3	3
5	26CSC02	Data Structures	ES (G)	T	3	0	0	3	3
6	26CSP02	Data Structures Laboratory	ES (G)	L	0	0	4	4	2
7	XXXX	Design Thinking	ES (G)	T	2	0	0	2	2
8	26GEA01	Analytical Skills - I	ES (G)	T	2	0	0	2	1
9	XXXX	Analytical Skills - II	ES (G)	T	2	0	0	2	1
10	XXXX	Analytical Skills - III	ES (G)	T	2	0	0	1	2

Engineering Science Programme Core - ES(PC)									
S. No.	COURSE CODE	COURSE TITLE	CATEGORY	COURSE TYPE	TEACHING AND LEARNING SCHEME			CREDITS	TCP
					L	T	P		
1	26CCC01	Foundations of cybersecurity	ES(PC)	LIT	3	0	2	4	5
2	26CCC02	Python for Cyber Security	ES(PC)	LIT	3	0	2	4	5
3	XXXX	Java programming	ES (PC)	T	3	0	0	3	3
4	XXXX	Design Analysis of Algorithms	ES (PC)	T	3	0	0	3	3
5	XXXX	Operating Systems and Security	ES (PC)	LIT	3	0	2	4	5

6	XXXX	Computer Networks and Internet Protocol	ES (PC)	T	3	0	0	3	3
7	XXXX	Java programming Laboratory	ES (PC)	L	0	0	4	2	4
8	XXXX	Computer Networks and Internet Protocol Laboratory	ES (PC)	L	0	0	4	2	4
9	XXXX	Cryptography and Networks Security	ES (PC)	T	3	0	0	3	3
10	XXXX	Secure Software Engineering	ES (PC)	T	3	0	0	3	3
11	XXXX	Intrusion Detection System	ES(PC)	T	3	0	0	3	3
12	XXXX	Database Security	ES (PC)	LIT	3	0	2	4	5
13	XXXX	Cryptography and Networks Security Laboratory	ES (PC)	L	0	0	4	2	4
14	XXXX	Automata Theory and Compiler Design	ES (PC)	T	4	0	0	3	0
15	XXXX	Vulnerability Assessment and Penetration Testing	ES (PC)	T	3	0	0	3	3
16	XXXX	Web Application security	ES(PC)	LIT	3	0	2	4	5
17	XXXX	Vulnerability Assessment and Penetration Testing Laboratory	ES (PC)	L	0	0	4	2	4
18	XXXX	Cyber Forensics	ES (PC)	T	3	0	0	3	3
19	XXXX	Cloud Security	ES (PC)	T	3	0	0	3	3
20	XXXX	Cyber Forensics Laboratory	ES (PC)	L	0	0	4	2	4
21	XXXX	Information Security Management	ES (PC)	T	3	0	0	3	3

Engineering Science Programme Elective - ES(PE)									
S. No.	COURSE CODE	COURSE TITLE	CATEGORY	COURSE TYPE	TEACHING AND LEARNING SCHEME			CREDITS	TCP
					L	T	P		
1	E1	Elective I	ES (PE)	T	3	0	0	3	3
2	E2	Elective II	ES (PE)	T	3	0	0	3	3
3	E4	Elective III	ES (PE)	T	3	0	0	3	3
4	E5	Elective IV	ES (PE)	T	3	0	0	3	3
5	E7	Elective V	ES (PE)	T	3	0	0	3	3
6	E8	Elective VI	ES (PE)	T	3	0	0	3	3

Engineering Science Open Elective - ES(OE)									
S. No.	COURSE CODE	COURSE TITLE	CATEGORY	COURSE TYPE	TEACHING AND LEARNING SCHEME			CREDITS	TCP
					L	T	P		
1	E3	Elective I(PE/OE)	ES(/PE/OE)	T	3	0	0	3	3
2	E9	Elective (OE)	ES (OE)	T	3	0	0	3	3

Skill Development Courses - SD									
S. No.	COURSE CODE	COURSE TITLE	CATEGORY	COURSE TYPE	TEACHING AND LEARNING SCHEME			CREDITS	TCP
					L	T	P		
1	26GEP01	Foundation Lab	SD	L	0	0	4	2	4
2	26GEP02	Maker Space	SD	L	0	0	4	2	4
3	XXXX	Personality and Character	SD		0	0	1	0	1

		Development							
4	XXXX	Macro Project	SD	L	0	0	4	2	2
5	XXXX	Capstone Design Project – Level I	SD	GDP	0	0	12	6	12
6	XXXX	Mini Project	SD	T	0	0	4	2	2
7	XXXX	Comprehension	SD	T	2	0	0	2	2
8	XXXX	Capstone Design Project – Level II	SD	GDP	0	0	12	6	12
9	XXXX	Internship / Industrial Training	SD					2	
10	XXXX	Capstone Design Project – Level III	SD	GDP	0	0	12	6	12
11	XXXX	Project Work / Internship cum Project Work	SD	PW	0	0	16	8	8

Mandatory Courses - M									
S. No.	COURSE CODE	COURSE TITLE	CATEGORY	COURSE TYPE	TEACHING AND LEARNING SCHEME			CREDITS	TCP
					L	T	P		
1	26MAN01	Induction Program	M						
2	XXXX	Disaster Management and Preparedness	M	T	2	0	0	0	2
3	XXXX	Indian Knowledge System	M	T	2	0	0	0	2
4	XXXX	Research Paper Writing^	M					3	2

SEMESTER WISE CREDIT DISTRIBUTION

SEMESTER	HUM	BS	ES (G)	ES(PC)	ES(PE)	ES(PE/OE)	ES(OE)	SD
I	4	10	6					2
II	3	4	12	8				2
III	2	4	4	17				
IV	1	2	1	15				2
V				12	6	3		
VI	3			8	6	3		4
VII				3	6		3	2
VIII								8
Total	13	20	23	63	18	6	3	20

Credits Total: 166

INDUCTION PROGRAMME (Common to All Branches)							
Course Code:		IP3151				CIA	-
Course Type: (Theory/Practical/Integrated)		-				ESE	-
L:T:P:C		0	0	0	0	Total Marks	Nil
Total Hours of Pedagogy		2 Weeks				Exam Hours	-
Prerequisite		Nil					
Course Objectives							
1. To recognize the importance of holistic development, professional ethics, human values, and social responsibility in engineering education. 2. To develop positive interpersonal relationships, adapt effectively to the academic environment and participate responsibly in institutional and societal activities.							
Course Outcomes The students will be able to						Cognitive Level	Weightage of COs in ESE
CO 1	Explain the objectives of the Induction Programme and the role of engineering in addressing societal and national needs.					U	-
CO 2	Demonstrate self-discipline, healthy lifestyle practices, and awareness of universal human values in day-to-day activities.					Ap	
CO 3	Participate effectively in creative, literary, physical, and department-specific activities to enhance personal and professional skills.					Ap	
CO 4	Analyze the significance of teamwork, communication, and ethical behavior in building positive relationships within the institution and society.					An	
CO 5	Develop innovative ideas and create simple solutions or models through department-specific activities, fostering creativity and a maker mindset.					C	

Mapping of COs with POs / PSOs													
COs	POs											PSOs	
	1	2	3	4	5	6	7	8	9	10	11	1	2
CO 1						3	2				3		
CO 2						2	3	2	3	2	3		
CO 3							2	3	3	2	3		
CO 4						2	3	3	3	2	3		
CO 5						1		2	3	2	3		
CO (W.A)						2	3	3	3	2	3		

(i) Physical Activity

This would involve a daily routine of physical activity with games and sports, yoga, gardening, etc.

(ii) Creative Arts

Every student would choose one skill related to the arts, whether visual arts or performing arts. Examples are painting, sculpture, pottery, music, dance, etc. The student would pursue it every day for the duration of the programme. These would allow for creative expression. It would develop a sense of aesthetics and also enhance creativity which would, hopefully, grow into engineering design later.

(iii) Universal Human Values

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

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

(iv) Literary Activity

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

(v) Proficiency Modules

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

(vi) Lectures by Eminent People

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

(vii) Visits to Local Area

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

(viii) Familiarization to Dept./Branch & Innovations

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

(ix) Department Specific Activities

About a week can be spent in introducing activities (games, quizzes, social interactions, small experiments, design thinking, etc.) that are relevant to the particular branch of Engineering/Technology/Architecture that can serve as a motivation and kindle interest in building things (become a maker) in that particular field. This can be conducted in the form of a workshop. For example, CSE and IT students may be introduced to activities that kindle computational thinking, and get them to build simple games. ECE students may be introduced to

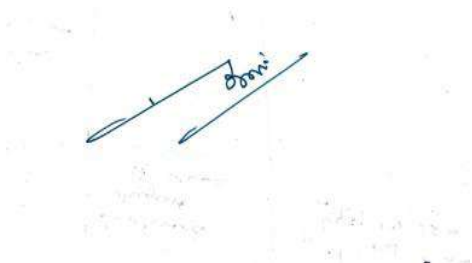
building simple circuits as an extension of their knowledge in Science, and so on. Students may be asked to build stuff using their knowledge of science.

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

Total (2 weeks)

References

Guide to Induction program from AICTE



LINEAR ALGEBRA AND APPLIED CALCULUS (Common to All Branches)							
Course Code:		26MYB01			CIA		40
Course Type: (Theory/Practical/Integrated)		Theory			ESE		60
L:T:P:C		3	1	0	4	Total Marks	100
Total Hours of Pedagogy		60			Exam Hours		3
Prerequisite		Nil					
Course Objectives							
1. To provide fundamental knowledge of Linear Algebra, Calculus, and Differential Equations to develop problem-solving skills for engineering and scientific applications. 2. To develop analytical skills in multivariable functions, optimization, vector calculus, and multiple Integrals for solving engineering problems involving area and volume.							
Course Outcomes					Cognitive Level	Weightage of COs in ESE	
CO 1	Apply the concepts of eigen values, eigen vectors, and the Cayley–Hamilton theorem to solve matrix-related problems.				Ap	20%	
CO 2	Analyze single and multivariable functions using limits, continuity, derivatives, and optimization techniques.				An	20%	
CO 3	Evaluate double and triple integrals to determine area and volume.				Ap	20%	
CO 4	Compute higher order linear differential equations using analytical methods.				Ap	20%	
CO 5	Apply vector calculus concepts and integral theorems in engineering and physical applications.				Ap	20%	

Mapping of COs with POs / PSOs													
COs	POs											PSOs	
	1	2	3	4	5	6	7	8	9	10	11	1	2
CO 1	3				2						2		
CO 2		3			2						2		
CO 3	3				2						2		
CO 4	3				2						2		
CO 5	3				2						2		
CO (W.A)	3	3			2						2		

Unit- I : Linear Algebra	(9+3)
Eigen values and Eigen vectors of a real matrix- Properties of Eigen values and Eigen vectors (without proof)- Cayley Hamilton Theorem (excluding proof) and its applications.	
Unit- II : Calculus of Single and Several Variables	(9+3)
Limit of a function, Continuity, Limits at infinity, Maxima and Minima of functions of single variable, Mean value theorem - Partial derivatives-Total Derivative-Euler's theorem on homogeneous function- Maxima and Minima of functions of two variables.	
Unit- III : Multiple Integration in Cartesian Coordinates	(9+3)
Double integration in Cartesian Co-ordinates-Change of order of integration-Area as double integral-Triple Integration in Cartesian Co-ordinates-Volume as triple integrals.	
Unit- IV : Linear Differential Equations of Second Order	(9+3)
Higher order linear differential equations with constant coefficients - Method of variation of parameters - Cauchy's and Legendre's linear equations.	
Unit- V : Vector Differentiation and Integration	(9+3)
Divergence and Curl – Irrotational and solenoidal vector fields – Line integral over a plane curve – Surface integral and volume integral - Green's, Gauss divergence Theorem (Excluding Proofs) and Stokes Theorem(Excluding Proofs).	
Total (L:45+T:15)	

Suggested Learning Resources
Text Books :
1. Erwin Kreyszig, Advanced Engineering Mathematics, 11th Edition, Wiley India, 2025.
2. B.S. Grewal, Higher Engineering Mathematics, 45th Edition, Khanna Publishers, 2023.
Reference Books:
1. H.K. Dass and Er. Rajnish Verma, Higher Engineering Mathematics, 3 rd Revised Edition, S. Chand Publishing, 2023.
2. T.K.V. Iyengar, B. Krishna Gandhi, S. Ranganatham and M.V.S.S.N. Prasad, Engineering Mathematics, Volume I & II, S. Chand Publishing, 2022.
3. N.P. Bali and Manish Goyal, A Textbook of Engineering Mathematics, Laxmi Publications, 2019.
4. B. V. Ramana, Higher Engineering Mathematics, 11th Edition, McGraw Hill Education, 2017.
5. Gilbert Strang, Linear Algebra and Its Applications, 4th Edition (Indian Reprint), Cengage Learning, 2022.



PHYSICS FOR COMPUTING TECHNOLOGIES (Common to AI&DS, CSE, CSE(CS), CSE(IoT) & IT Branches)							
Course Code:		26PYB01				CIA	40
Course Type: (Theory/Practical/Integrated)		Theory				ESE	60
L:T:P:C		3	0	0	3	Total Marks	100
Total Hours of Pedagogy		45				Exam Hours	3
Prerequisite		Nil					
Course Objectives							
1. To provide students with a fundamental understanding of crystal structures, semiconductor physics, optical fiber communication, oscillations, wave phenomena, and quantum computing. 2. To develop the ability to apply physics principles for analyzing engineering materials, electronic devices, communication systems, and emerging quantum technologies.							
Course Outcomes						Cognitive Level	Weightage of COs in ESE
CO 1	Apply classical and quantum free electron theories to evaluate the electrical and thermal conductivity of materials.					Ap	20%
CO 2	Analyze the working principles and V-I characteristics of semiconductor devices and PN junctions used in computing hardware.					An	20%
CO 3	Apply light transmission principles to design fiber optic communication systems and optical sensor technologies.					Ap	20%
CO 4	Analyze the properties of magnetic materials and their roles in digital data storage devices such as RAM, ROM, and GMR sensors.					An	20%
CO 5	Apply the concepts of modern materials and emerging technologies to solve engineering problems in electronics, communication, and computing.					Ap	20%

Mapping of Cos with POs / PSOs													
COs	POs											PSOs	
	1	2	3	4	5	6	7	8	9	10	11	1	2
CO 1	3	2			1								
CO 2	3	3		2									
CO 3	3	2		1									
CO 4	3	2			1								
CO 5	3	2											
CO (W.A)	3	2		1	1								

Unit- I : Electrical Properties of Materials	9
Conducting materials - Classical free electron theory (postulates) - Electrical and thermal conductivity - Wiedemann - Franz Law (verification) - Quantum free electron theory - Fermi-Dirac statistics - Band theory of solids - Density of states	
Unit- II : Basics of Semiconductor devices	9
Properties of semiconductors - Classification: Elemental and compound - Energy band diagrams (direct & indirect) - Intrinsic and extrinsic semiconductors - N-type and P-type semiconductors - PN junction diode (biasing & V-I characteristics – qualitative) - Hall effect and applications - Ohmic contacts and Schottky diode.	
Unit- III : Fiber Optics and Sensors	9
Principle of light transmission - Acceptance angle & numerical aperture - Types of optical fibers - Fabrication (double crucible method) - Fiber optic communication system - Splicing techniques - Fiber optic sensors (temperature & displacement) - Medical applications (endoscopy).	
Unit- IV : Magnetic Properties and Data Storage	9
Magnetic materials: Dia, para, ferro - Bohr magneton - Domain theory of ferromagnetism - Hysteresis - Hard and soft magnetic materials - Magnetic semiconductors - Spintronic devices - Data storage principles (RAM & ROM) - Magnetic hard disk and GMR sensor.	
Unit- V : Quantum Computing	9
Quantum system for information processing - quantum states – classical bits – quantum bits or qubits – Bloch sphere – CNOT gate – Single and multiple qubits – quantum gates (Pauli – X, Y and Z Gates, Hadamard Gate) – Advantage of quantum computing over classical computing.	
Total (L : 45)	

Suggested Learning Resources
Text Books : 1. Bhattacharya, D.K. & Poonam (2015), T. "Engineering Physics". Oxford University Press. 2. Bernhardt, C. (2019). Quantum computing for everyone. MIT Press.
Reference Books: 1. V. Raghavan, 2015, Materials Science and Engineering: A First Course, PHI Learning Pvt. Ltd., New Delhi. 2. S. O. Pillai, 2018, Solid State Physics, New Age International Publishers. 3. Gerd Keiser, 2011, Optical Fiber Communications, McGraw-Hill Education. 4. Charles Kittel, 2005, Introduction to Solid State Physics, Wiley India / John Wiley & Sons. 5. Michael A. Nielsen & Isaac L. Chuang, 2010, Quantum Computation and Quantum Information, Cambridge University Press.



CLIMATE CHANGE AND SUSTAINABILITY (Common to All Branches)							
Course Code:		26CYB04			CIA		40
Course Type: (Theory/Practical/Integrated)		Theory			ESE		60
L:T:P:C		2	0	0	2	Total Marks	100
Total Hours of Pedagogy		30			Exam Hours		3
Prerequisite		NIL					
Course Objectives							
1. To develop students ability to analyze environmental systems, including resources, ecosystems, biodiversity, and pollution, and evaluate the impact of human activities. 2. To prepare students to design sustainable solutions using principles of conservation, environmental management, and environmental laws for addressing global and local challenges.							
Course Outcomes						Cognitive Level	Weightage of COs in ESE
CO 1	Evaluate natural resources and climate change impacts for sustainable conservation.					E	20%
CO 2	Examine ecosystem functions, biodiversity values and conservation strategies for ecological management.					An	20%
CO 3	Implement eco-friendly practices for pollution prevention and control.					Ap	20%
CO 4	Analyze sustainable energy and environmental management strategies for sustainable development.					An	20%
CO 5	Apply circular economy and green practices for environmental sustainability.					Ap	20%

Mapping of Cos with POs / PSOs													
COs	POs											PSOs	
	1	2	3	4	5	6	7	8	9	10	11	1	2
CO 1	2					2							
CO 2	2					2							
CO 3	2		2			2							
CO 4		2	2			2							
CO 5		2	2			2							
CO (W.A)	2	2	2			2							

UNIT- I : NATURAL RESOURCES AND CLIMATE CHANGE	6
Environment - scope and importance - Natural resources - forest resources - deforestation - causes - effects - control measures - mineral resources - environmental effects of extracting and using mineral resources - food resources - effects of modern agriculture - fertilizer - pesticide problems - role of an individual in conservation of natural resources - Climate change - causes - effects - control measures - importance and applications of AI in climate change.	
UNIT- II :ECOSYSTEM AND BIODIVERSITY	6
Ecosystem -structure and function of an ecosystem - forest ecosystem - food chains - food webs - Biodiversity - value of biodiversity - consumptive use values- productive use values - social values - ethical values - aesthetic values - hotspots of biodiversity - threats to biodiversity - habitat loss - poaching - conservation of biodiversity - In-situ - Ex-situ conservation of biodiversity - effects of climate change on ecosystem and biodiversity.	
UNIT- III : ENVIRONMENTAL POLLUTION	6
Pollution - causes - effects and control measures of air pollution - water pollution - ozone layer depletion - acid rain - solid waste management - methods of disposal of solid waste - land filling - incineration - composting - effects of climate change on environmental pollution.	
UNIT- IV : SUSTAINABILITY AND MANAGEMENT	6
Sustainable development - factors affecting development - sustainable energy techniques - hydrogen energy - solar energy - wind energy - GDP - types - nominal GDP - real GDP - components of GDP - expenditure approach - carbon credit - carbon footprint - sources – preventivemeasures - environmental management.	
UNIT- V : SUSTAINABILITY PRACTICES	6
Zero waste and R concept - circular economy concepts - green chemistry - principles - environmental impact assessment - carbon emission - sources - effects - control measures - Environmental laws and regulations - air act - water act - role of AI in sustainability practices.	
Total (L :30)	

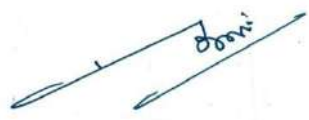
Suggested Learning Resources

Text Books :

1. Dr. A.Ravikrishnan, Environmental Science and Engineering, Sri Krishna Hitech Publishing Co. Pvt.Ltd., Chennai, 15th Edition, 2023.
2. Anubha Kaushik and C. P. Kaushik's "Perspectives in Environmental Studies", 8th Edition, New Age International Publishers, 2025.

Reference Books:

1. Rajagopalan R, 'Environmental Studies-From Crisis to Cure', Oxford University Press, Fourth Edition, 2023.
2. Erach Bharucha "Textbook of Environmental Studies for Undergraduate Courses" Orient Blackswan Pvt. Ltd. 2025.
3. G. Tyler Miller Jr. and Scott Spoolman, Environmental Science, 17th Edition, Cengage Learning, Boston, 2024.
4. Bala Krishnamoorthy, Environmental Management: Text and Cases, 2nd Edition, PHI Learning Pvt. Ltd., New Delhi, 2023.
5. Paul T. Anastas and John C. Warner, Green Chemistry: Theory and Practice, Oxford University Press, New York, Reprint Edition, 2023.



தமிழர்மரபு - HERITAGE OF TAMILS (Common to all branches)							
Course Code:	26GYA01				CIA	40	
Course Type: (Theory/Practical/Integrated)	Theory				ESE	60	
L:T:P:C	1	0	0	1	Total Marks	100	
Total Hours of Pedagogy	15				Exam Hours	3	
Prerequisite	Nil						
பாடத்திட்டத்தின்நோக்கம் :							
பழந்தமிழரிடமிருந்தஅறம், இசை, கலைநுட்பம், வாணிபம், கட்டுமானம், மருத்துவம், வீரம், வாழ்வுமுறைஇவற்றைமாணவர்களுக்குஉணர்த்துவது.							
Course Outcomes					Cognitive Level	Weightage of COs in ESE	
CO1	தமிழ்மொழியின்தொன்மை, பகுத்துண்டுவாழ்தல், மேலாளருக்கானதகுதிகள், மாணவர்களின்தனித்திறனைவளர்த்தல்.				R	20%	
CO2	பண்பாட்டுவிழுமியங்கள், மனிதவளம், நம்பிக்கைகள்ஆகியவற்றைஅறிதல்.				U	20%	
CO3	குழுமனப்பான்மை, கலைநுட்பங்கள், இசைவடிவங்களைஅறிதல்.				U	20%	
CO4	வாணிபத்தொடர்பு, ஒழுக்ககோட்பாடுகள், சமூகத்தொடர்புஇவற்றைஅறிதல்.				R	20%	
CO5	பழந்தமிழரின்வீரம், மருத்துவமுறைகள், தமிழ்பிராமியஎழுத்துவடிவங்கள்ஆகியவற்றைஅறிதல்.				An	20%	

அலகு1 – மொழி மற்றும் இலக்கியம்	3
திராவிடமொழிகள் – தமிழ்ஒருசெம்மொழி – சங்கஇலக்கியத்தின்சமயச்சார்பற்றதன்மை – சங்கஇலக்கியத்தில்பகிர்தல்அறம்–திருக்குறளில்மேலாண்மைகருத்துக்கள் – இக்காலஇலக்கியங்கள்	
அலகு 2 –பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை	3
நடுகல் முதல் நவீன சிற்பங்கள் வரை–பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினைப் பொருட்கள் – தேர்–குமரி முனையில் திருவள்ளுவர் சிலை – இசைக்கருவிகள்–தமிழர்களின் சமூக பொருளாதார வாழ்வில் கோவில்களின் பங்கு	
அலகு 3 –நாட்டுப்புறக் கலைகள் மற்றும் வீரவிளையாட்டுகள்.	3
தெருக்கூத்து – கரகாட்டம் – வில்லுப்பாட்டு – ஒயிலாட்டம்–தோல்பாவைகூத்து - சிலம்பாட்டம் – வளரி–தமிழர்களின்விளையாட்டுகள்	

அலகு 4 –தமிழர்களின் திணைக் கோட்பாடுகள்	3
தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக் கோட்பாடுகள்-சங்ககாலத்தில் தமிழகத்தில் எழுத்தறிவும் கல்வியும்-சங்ககாலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி-கடல்கடந்த நாடுகளில் சோழர்களின் வெற்றி	
அலகு 5 –இந்தியதேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு.	3
இந்திய விடுதலைப் போரில் தமிழர்களின் பங்கு – சுயமரியாதை இயக்கம் – இந்தியமருத்துவத்தில் சித்தமருத்துவத்தின் பங்கு – கல்வெட்டுக்கள் – ஓலைச்சுவடிகள்	
TOTAL(L:15)	

Suggested Learning Resources

Text Books – CUM- Reference Books

1. கே.கே.பிள்ளை-தமிழக வரலாறு-மக்களும் பண்பாடும்-வெளியீடு தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்.
2. முனைவர் இல.சுந்தரம் - கணினித்தமிழ்-விகடன்பிரசுரம்
3. கீழடி – வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம்- தொல்லியல் துறை வெளியீடு
4. பொருநை-ஆற்றங்கரை நாகரிகம்-தொல்லியல் துறை வெளியீடு
5. Dr.K.K.Pillay - Social life of Tamils, A join publication of TNTB & ESC and RMRL - (in print)
6. Dr.K.K.Pillay - Studies in the History of India with special reference to Tamil Nadu.(Published by: The Author)
7. Keeladi – ‘Sangam City Civilization on the Banks of River Vaigai’ (Jointly published by : Department of Archaeology & Tamil Nadu Text Book and Educational Service Corporation, Tamilnadu)
8. Dr. S. V. Subrahmanian, Dr.K.D. Thirunavvukarasu - Historical Heritage of Tamils - Published by : International Institute of Tamil Studies



BASICS OF ELECTRONICS ENGINEERING							
(Common to AI&DS, CSE, CSE(CS), CSE(IoT) & IT Branches)							
Course Code:		26CIC01			CIA		40
Course Type: (Theory/Practical/Integrated)		Theory			ESE		60
L:T:P:C		3	0	0	3	Total Marks	100
Total Hours of Pedagogy		45			Exam Hours		3 Hours
Pre-requisites		-					
Course Objectives							
1. To understand the basic concepts of electrical circuits, circuit laws, and network analysis techniques for DC circuits. 2. To apply semiconductor device concepts and analyze the working of rectifiers, filters, and amplifiers. 3. To develop knowledge on transducers, measuring instruments, and basic digital electronic circuits for practical applications.							
Course Outcomes						Cognitive Level	Weightage of COs in ESE
CO 1	Demonstrate the use of Ohm’s law, Kirchhoff’s laws, and basic circuit analysis methods in electrical circuits.					Ap	20%
CO 2	Apply network theorems such as Thevenin’s, Norton’s, Superposition, and Maximum Power Transfer in DC circuits.					Ap	20%
CO 3	Illustrate the operation and characteristics of semiconductor devices including diodes, BJT, JFET, MOSFET and UJT in electronic applications.					Ap	20%
CO 4	Analyse the performance of rectifiers, filters, transformers and operational amplifiers in electronic applications.					Ap	20%
CO 5	Utilize transducers, measuring instruments, logic gates and flip-flops in basic digital electronic systems.					Ap	20%

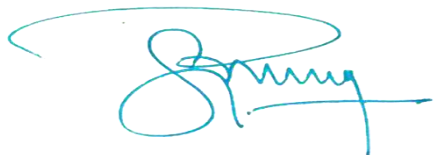
Mapping of COs with POs / PSOs

COs	POs											PSOs	
	1	2	3	4	5	6	7	8	9	10	11	1	2
CO 1	3	3	3									3	2
CO 2	3	3	3									3	2
CO 3	3	3	3									3	2
CO 4	3	3	3		2				2			3	2
CO 5	3	3	3		2				2			3	2
CO (W.A)	3	3	3		2				2			3	2

Unit- I : BASIC CIRCUITS ANALYSIS	9
Charge, Current, Voltage, and Power - Voltage and Current Sources-Ohm's Law-Nodes, Paths, Loops and Branches-Kirchhoff's Current Law-Kirchhoff's Voltage Law-The Single-Loop Circuit-The Single-Node-Pair Circuit-Resistors in Series and Parallel-Voltage and Current Division	
Unit- II : NETWORK THEOREMS FOR DC CIRCUITS	9
Nodal Analysis -The Supernode-Mesh Analysis-The Supermesh-Nodal vs. Mesh Analysis: A Comparison-Computer-Aided Circuit Analysis-Source Transformations-Thevenin and Norton Theorem - Maximum Power Transfer Theorem.	
Unit- III : SEMICONDUCTOR DEVICES	9
Qualitative Theory of P-N Junction-PN Junction as a Diode, Volt-Ampere Characteristics– Diffusion and Drift Current – Zener diode, Characteristics – BJT: PNP and NPN, Common Emitter Configuration of BJT – Field Effect Transistors: JFET and MOSFET – Uni Junction Transistor.	
Unit- IV : RECTIFIERS, FILTERS AND DIGITAL CIRCUITS	9
Transformers: Construction & Types – Rectifiers: Half Wave, Full Wave and Bridge – Filters: Induction, Capacitor, LC - Logic Gates: AND, OR, NOT and Universal Gates: NAND, NOR – Flip Flop: SR, JK-Introduction to digital electronics in AI based systems.	
Unit- V : AMPLIFIERS, TRANSDUCERS AND MEASURING INSTRUMENTS	9
Operational Amplifiers – Applications of Amplifier – Introduction to signal conditioning circuits- LED – Piezo electric Transducers – LCD – Moving Coil and Moving Iron Instrument – CRO	
Total (L : 45)	

Suggested Learning Resources
Text Books : 1. William H. Hayt Jr, Jack E. Kemmerly and Steven M. Durbin, "Engineering Circuits Analysis", 10th Edition, Tata McGraw Hill publishers, New Delhi, 2024. 2. S. Salivahanan, N. Suresh kumar and A. Vallavanraj, "Electronic Devices and Circuits", Tata McGrawHill 5th Edition. 2022.
Reference Books: 1.R. Muthusubramanian and S. Salivahanan, Basic Electrical and Electronics Engineering, 2nd ed. New York, NY, USA: McGraw Hill, 2025. 2.A. K. Sawhney and P. Sawhney, A Course in Electrical and Electronic Measurements and Instrumentation, 19th ed. New Delhi, India: Dhanpat Rai & Co., 2015 3. R. L. Boylestad and L. Nashelsky, Electronic Devices and Circuit Theory, 11th ed. Upper Saddle River, NJ, USA: Pearson, 2012. 4. Gupta, J.B., <i>Electronic Devices and Circuits</i> , 6th Edition, S.K. Kataria & Sons, 2016 (Reprint 2025).

5. Chakrabati A, "Circuits Theory (Analysis and synthesis), Dhanpath Rai & Sons, New Delhi, 2018.

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C PROGRAMMING							
(Common to AI&DS, IT, CSE, CSE(CS), CSE(IoT), ECE,EEE and BME Branches)							
Course Code:		26CSC01				CIA	40
Course Type: (Theory/Practical/Integrated)		Theory				ESE	60
L:T:P:C		3	0	0	3	Total Marks	100
Total Hours of Pedagogy		45				Exam Hours	3
Pre-requisites		Nil					
Course Objectives							
To provide students with a strong foundation in computational thinking and structured programming for solving engineering problems.							
Course Outcomes						Cognitive Level	Weightage of COs in ESE
CO 1	Apply computational thinking principles and fundamental concepts of C programming to develop simple programs.					Ap	20%
CO 2	Implement decision-making and looping constructs in C to solve computational problems.					Ap	20%
CO 3	Apply knowledge of arrays and pointers for data storage and manipulation.					Ap	20%
CO 4	Develop modular programs using functions, recursion, and strings.					Ap	20%
CO 5	Apply the use of structures, file handling and dynamic memory allocation in C programs.					Ap	20%

Mapping of COs with POs / PSOs													
COs	POs											PSOs	
	1	2	3	4	5	6	7	8	9	10	11	1	2
CO 1	3	3			3							3	
CO 2	3	3			3							3	3
CO 3	3	2			3							3	3
CO 4	3	3	3		3						3	3	3
CO 5	3	3	2	2	3						3	3	3
CO (W.A)	3	2.8	2.5	2	3						3	3	3

UNIT- I : COMPUTATIONAL THINKING AND INTRODUCTION TO C PROGRAMMING	9
Computational Thinking and Problem Solving – Problem Definition and Analysis – Steps in Problem Solving – Characteristics of an Algorithm – Algorithms and Pseudo code – Flowchart Representation with Examples – Introduction to C Programming – Features and Applications of C – Structure of a C Program – Compilation and Execution Process – Types of Errors – Tokens – Character Set – Keywords – Identifiers – Data Types – Constants and Variables – Input and Output Statements – Type Conversion and Type Casting – Operators and Expressions.	
UNIT - II : DECISION CONTROL AND LOOPING STATEMENTS	9
Decision Making Statements – if Statement – if-else Statement – Nested if-else Statement – else-if Ladder – switch Statement – Looping Constructs: while Loop – do-while Loop – for Loop – Nested Loops – Jump Statements: break, continue and goto – Simple Programs using Control Structures.	
UNIT - III : ARRAYS AND POINTERS	9
Arrays – One Dimensional Arrays – Two Dimensional Arrays – Multidimensional Arrays – Array Operations and Applications – Introduction to Pointers – Pointer Declaration and Initialization – Types of Pointers – Pointer Arithmetic – Relationship between Arrays and Pointers – Array of Pointers – Pointer to Pointer.	
UNIT - IV : STRINGS AND FUNCTIONS	9
Strings – String Handling Functions – User Defined Functions – Function Declaration and Definition – Function Prototypes – Function Call Mechanism – Passing Arguments to Functions – Passing Arrays and Pointers to Functions – Recursive Functions – Scope and Lifetime of Variables – Storage Classes.	
UNIT - V : STRUCTURES, UNION AND FILES	9
Structures – Defining and Accessing Structures – Array of Structures – Nested Structures – Pointers to Structures – Unions– File Handling: Text and Binary Files – File Operations: open, read, write, append and close – Dynamic Memory Allocation using malloc(), calloc(), realloc() and free().	
Total (L : 45)	

Suggested Learning Resources
Text Books : 1. E. Balagurusamy, "Programming in ANSI C", 9th Edition, McGraw Hill, 2024. 2. Ashok N. Kamthane and Amit Ashok Kamthane , " <i>Programming in C</i> ", 4th Edition , Pearson Education, 2025 .
Reference Books: 1. S. Sridhar, S. S. Sridhar and V. M. Hariharan, "Problem Solving and Programming in C: A Computational Thinking Approach", 1st Edition, Pearson Education,2025. 2. Yashavant Kanetkar," Let Us C", 20th Edition, BPB Publications, 2025. 3. Stephen G. Kochan, "Programming in C", 5th Edition, Pearson Education, 2024.

4. Behrouz A. Forouzan and Hamidreza Afyouni, "Computer Science: A Structured Programming Approach in C", 4th Edition, Cengage Learning, 2023.
5. Noel Kalicharan, "Learn to Program with C: An Introduction to Programming Using the C Language", Apress, 2022.



ENGLISH COMMUNICATION LAB (Common to all branches)							
Course Code:	26EYP01				CIA	60	
Course Type: (Theory/Practical/Integrated)	Practical				ESE	40	
L:T:P:C	0	0	4	2	Total Marks	100	
Total Hours of Pedagogy	60				Exam Hours	3	
Prerequisite	Nil						
Course Objectives							
1. Apply listening, speaking, reading, and writing skills in professional communication contexts. 2. Express ideas effectively in real-world professional scenarios using integrated LSRW skills.							
Course Outcomes					Cognitive Level	Weightage of COs in ESE	
CO 1	Employ effective Communication in academic and professional environments.				Ap	20%	
CO 2	Demonstrate improved listening, speaking, reading, and writing competencies.				Ap	20%	
CO 3	Participate confidently in interpersonal, workplace, and group interactions.				Ap	20%	
CO 4	Apply digital and AI-assisted tools for professional communication tasks.				Ap	20%	
CO 5	Develop ideas clearly and perform effectively in real-world communication scenarios.				C	20%	

Mapping of Cos with POs / PSOs													
COs	Pos											PSOs	
	1	2	3	4	5	6	7	8	9	10	11	1	2
CO 1								2	3	-	2		
CO 2								2	3	-	2		
CO 3								2	3	-	2		
CO 4								2	3	-	2		
CO 5								2	3	-	2		
CO (W.A)								2	3	-	2		

Module - I : COMMUNICATION FOUNDATIONS	12
Grammar –Adjectives - Listening -Audio-Based Diagram Interpretation and Labelling – Speaking - Structured Self-Introduction– Reading -Reading and Interpreting Motivational and Inspirational Passages – Writing -Drafting Formal Permission Letters (Industrial Visit / In-Plant Training Requests)	
Module - II : PROFESSIONAL CORRESPONDENCE	12
Grammar –Verbs- Listening - Listening to Iconic Speeches and Transcript Preparation – Speaking -Flash Speak (JAM – Just A Minute) – Reading -Critical Reading of Newspaper Editorials – Writing -Professional E-mail Writing	
Module - III : COMMUNICATION IN PRACTICE	12
Grammar –Tenses- Listening -Audio-Visual News Analysis and Reporting English Marathon – 30 Day Speaking Challenge – Speaking - Engineering Problem Identification and Solution Presentation– Reading – Inferential and Analytical Reading Practice– Writing -Writing Instructions and Procedural Guideline	
Module - IV : INTERPERSONAL COMMUNICATION	12
Grammar –WH and Yes/No Questions - Listening - Listening for Specific Information – Gap Filling Activities – Speaking - Role Play for Workplace and Real-Life Situations– Reading - Cloze Reading for Language Accuracy and Contextual Understanding – Writing -Developing Hints into Structured Paragraphs	
Module - V : PROFESSIONAL PRESENTATION SKILLS	12
Grammar –Discourse Markers- Listening -Listening to TED Talks and Expert Presentations - Note-Making and Idea Summarization – Speaking –Elevator Pitch - Professional Storytelling Techniques – Reading - Visual Interpretation and Information Analysis - Reading Infographics, Charts, and Visual Data – Writing - Engineering Process Description.	
Total (P : 60)	

Suggested Learning Resources

Text Books :

1. Meenakshi Raman and Sangeeta Sharma. "Professional Communication", Oxford University Press, 2023.
2. Rizvi M. Ashraf. "Effective Technical Communication", McGraw Hill Education (India) Pvt. Ltd., 2021.

Reference Books:

1. Guffey Mary Ellen and Loewy Dana. "Essentials of Business Communication", Cengage Learning, 2023.
2. Raman M. and Sharma S. "Technical Communication: Principles and Practice", Oxford University Press, 2022.
3. Murphy Raymond. "English Grammar in Use", Cambridge University Press, 2022.
4. Butterfield Jeff. "Soft Skills for Everyone", Cengage Learning, 2021.
5. TyagiKavita and Misra Padma. "Advanced Technical Communication", PHI Learning Pvt. Ltd., 2020.



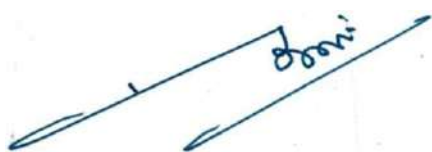
PHYSICS LABORATORY (Common to All Branches)							
Course Code:		26PYP01				CIA	60
Course Type: (Theory/Practical/Integrated)		Theory				ESE	40
L:T:P:C		0	0	2	1	Total Marks	100
Total Hours of Pedagogy		30				Exam Hours	2
Prerequisite		Nil					
Course Objectives							
1. To infer the practical knowledge by applying the experimental methods to correlate with the Physics theory. 2. To introduce different experiments to test basics of physics concepts applied in optics and electronics.							
Course Outcomes						Cognitive Level	Weightage of COs in ESE
CO 1	Apply elasticity concepts to determine mechanical and thermal properties of materials using experimental methods.					Ap	20%
CO 2	Evaluate optical phenomena using laser, diffraction, and interference techniques.					Ev	20%
CO 3	Apply semiconductor concepts to determine band gap energy and solar cell characteristics.					Ap	20%
CO 4	Analyze electrical and magnetic properties using Ohm’s law and B–H curve experiments.					An	20%
CO 5	Apply modern physics concepts to determine Planck’s constant using electroluminescence.					Ap	20%

Mapping of Cos with POs / PSOs													
COs	POs											PSOs	
	1	2	3	4	5	6	7	8	9	10	11	1	2
CO 1	3	2		1									
CO 2	3	3											
CO 3	3	3	1	1									
CO 4	3	2											
CO 5	3	2											
CO (W.A)	3	2	1	1									

LIST OF EXPERIMENTS:

1. Determination of Young's modulus by non-uniform bending method.
2. Determination of (a) wavelength and (b) particle size using Laser.
3. Determination of thermal conductivity of a bad conductor – Lee 's Disc method.
4. Determination of wavelength of mercury spectrum – spectrometer grating.
5. Determination of band gap of a semiconductor.
6. Determination of thickness of a thin wire – Air wedge method.
7. Determination of V-I characteristics of solar cell.
8. Experiments on electromagnetic induction B-H Curve experiment to determine magnetic parameter.
9. Verify Ohm's law – Series and parallel Connection.
10. Determination of Planck's constant using electroluminescence process.

TOTAL (P:30)



C PROGRAMMING LABORATORY							
(Common to AI&DS, IT, CSE, CSE(CS), CSE(IoT), ECE, EEE and BME Branches)							
Course Code:		26CSP01			CIA	60	
Course Type: (Theory/Practical/Integrated)		Practical			ESE	40	
L:T:P:C		0	0	3	1.5	Total Marks	100
Total Hours of Pedagogy		45			Exam Hours	3	
Pre-requisites		Nil					
Course Objectives							
To develop programming skills in C by implementing programs based on fundamental concepts and constructs of the language.							
Course Outcomes						Cognitive Level	Weightage of COs in ESE
CO 1	Develop simple C programs using basic programming constructs, input/output statements, operators, and type conversion.					Ap	20%
CO 2	Implement decision-making and looping constructs to solve computational problems effectively.					Ap	20%
CO 3	Apply arrays and pointers for efficient data storage and memory manipulation.					Ap	20%
CO 4	Develop modular C programs using string handling techniques and functions, recursion.					Ap	20%
CO 5	Apply structures, unions, file handling and dynamic memory allocation to solve real-world problems.					Ap	20%

Mapping of COs with POs / PSOs													
COs	POs											PSOs	
	1	2	3	4	5	6	7	8	9	10	11	1	2
CO 1	3	3			3							3	3
CO 2	3	3			3							3	3
CO 3	3	2			3							3	3
CO 4	3	3	3		3					3		3	3
CO 5	3	3	3		3					3		3	3
CO (W.A)	3	2.8	3		3					3		3	3

List of Experiments:	
1. Programs to perform formatted input/output operations, arithmetic operations, operators, expressions and type conversion. 2. Programs to demonstrate the usage of decision-making statements. 3. Programs to demonstrate the various looping statements. 4. Programs to perform operations using one-dimensional and two-dimensional arrays. 5. Programs to demonstrate pointer operations and array manipulation using pointers. 6. Program to perform string operations. 7. Programs to demonstrate user-defined functions, parameter passing, and recursion. 8. Programs to demonstrate the use of structures and unions. 9. Programs for reading and writing data in text and binary files. 10. Programs to demonstrate dynamic memory allocation.	
Total (P : 45)	

Hardware / Software
Hardware Requirements Computer/Desktop with 4 GB RAM or above Intel Core i3 Processor or equivalent Software Requirements C Compiler (GCC / Turbo C or equivalent) Operating System: Windows/Linux

T. O. S.

Foundation Laboratory							
Course Code:		26GEP01			CIA		100
Course Type: (Theory/Practical/Integrated)		Practical			ESE		-
L:T:P:C		0	0	60	2	Total Marks	100
Total Hours of Pedagogy		60			Exam Hours		-
Pre-requisites		NIL					
Course Objectives							
To provide hands-on experience in: - Developing fundamental practical competencies in electrical wiring, protection, motor control, measurement, and IoT-based applications using standard engineering tools and safe working practices. - Designing, fabricating, assembling, and testing single-layer PCB circuits, and developing IoT-enabled embedded applications using modern development platforms. - Developing responsive and interactive web application prototypes using HTML, CSS, and JavaScript for simple monitoring and control applications.							
Course Outcomes The students will be able to						Cognitive Level	Weightage of COs in CIA
CO 1	Assemble, test, and troubleshoot electrical wiring, protection, motor control, measurement, and IoT-based systems using appropriate tools and safe engineering practices.					Ap	33
CO 2	Develop and assemble a single-layer PCB circuits and implement an IoT system with sensor interfacing.					An	33
CO 3	Develop responsive and interactive web application prototypes using HTML, CSS, and JavaScript for simple monitoring and control applications.					Ap	34

Mapping of COs with POs / PSOs													
COs	POs											PSOs	
	1	2	3	4	5	6	7	8	9	10	11	1	2
CO 1	3		3		3							3	
CO 2	3	3			3								3
CO 3	3		3		3				2			3	
CO (W.A)	3	3	3		3				2			3	3

List of Experiments:	
(i) Electrical	
11. Design and development of domestic electrical wiring and protection system.	
12. Design and implementation of electrical measurement and motor control system.	
13. Development of smart electrical monitoring and load control system using ESP32.	
(ii) IoT & PCB Design	
1. Designing a single layer PCB layout.	
2. Fabrication and assembling a single layer PCB.	
3. Integration of IoT devices with cloud platform.	
(iii) WebX	
1. Design basic web pages using HTML and CSS.	
2. Create Interactive web pages using JavaScript.	
3. Develop a web application prototype.	
Total (P : 60)	

Reference Books:
1. IS 732:2019 – Code of Practice for Electrical Wiring Installations, Bureau of Indian Standards, 2019. 2. S. L. Uppal and G. C. Garg, Electrical Wiring, Estimating and Costing, Khanna Publishers, New Delhi, 2021. 3. B. L. Theraja and A. K. Theraja, Electrical Technology – Volume I, S. Chand Publishing, 2022. 4. R. S. Khandpur, Printed Circuit Boards: Design, Fabrication, Assembly and Testing, McGraw Hill Education India Pvt. Ltd., 2019. 5. Arshdeep Bahga and Vijay Madisetti, Internet of Things – A Hands-on Approach, Universities Press, 2015. 6. Simon Monk, Programming with ESP32, McGraw Hill, 2022. 7. Jon Duckett, HTML and CSS: Design and Build Websites, Wiley Publications, 2014. 8. Jon Duckett, JavaScript and JQuery: Interactive Front-End Web Development, Wiley Publications, 2015. 9. Marco Schwartz, Internet of Things with ESP8266, Packt Publishing, 2016.

ENGLISH PROFICIENCY LAB (Common to All Branches)							
Course Code:		26EYP02			CIA		60
Course Type: (Theory/Practical/Integrated)		Practical			ESE		40
L:T:P:C		0	0	2	1	Total Marks	100
Total Hours of Pedagogy		30			Exam Hours		3
Prerequisite		26EYP01					
Course Objectives							
3. To improve real-time communication and interaction skills							
4. To enhance digital, collaborative, and workplace communication							
Course Outcomes						Cognitive Level	Weightage of COs in ESE
CO 1	Communicate effectively in collaborative and workplace situations.					Ap	20%
CO 2	Demonstrate fluency in professional and interpersonal interactions.					Ap	20%
CO 3	Respond effectively to real-world communication contexts.					Ap	20%
CO 4	Apply creative and analytical thinking in communication tasks.					Ap	20%
CO 5	Create clear oral and written communications for academic, social, and professional purposes.					C	20%

Mapping of Cos with POs / PSOs													
Cos	Pos											PSOs	
	1	2	3	4	5	6	7	8	9	10	11	1	2
CO 1								2	3	-	2		
CO 2								2	3	-	2		
CO 3								2	3	-	2		
CO 4								2	3	-	2		
CO 5								2	3	-	2		
CO (W.A)								2	3	-	2		

Module - I : Interactive Communication Skills	6
Grammar –If Conditional Clauses - Listening - Listening to Engineering Project Briefings and Response Analysis- Speaking - Expressing Opinions through Agree–Disagree Circles	
Module - II : Workplace Communication	6
Grammar –Active and Passive Voice - Reading - Reading Corporate Communication Samples – Writing - Drafting LinkedIn Profile Summaries	
Module - III : Real-World Communication	6
Grammar – Synonyms & Antonyms - Listening - Listening to Travel Vlogs and Experience Narration – Speaking –Tech-Talk Video Presentation	
Module - IV : Technical Communication	6
Grammar – Articles– Reading - Reading Technology Blogs – Writing - Writing Captions for Technical Posters	
Module - V :Professional Interaction Skills	6
Grammar –Confusable Words - Listening - Listening to Interview Experiences and Career Talks – Speaking – Resolving a conflict in a team project	
Total (P: 30)	

Suggested Learning Resources
Text Books :
1. Sanjay Kumar and PushpLata, "Communication Skills", Oxford University Press, Third Edition, 2023. 2. Meenakshi Raman and Sangeeta Sharma, "Professional Communication", Oxford University Press, Third Edition, 2022.
Reference Books:
1. Barun K. Mitra, "Personality Development and Soft Skills", Oxford University Press, Second Edition, 2023. 2. Flatley, Marie E. and Rentz, Kathryn. "Business Communication: Connecting in a Digital World", McGraw Hill Education, 2022. 3. Murphy, Herta A., Hildebrandt, Herbert W. and Thomas, Jane P. "Effective Business Communication", McGraw Hill Education, 2022. 4. Raman, Meenakshi and Sharma, Sangeeta. "Technical Communication: Principles and Practice", Oxford University Press, 2021.

5. D. Sudha Rani, "English for Professional Communication", Pearson Education, Second Edition, 2021.

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PROBABILITY, STATISTICS AND DATA ANALYTICS (Common to AI&DS, CSE & IT Branches)							
Course Code:		26MYB03			CIA		40
Course Type: (Theory/Practical/Integrated)		Theory			ESE		60
L:T:P:C		3	1	0	4	Total Marks	100
Total Hours of Pedagogy		60			Exam Hours		3
Prerequisite		Nil					
Course Objectives							
1. To provide fundamental knowledge of probability theory, random variables, and probability distributions for engineering, computing, and data analysis applications. 2. To develop skills in statistical methods, hypothesis testing, correlation, regression, and analysis of variance for data analysis, decision-making, and statistical inference.							
Course Outcomes						Cognitive Level	Weightage of COs in ESE
CO 1	Apply the axioms of probability and the moments of discrete and continuous random variables to engineering problems.					Ap	20%
CO 2	Apply the discrete and continuous probability distributions to model and solving the practical data analysis problems.					Ap	20%
CO 3	Analyze relationships between random variables using distributions, correlation, covariance, and regression techniques.					An	20%
CO 4	Apply statistical hypothesis tests to analyze data and draw valid inferences.					Ap	20%
CO 5	Apply analysis of variance techniques for evaluating experimental data and statistical inference.					Ap	20%

Mapping of COs with POs / PSOs													
COs	POs											PSOs	
	1	2	3	4	5	6	7	8	9	10	11	1	2
CO 1	3				2						2		
CO 2	3				2						2		
CO 3		3			2						2		
CO 4	3				2						2		
CO 5	3				2						2		
CO (W.A)	3				2						2		

Unit- I : Probability and Random Variables	(9+3)
Probability: Axioms of probability – Conditional probability – Baye’s theorem - Random variable - Probability mass function - Probability density functions - Properties - Moment generating functions.	
Unit- II : Probability Distributions	(9+3)
Discrete distributions: Binomial, Poisson and Geometric distribution - Continuous distributions: Uniform, Exponential and Normal distribution and its properties.	
Unit- III : Two Dimensional Random Variable	(9+3)
Joint distributions - Marginal distributions and conditional distribution - Covariance - Correlation and Regression.	
Unit- IV : Testing of Hypothesis	(9+3)
Sampling Distributions-Tests for single mean, difference of means (Large and Small samples) Using z,t - distribution, F – distribution- Chi-square - Test for independence of attributes and Goodness of fit.	
Unit- V : Analysis of Variance	(9+3)
Analysis of variance - Completely randomized design - Randomized block design - Latin square design.	
Total (L:45+T:15)	

Suggested Learning Resources
Text Books : 1. Ronald E. Walpole, Probability and Statistics for Engineers and Scientists 9th Edition, (2024). 2. S. C. Gupta and V. K. Kapoor Fundamentals of Mathematical Statistics, Sultan Chand & Sons, 12th Edition, (2017).
Reference Books: 1. T. Veerarajan, Probability, Statistics and Random Processes McGraw Hill Education, (2018). 2. William Mendenhall, Introduction to Probability and Statistics, 14th Edition, (2016). 3. Douglas C. Montgomery & George C. Runger Applied Statistics and Probability for Engineers 6th Edition, Wiley (2017). 4. William Navidi, Statistics for Engineers and Scientists McGraw Hill Education, (2016). 5. B.S. Grewal, Higher Engineering Mathematics, 45th Edition, Khanna Publishers, 2023.



தமிழரும் தொழில்நுட்பமும்- TAMILS AND TECHNOLOGY
(Common to All Branches)

Course Code:	26GYA02				CIA	40
Course Type: (Theory/Practical/Integrated)	Theory				ESE	60
L:T:P:C	1	0	0	1	Total Marks	100
Total Hours of Pedagogy	15				Exam Hours	3
Prerequisite	Heritage of Tamils					
பாடத்திட்டத்தின்நோக்கம்						
1.பழந்தமிழிடமிருந்த அறிவியல் தொழில்நுட்பங்களை மாணவர்களுக்கு உரைத்தல்.						
Course Outcomes					Cognitive Level	Weightage of COs in ESE
CO 1	நூல்நூற்றல், சாயமிடல், பானைவனைதல், தமிழ்பிராமிஎழுத்துவடிவங்களைமாணவர்களுக்குஉணர்த்துதல்.				An	20%
CO 2	வீடு, கோவில், கட்டுமானவடிவமைப்பு, காலந்தோறும்மாறிவரும்நுட்பங்களைஅறிதல்.				U	20%
CO 3	இரும்புபயன்பாடு, நாணயவடிவமைப்பு, மணிஉருவாக்குதலின்தொழில்நுட்பங்களைஅறிதல்.				U	20%
CO 4	நீர்மேலாண்மை, பயிர்சாகுபடி, கடல்வளம்உணர்தல்.				R	20%
CO 5	தமிழ்மொழியைகணினிவழிபயன்படுத்தும்உத்திகளைதெரிந்துகொள்ளுதல்.				U	20%

அலகு 1 நெசவுமற்றும்பானைத்தொழில்நுட்பம்	3
நெசவுத்தொழில்-பானைத்தொழில்நுட்பம்-கருப்புசிவப்புபண்டங்கள் - பாண்டங்களில்கீறல்குறியீடுகள்	
அலகு 2 வடிவமைப்புமற்றும்கட்டிடத்தொழில்நுட்பம்	3
சங்ககாலத்தில்வடிவமைப்புமற்றும்கட்டுமானங்கள் – சிலப்பதிகாரத்தில்மேடைஅமைப்பு- மாமல்லபுரம்சிற்பங்களும்கோவில்களும்-தஞ்சைபெரியகோயில்-மதுரைமீனாட்சிஅம்மன்ஆலயம் - செட்டிநாட்டுவீடுகள்-சென்னையில்இந்தோசாரோசெனிக்கட்டிடக்கலை	
அலகு 3 உற்பத்தித்தொழில்நுட்பம்	3

கப்பல்கட்டும்கலை-இரும்புஉருக்குதல்-நாணயங்கள்அச்சடித்தல் – கல்மணிகள், கண்ணாடிமணிகள், சுடுமண்மணிகள், சங்குமணிகள்-தொல்லியல்

அலகு 4 வேளாண்மைமற்றும்நீர்பாசனத்தொழில்நுட்பம்

3

கல்லணை - சோழர்காலகுமிழித்தூம்பு - வேளாண்மைமற்றும்வேளாண்மைசார்ந்தசெயல்பாடுகள்-கடல்சார்அறிவு - முத்துக்குளித்தல்

அலகு 5 அறிவியல்தமிழ்மற்றும்கணினித்தமிழ்

3

அறிவியல்தமிழின்வளர்ச்சி-தமிழ்மென்பொருட்கள்உருவாக்கம்-தமிழ்மின்நூலகம்-இணையத்தில்தமிழ்அகராதிகள்-சொற்குவைத்திட்டம் - தமிழும்செயற்கைநுண்ணறிவும்

TOTAL(L:15)

Suggested Learning Resources

Text Books – CUM- Reference Books

1. கே.கே.பிள்ளை-தமிழகவரலாறு - மக்களும்பண்பாடும்- வெளியீடு : தமிழ்நாடுபாடநூல் மற்றும் கல்வியியல் பணிகள்கழகம்
2. முனைவர் இல.சுந்தரம்-கணினித்தமிழ்- விகடன்பிரசுரம்
3. கீழடி - வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம்-தொல்லியல்துறை வெளியீடு-
4. பொருநை - ஆற்றங்கரை நாகரிகம்-தொல்லியல்துறை வெளியீடு
5. Dr.K.K.Pillay - Social life of Tamils, A join publication of TNTB & ESC and RMRL - (in print)
6. Dr.K.K.Pillay - Studies in the History of India with special reference to Tamil Nadu.(Published by: The Author)
7. Keeladi – ‘Sangam City Civilization on the Banks of River Vaigai’ (Jointly published by : Departmental Archaeology& Tamil Nadu text book and Educational Service Corporation, Tamilnadu)
8. Dr. S. V. Subrahmanian, Dr.K.D. Thirunavukarasu - Historical Heritage of Tamils - Published by : International Institute of Tamil Studies
9. Dr. K.S. Kuppusamy, A I Vasiyak kalai – Zero Degree Publishing, 2025.

FOUNDATIONS OF CYBER SECURITY							
Course Code:		26CCC01				CIE	50
Course Type: (Theory/Practical/Integrated)		Integrated				ESE	50
L:T:P:C		3	0	2	4	Total Marks	100
Total Hours of Pedagogy		75 (L : 45 + P : 30)				Exam Hours	3
Pre-requisites		Nil					
Course Objectives							
To equip students with the essential skills and knowledge to solve computational problems using the Python programming language for cyber security							
Course Outcomes						Cognitive Level	Weightage of COs in ESE
CO 1	Apply the fundamentals of cyber security, computer architecture, operating systems, virtualization, and cyber threat landscapes.					Ap	20%
CO 2	Apply Linux commands, system administration techniques, shell scripting, process management, and file permissions to manage Linux systems.					Ap	20%
CO 3	Apply operating system security concepts, system hardening techniques, access controls, firewall configuration, patch management, and endpoint protection mechanisms.					Ap	20%
CO 4	Apply networking concepts, IP addressing, subnetting, network protocols, virtual network configurations, and basic packet analysis for cyber security tasks.					Ap	20%
CO 5	Apply virtual machines, Docker, Git/GitHub, Nmap, Wireshark, Burp Suite, and OWASP ZAP to establish and operate a secure cyber security laboratory environment.					Ap	20%

Mapping of COs with POs / PSOs													
COs	POs											PSOs	
	1	2	3	4	5	6	7	8	9	10	11	1	2
CO 1	3	2			1					1	1	3	2
CO 2	3	2			3					1	1	3	2
CO 3	3	3	2	2	3				1	1	2	3	3
CO 4	3	3	2	2	3				1	1	2	3	3
CO 5	2	2	3	2	3				2	2	2	3	3
CO (W.A)	1.8	1.6	2.1	2	2.6				1.3	1.2	1.6	3	2.6

Unit- I : Introduction to Cyber Security and Operating Systems	9
Introduction to Cyber Security – Cyber Threat Landscape – Information Security Principles (CIA Triad) – Types of Cyber Attacks – Cyber Security Domains – Career Opportunities in Cyber Security – Fundamentals of Computer Architecture – Kernel and Types of Kernels – User Space and Kernel Space – Boot Process (BIOS/UEFI) – Virtualization Concepts – Hypervisors – Virtual Machine Installation and Configuration.	
Unit- II: Linux Fundamentals and System Administration	9
Introduction to Linux – Open Source Concepts – Linux Distribution Families (Debian, Red Hat, Arch, SUSE, Kali) – Linux File System Hierarchy (FHS) – Linux Directory Structure – File and Directory Management – Users and Groups – File Permissions and Ownership – Package Management – Process Management – Environment Variables – Shell and Bash Scripting Basics – Essential Linux Commands – Networking Commands – Service Management – Software Installation and Configuration – System Monitoring and Log Management.	
Unit- III: Operating System Architecture and Security Hardening	9
Introduction to Operating Systems – Functions of an Operating System - Windows Operating System Architecture – Windows File System (NTFS) – Windows Registry Basics – Linux Security Architecture – Operating System Hardening – System Configuration and Administration – User and Account Management – Password Policies – Firewall Configuration – Patch and Update Management – Backup and Recovery – Android Operating System Architecture – Android File System – Android Security Model – macOS Architecture – APFS File System – macOS Security Features – Secure Boot – Endpoint Protection Fundamentals.	
Unit- IV : Networking Foundations for Cyber Security	9
Computer Networking Fundamentals – OSI Reference Model – TCP/IP Protocol Suite – IPv4 and IPv6 Addressing – Subnetting Basics – Public and Private IP Addressing – MAC Addressing – ARP Protocol – DNS – DHCP – Routing and Switching Concepts – Common Network Protocols – TCP and UDP – Common Port Numbers – Network Interface Cards and Adapters – NAT Adapter – Bridged Adapter – Host-Only Adapter – Internal Network – Virtual Network Configuration – Basic Packet Analysis – Network Troubleshooting Fundamentals.	
Unit- V : Cyber Security Lab Setup and Foundation Tools	9
Cyber Security Lab Environment Setup – Windows Virtual Machine Setup – Docker Fundamentals – Docker Installation and Configuration – Docker Images, Containers and Volumes – Docker Networking – Introduction to Git and GitHub – Security Tool Installation – Nmap Basics – Wireshark Basics – Burp Suite Community Edition – OWASP ZAP – Secure Lab Management – Cyber Ethics – Responsible Disclosure – Introduction to Cyber Laws – Documentation and Reporting – Cyber Security Career Roadmap.	

List of Experiments:	30 Hours
1. Installation and configuration of a virtual machine using VirtualBox or VMware Workstation and deployment of a Linux operating system. 2. Perform basic Linux system administration using file management, directory operations, user management, and file permission commands. 3. Install software packages, manage services, monitor system processes, and analyze system log files in Linux. 4. Configure operating system security by implementing user account management, password policies, firewall settings, system updates, and service hardening. 5. Explore the Linux File System Hierarchy (FHS), directory structure, symbolic links, file permissions, and storage management. 6. Configure virtual networking using NAT, Bridged, Host-Only, and Internal Network adapters and verify connectivity between virtual machines. 7. Configure network parameters including IP addressing, DNS, gateway, and network interfaces, and verify connectivity using networking utilities. 8. Install and configure Docker, create and manage containers, configure container networking, and use Docker volumes for persistent storage. 9. Install and configure Git, create a local repository, perform version control operations, and synchronize with a remote GitHub repository. 10. Perform network reconnaissance using Nmap to identify live hosts, open ports, and running services within a controlled laboratory environment. 11. Capture, analyze, and interpret network traffic using Wireshark to identify common network protocols and communication patterns. 12. Install and configure Burp Suite Community Edition and OWASP ZAP to intercept HTTP/HTTPS requests and perform basic web application security testing in a controlled environment.	
Total (L : 45 + P : 30)	

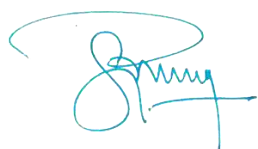
Suggested Learning Resources

Text Books:

1. William Stallings, *Operating Systems: Internals and Design Principles*, 9th Edition, Pearson, 2018.
2. William Stallings and Lawrie Brown, *Computer Security: Principles and Practice*, 4th Edition, Pearson, 2018.

Reference Books:

1. Christopher M. Bishop, *Computer Security: Art and Science*, 2nd Edition, Addison-Wesley Professional, 2019.
2. Nemeth, Snyder, Hein and Whaley, *UNIX and Linux System Administration Handbook*, 5th Edition, Addison-Wesley Professional, 2017.
3. Brian Ward, *The Linux Kernel-HOWTO*, relevant online/reference editions.
4. Michael Jang, *Mastering Linux Security and Hardening*, 2nd Edition, Packt Publishing, 2021.
5. James F. Kurose and Keith W. Ross, *Computer Networking: A Top-Down Approach*, 8th Edition, Pearson, 2021.



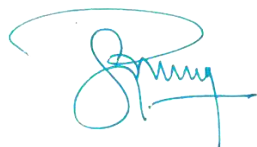
PYTHON PROGRAMMING FOR CYBER SECURITY							
Course Code:		26CCC02			CIE	50	
Course Type: (Theory/Practical/Integrated)		Integrated			ESE	50	
L:T:P:C		3	0	2	4	Total Marks	100
Total Hours of Pedagogy		75 (L : 45 + P : 30)			Exam Hours	3	
Pre-requisites		Nil					
Course Objectives							
To equip students with the essential skills and knowledge to solve computational problems using the Python programming language for cyber security							
Course Outcomes						Cognitive Level	Weightage of COs in ESE
CO 1	Apply the fundamentals of Python programming and develop structured programs using core language features.					Ap	20%
CO 2	Apply control structures, functions, file handling, and exception handling to solve programming problems.					Ap	20%
CO 3	Apply object-oriented Python concepts using standard libraries and modular programming techniques to solve programming problems.					Ap	20%
CO 4	Apply Python libraries for networking, automation, and introductory cyber security applications to solve practical problems.					Ap	20%
CO 5	Design and implement Python-based automation solutions for cyber security tasks, reporting, and secure software development.					An	20%

Mapping of COs with POs / PSOs													
COs	POs											PSOs	
	1	2	3	4	5	6	7	8	9	10	11	1	2
CO 1	3	2	2		2					1	1	3	2
CO 2	3	2	2	1	2					1	1	3	2
CO 3	3	2	3		3				1	1	2	3	3
CO 4	3	3	3	1	2				1	1	2	3	3
CO 5	3	3	3	2	3				2	2	2	3	3
CO (W.A)	3	2.4	2.6	1.3	2.4				1.3	1.2	1.6	3	2.6

Unit- I : Introduction to Python Programming	9
Introduction to Python – Features and Applications of Python – Installing Python and IDEs – Python Interpreter – Writing and Executing Python Programs – Variables and Data Types – Input and Output Statements – Operators and Expressions – Type Casting – Comments and Documentation – Strings and String Operations – Lists – Tuples – Sets – Dictionaries – Basic Programming Practices.	
Unit- II : Control Structures and Functions	9
Conditional Statements – Nested Conditions – Looping Statements – Break, Continue and Pass Statements – Range Function – Functions – Types of Functions – Function Arguments – Recursive Functions – Lambda Functions – Variable Scope – Modules – Packages – Built-in Modules – Exception Handling – Assertions – File Handling – Working with CSV and JSON Files.	
Unit- III : Object-Oriented Programming and Python Libraries	9
Object-Oriented Programming Concepts – Classes and Objects – Constructors – Instance and Class Variables – Methods – Inheritance – Polymorphism – Encapsulation – Abstraction – Operator Overloading – Python Standard Library – Date and Time Module – OS Module – Sys Module – Pathlib – Logging Module – Regular Expressions (Regex).	
Unit- IV : Python for Networking and Cyber Security	9
Socket Programming Fundamentals – TCP and UDP Communication – IP Address Manipulation – DNS Lookup – HTTP Requests and Responses – Working with APIs – Multithreading Fundamentals – Multiprocessing Basics – Python Libraries for Cyber Security – Requests – Socket – Scapy – Python-Nmap – Paramiko – BeautifulSoup – Cryptography Library – Hashlib – Base64 Encoding and Decoding – Secure Coding Practices.	
Unit- V : Automation, Reporting and Cyber Security Applications	9
Automation using Python – Task Scheduling – File and Directory Automation – Network Automation – Report Generation – HTML, CSV and PDF Report Creation – Logging and Error Reporting – Configuration File Management – Introduction to AI-Assisted Python Applications – Python for Reconnaissance – Python for Network Monitoring – Python for Log Analysis – Python for Digital Forensics – Python Project Development Lifecycle – Best Practices for Secure Python Programming.	

List of Experiments:	30 Hours
1. ICMP Ping: Check host availability using Python. 2. TCP Port Scanning: Identify open ports on a target IP. 3. DNS Reconnaissance: Retrieve IP, hostname, and DNS information. 4. File Hashing: Generate and verify MD5, SHA-1, and SHA-256 hashes. 5. ARP Scanning: Discover active devices and generate an IP–MAC CSV report. 6. Web Reconnaissance: Collect WHOIS, DNS, HTTP headers, robots.txt, and sitemap information. 7. SSL/TLS Analysis: Analyze certificate details, protocol, issuer, and validity. 8. Banner Grabbing: Identify running services, applications, and versions. 9. Network Vulnerability Scanner: Integrate Nmap and generate a PDF security report. 10. Multi-threaded Port Scanner: Scan multiple systems concurrently and analyze execution time. 11. Web Application Recon: Perform subdomain, directory, technology, and security-header analysis. 12. AI-Assisted Reconnaissance: Automate cyber reconnaissance and generate a PDF security assessment report.	
Total (L : 45 + P : 30)	

Suggested Learning Resources
Text Books: 1. Mark Lutz, <i>Learning Python</i>, 6th Edition, O'Reilly Media, 2024. 2. Justin Seitz, <i>Black Hat Python: Python Programming for Hackers and Pentesters</i>, 2nd Edition, No Starch Press, 2021.
Reference Books: 1. Justin Seitz, <i>Black Hat Python: Python Programming for Hackers and Pentesters</i>, 2nd Edition, No Starch Press, 2021. 2. TJ O'Connor, <i>Violent Python: A Cookbook for Hackers, Forensic Analysts, Penetration Testers and Security Engineers</i>, Syngress, 2012. 3. Daniel J. Barrett, <i>Linux Pocket Guide</i>, 4th Edition, O'Reilly Media, 2020. 4. Luciano Ramalho, <i>Fluent Python</i>, 2nd Edition, O'Reilly Media, 2022. 5. Wes McKinney, <i>Python for Data Analysis</i>, 3rd Edition, O'Reilly Media, 2022.



DATA STRUCTURES							
(Common to AI&DS, IT, CSE, CSE(CS), CSE(IoT), ECE,EEE and BME Branches)							
Course Code:		26CSC02				CIA	40
Course Type: (Theory/Practical/Integrated)		Theory				ESE	60
L:T:P:C		3	0	0	3	Total Marks	100
Total Hours of Pedagogy		45				Exam Hours	3
Prerequisites		Nil					
Course Objective							
To provide knowledge of linear and non-linear data structures and their applications in problem solving.							
Course Outcomes						Cognitive Level	Weightage of COs in ESE
CO 1	Apply the concepts of Abstract Data Types (ADT) and implement linear data structures for solving computational problems.					Ap	20%
CO 2	Implement linear data structures such as linked lists, stacks, queues, and hashing techniques.					Ap	20%
CO 3	Apply tree-based data structures and heap operations to solve computational problems.					Ap	20%
CO 4	Apply trie structures and hashing techniques for efficient data storage and retrieval.					Ap	20%
CO 5	Apply graph traversal algorithms and their applications to solve computational problems.					Ap	20%

Mapping of COs with POs / PSOs													
COs	POs											PSOs	
	1	2	3	4	5	6	7	8	9	10	11	1	2
CO 1	3	2	2								2	3	2
CO 2	3	3	2		2						2	3	3
CO 3	3	3	3	2	2						2	3	3
CO 4	2	3	3	2	3						2	2	3
CO 5	3	3	3	2	3						3	3	3
CO (W.A)	2.8	2.8	2.6	2	2.5						2.2	2.8	2.8

Unit- I : FOUNDATIONS OF DATA STRUCTURES AND LINEAR LISTS	9
Abstract Data Types (ADT) - Basic concept of Data Structures - Array-based implementation - Linked list implementation - Singly, Doubly, Circular linked lists - Applications of lists - Polynomial ADT.	
Unit- II :STACKS AND QUEUES	9
Stack ADT – Operations and Applications – Balancing Symbols – Expression Evaluation – Infix to Postfix Conversion – Function Calls and Recursion – Queue ADT – Array-based Queue – Linked Queue – Circular Queue – Double-ended Queue (Deque).	
Unit- III :TREES	9
Tree ADT – Tree Traversals - Binary Tree ADT – Expression trees – Binary Search Tree ADT – AVL Trees – Priority Queue (Heaps) – Binary Heap.	
Unit- IV : TRIES AND HASHING	9
Tries: Standard Tries, Compressed Tries, Binary Tries– Introduction to Hashing – Hash Functions – Collision Resolution Techniques: Separate Chaining and Open Addressing – Applications of Hashing.	
Unit- V : GRAPHS	9
Definitions – Representation of Graphs – Types of Graph – Graph Traversal: Depth-First Search (DFS) – Breadth-First Search (BFS) – Topological Sort – Applications of DFS: Bi-connectivity – Euler Circuits – Finding Strongly Connected Components – Applications of BFS: Bipartite Graph.	
Total(L : 45)	

Suggested Learning Resources
Text Books : Mark Allen Weiss, “Data Structures and Algorithm Analysis in C”, Pearson Education, 2014. Gilberg, R. F., &Forouzan, B. A, “Data Structures: A Pseudocode Approach”, Cengage Learning India Private Limited, 2023. Ellis Horowitz and Sartaj Sahni, “Fundamentals of Data Structures”, Universities Press, 2014.
Reference Books:
1. Thomas H. Cormen et al.,” Introduction to Algorithms”, MIT Press, 2022. Robert Lafore, “Data Structures and Algorithms in Java”, Sams Publishing, 2017. Michael T. Goodrich et al., “Data Structures and Algorithms in Python”, Wiley India, 2016. Alfred V. Aho, John E. Hopcroft, Jeffrey D. Ullman, “Data Structures and Algorithms”, Pearson, 2001. D.S. Malik, Data Structures Using C++, 2nd Edition, Cengage, 2012.

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DATA STRUCTURES LABORATORY							
(Common to AI&DS, IT, CSE, CSE(CS), CSE(IoT), ECE, EEE and BME Branches)							
Course Code:		26CSP02				CIA	60
Course Type: (Theory/Practical/Integrated)		Practical				ESE	40
L:T:P:C		0	0	3	1.5	Total Marks	100
Total Hours of Pedagogy		45				Exam Hours	3
Pre-requisites		Programming Skills					
Course Objective							
To develop skills in implementing and applying linear and non-linear data structures for efficient problem-solving.							
Course Outcomes						Cognitive Level	Weightage of COs in ESE
CO 1	Apply List ADT and linked list concepts to perform basic operations.					Ap	20
CO 2	Implement stack and queue operations to solve computational problems.					Ap	20
CO 3	Demonstrate binary tree, BST, and AVL tree operations and traversals.					Ap	20
CO 4	Analyze hash functions and priority queue operations for efficient data handling.					An	20
CO 5	Analyze graph traversal techniques to solve computational problems.					An	20

Mapping of COs with POs / PSOs													
COs	POs											PSOs	
	1	2	3	4	5	6	7	8	9	10	11	1	2
CO 1	3	2			3							3	2
CO 2	3	3	2		3							3	3
CO 3	3	3	2		3							3	3
CO 4	2	3	2		3						2	3	3
CO 5	2	3	2		3						2	3	3
CO (W.A)	2.6	2.8	2		3						2	3	2.8

List of Experiments:

1. Implementation of List ADT using arrays and linked lists.
2. Implementation of Singly, Doubly, and Circular Linked Lists and their operations.
3. Implementation of Stack ADT and its applications.
4. Implementation of Queue ADT using arrays and linked lists.
5. Implementation of Circular Queue and Double-ended Queue (Deque).
6. Implementation of Binary Trees and its Tree Traversals.
7. Implementation of Binary Search Tree (BST) and AVL Tree operations.
8. Implementation of Priority Queue.
9. Implementation of Hash functions and Hashing operations.
10. Implementation of Graph representation and Graph Traversals (BFS and DFS).

Total (P : 45)

Hardware / Software

Hardware Requirements

Computer/Desktop with 4 GB RAM or above
Intel Core i3 Processor or equivalent

Software Requirements

C Compiler (GCC / Turbo C or equivalent) / Python IDLE

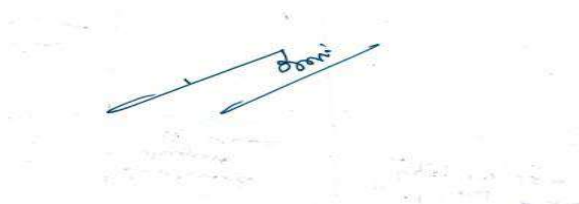


ANALYTICAL SKILLS – I (Common to All Branches)							
Course Code:	26GEA01				CIA	100	
Course Type: (Theory/Practical/Integrated)	Theory				ESE	-	
L:T:P:C	2	0	0	1	Total Marks	100	
Total Hours of Pedagogy	30				Exam Hours	2.5	
Prerequisite	Nil						
Course Objectives							
1. To develop students' proficiency in quantitative aptitude by strengthening their understanding of number systems, arithmetic concepts, mathematical applications, and problem-solving techniques required for academic, competitive, and placement examinations. 2. To enhance students' logical reasoning and analytical thinking skills by enabling them to identify patterns, solve reasoning problems, analyze relationships, and apply spatial visualization techniques for effective decision-making and logical problem-solving.							
Course Outcomes The students will be able to					Cognitive Level	Weightage of COs in CIA	
CO 1	Understand and apply fundamental number theory techniques to solve quantitative aptitude efficiently.				U	20%	
CO 2	Solve basic mathematical and word problems accurately and efficiently.				AP	20%	
CO 3	Analyze and solve real-life and aptitude-based arithmetic problems effectively.				Ap	20%	
CO 4	Develop logical thinking and analytical reasoning skills for solving reasoning problems effectively.				An	20%	
CO 5	Apply analytical and spatial reasoning skills and solve analogy and image-based reasoning problems effectively.				An	20%	

Mapping of COs with POs / PSOs													
COs	POs											PSOs	
	1	2	3	4	5	6	7	8	9	10	11	1	2
CO 1	2	2											
CO 2	2	2											
CO 3		2	2										
CO 4		2									2		
CO 5		2									2		
CO (W.A)	2	2	2								2		

Unit- I : Number Theory and Divisibility Rules	6
Place and Face Value – Types of Numbers – Divisibility Rule – Unit Digit Concept – Remainder Theorem - Problems on HCF and LCM - Arithmetic Progression - Geometric Progression.	
Unit- II : Basic Arithmetic and Word Problems	6
BODMAS – Simplification – Problems on Numbers – Math Puzzle.	
Unit- III : Fundamentals of Arithmetic Applications	6
Percentage - Ratio and Proportion – Ages – Average.	
Unit- IV : Pattern Analysis and Logical Thinking	6
Number series - Alphabetical Series – Alphanumeric – Odd man out - Coding and Decoding.	
Unit- V : Analogy and Spatial Visualization	6
Analogy – Mirror Images –Water Images – Pattern Completion.	
Total (P : 30)	

Suggested Learning Resources
Reference Books:
1. Aggarwal R S. “Quantitative Aptitude for Competitive Examinations”, S. Chand Publishing Company Ltd(s)., 2022. 2. Sharma, Arun. “How to Prepare for Quantitative Aptitude for the CAT”, Tata McGraw – Hill Publishing, 2024. 3. Dr. R. S. Aggarwal. “A Modern Approach to Logical Reasoning”, S. Chand Publishing., 2024–2025 (revised editions used for competitive exams).
Web links and Video Lectures (e-Resources):
1. https://www.geeksforgeeks.org/aptitude/quantitative-aptitude/ 2. https://aspirantzone.in/study-materials/subject-wise-study-materials/quantitative-aptitude-study-material-practice/ 3. https://www.testmocks.com/blog/quantitative-aptitude-mock-test/ 4. https://letsstudytogether.co/quantitative-aptitude-topic-wise-questions-and-answers-pdf-download/



YOGA FOR YOUTH EMPOWERMENT (Common to All Branches)							
Course Code:	26GYP01				CIA	100	
Course Type: (Theory/Practical/Integrated)	Practical				ESE	-	
L:T:P:C	0	0	2	1	Total Marks	100	
Total Hours of Pedagogy	30				Exam Hours	-	
Prerequisite	Nil						
Course Objectives							
1. To develop students' character and ethical values through value-based education. 2. To apply yogic principles and healthy lifestyle practices to enhance physical well-being and maintain youthfulness.							
Course Outcomes The students will be able to					Cognitive Level	Weightage of COs in ESE	
CO 1	Apply yoga and physical exercises for a healthy life.				Ap	Internal Assessment	
CO 2	Explain the principles of Kayakalpa for maintaining health and youthfulness.				U		
CO 3	Practice meditation techniques for mental well-being.				Ap		
CO 4	Demonstrate individual and social values in daily life.				Ap		
CO 5	Analyze the importance of introspection and moral values for personal development				An		

Mapping of COs with POs / PSOs													
COs	POs											PSOs	
	1	2	3	4	5	6	7	8	9	10	11	1	2
CO 1						2	1				2		
CO 2										2	3		
CO 3						2	1	2			3		
CO 4						2	2	3	2	2	3		
CO 5										2	3		
CO (W.A)						2	1	2	1	2	3		

Unit- I : Physical Health	6
Sky – Introduction – Education as a means for Youth Empowerment – Greatness of Education – Yoga for Youth Empowerment. Simplified Physical Exercise Explanation – Hand, Leg, Breathing and Eye exercises – Kapalabathi, Makarasanam, Massaging, Acupressure and Relaxation practices – Benefits, Pranayamam: Nadi Saddhi – Clearance – Explanation Benefits.	
Unit- II : Strengthening Life Force	6
Reasons for Diseases: Natural Reasons – Artificial Reasons, Philosophy of Kayakalpa – Physical Body – Sermlinal Fluid – Life Force – Biomagnetism – Mind, Maintaining Youthfulness – Postponing Aging – Transformation of food into Seven Body Constitutes Greatness of Sermlinal fluid, Limit and method in five factors - Managing infatuation, Kayakalpa Practice – Toning up of nerves – Ojas Breathing – Benefits.	
Unit- III : Wellness of Mind	6
Classification of mind waves – Agna Meditation - Benefits, Shanthi meditation – Benefits, Thuriya meditation – Benefits. Blessing and its benefits : Auto suggestion – Blessing the family and others – Blessing the World – Divine Protection.	
Unit- IV : Virtues : Individual virtues	6
Self Control – Self Confidence – Speaking truth, Contentment - Humility – Mind Control., Tolerance – Adjustment – Sacrifice – Forgiveness, Cleanliness - External, Mental, Inner Cleanliness. Societal Virtues: Ahimsa – Service, Patriotism – Equality, Respecting the parents and elders – Caring for them – Respecting Teachers, Punctuality – Time management.	
Unit- V : Morals	6
Importance of Introspection : I and Mine, Six temperaments: Greed – Anger – Miserliness – Immoral Sexual Passion – Inferior Superior Complex – Vengeance, Manovering the Six Temperaments: Contentment – Tolerance - Charity – Parity – Forgiveness, Five important Benefits of Meditation, Perspicacity – Magnanimity – Adaptability – Receptivity – Creativity, Enhancing Memory – Effective Examination Preparation.	
Total (P : 30)	

Web links and Video Lectures (e-Resources):

www.vethathiri.edu.in

Makerspace (Product Design and Manufacturing Laboratory)							
(Common to All Branches)							
Course Code:		26GEP02			CIA		100
Course Type: (Theory/Practical/Integrated)		Practical			ESE		-
L:T:P:C		0	0	4	2	Total Marks	100
Total Hours of Pedagogy		60			Exam Hours		-
Pre-requisites		Nil					
Course Objectives							
To apply the basic knowledge of Computer-Aided Design (CAD), manufacturing processes, and 3D printing technology to develop a functional prototype model through hands-on practice.							
Course Outcomes						Cognitive Level	Weightage of COs in ESE
CO 1	Sketch and develop basic component designs from innovative ideas.					Ap	-
CO 2	Develop 3D CAD models for digital prototyping.					Ap	-
CO 3	Operate basic fabrication tools and equipment safely to develop simple prototype components.					Ap	-
CO 4	Perform machining and manufacturing operations to produce prototype parts with specified dimensions.					Ap	-
CO 5	Fabricate and assemble components to produce functional prototype models.					Ap	-

Mapping of Cos with POs / PSOs													
COs	POs											PSOs	
	1	2	3	4	5	6	7	8	9	10	11	1	2
CO 1	3		3		2			2			2		
CO 2	3		3		3			2			2		
CO 3	2		3		2			2		2	2		
CO 4	3		3		2			2		2	2		
CO 5	2		3		2			3	3	2	2		
CO (W.A)	2.6		3		2.2			2.2	3	2	2		

List of Experiments:
PART A – Product Design Lab 1. Select a simple product idea. 2. Prepare freehand sketches (top, front, and side views) with component detailing. 3. Develop 3D CAD models of the components using CAD software. 4. Convert the CAD model to STL format and perform engineering analysis. 5. Fabricate the component using a 3D printer. 6. Perform post-processing to improve the quality, appearance, and functionality of the printed component. PART B – Manufacturing Lab 1. Product Ideation and Design. • Select a simple innovative product. • Prepare freehand sketches with component detailing. 2. Manufacturing of Components. • Prepare a simple process plan and select suitable materials. • Manufacture components using appropriate workshop machines (CO₂ laser cutter, CNC wood router, lathe-cum-milling machine, and power tools). 3. Joining and Assembly. • Join the components using suitable joining processes (welding, riveting, or adhesive bonding). • Assemble the components into a functional product. 4. Testing and Evaluation. • Perform basic performance evaluation. • Conduct functional testing of the assembled product.
Total = P : 60

Suggested Learning Resources
Text Books:
1) Wang, W. (2010). Reverse engineering: Mechanisms, structures, systems & materials. CRC Press.
2) Stephen Christena, Learn to Weld: Beginning MIG Welding and Metal Fabrication Basics, Crestline Books, 2014.
3) H. Lipson, Fabricated - The New World of 3D Printing, Wiley, 1st edition, 2013.
Reference Books:
1) Makerspace (Product Design and Manufacturing Laboratory Manual)
Software:
1) Fusion 360

