Selvam College of Technology

An Autonomous Institution

Accredited by NAAC with "A" Grade, UGC Recognized 2(f) Status,
An ISO 9001:2015 Certified Institution, Approved by AICTE New Delhi, Affiliated to Anna University-Chennai

Salem Road (NH 44), Namakkal – 637 003. TAMIL NADU.
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B.E

COMPUTER SCIENCE AND ENGINEERING

Curriculum and Syllabi

(Regulation 2024)

Choice Based Credit System

For the Students Admitted from the Academic Year 2024-25 Onwards

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B. E COMPUTER SCIENCE AND ENGINEERING

Vision of the Institution

- ✓ To be a world class institute in technical education through innovations and research in various fields of engineering and technology by creating highly competent technocrats with moral qualities.

Mission of the Institution

- ✓ Be a focal point in engineering education for emerging technologies in accordance with societal contexts.
- ✓ Be an engineering institute fostering research and development, evolving innovative applications of technology, encouraging entrepreneurship of students with moral qualities.
- ✓ Empower the students from various socio-economic strata.

Vision of the Department

- ✓ To produce globally competent ethical computer engineers by practicing creativity and innovation.

Mission of the Department

- ✓ To enhance global exposure through academic excellence
- ✓ To provide a futuristic environment for the development of computing skills and lifelong learning.
- ✓ To cultivate and strengthen research attitude and spirit of entrepreneurship.
- ✓ To impart high moral, ethical, social, political and environmental sustainability among students through theoretical and practical knowledge.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)	
PEO1	To provide opportunities for acquiring in depth knowledge of fundamental concepts and programming skills to solve real world problems and for integrated development.
PEO2	To ensure that graduates will be professional and apply appropriate knowledge of societal impacts of computing technologies and ethical in their work, contributing to the advancement of society.
PEO3	Graduates will be leaders and managers by effectively communicating at both technical and personal levels.
PEO4	To enable graduates to pursue higher education and research and have a successful career in industries associated with Computer Science and Engineering, or as entrepreneurs.

PROGRAMME OUTCOMES (POs)	
Engineering Graduates will be able to:	
PO1	**Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.
PO2	**Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	**Design /development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	**Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	**Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations

PO6	**The Engineer and Society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	**Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	**Ethics:** Apply ethical principles and commit professional ethics and responsibilities and norms of the engineering practice.
PO9	**Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multi-disciplinary settings.
PO10	**Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	**Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multi disciplinary environments.
PO12	**Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs)	
On successful completion of the program, our graduates will be able to:	
PSO1	To Exhibit design and programming skills to build and automate business solutions across various domains with appropriate computational techniques and evaluate their effectiveness.
PSO2	Strong theoretical foundation leading to excellence and use knowledge in various domains to identify research gaps and hence to provide solution to complex problems and innovations.
PSO3	Ability to work effectively with various engineering fields as a team to design, build and develop system applications.

Courses of Study (Regulations 2024)

B.E. COMPUTER SCIENCE AND ENGINEERING

S.No.	Course Code	Course Title	L	T	P	C	CAT	Total Contact Periods
SEMESTER I								
THEORY COURSES								
1.	U24HS101	Communication Skills	2	0	0	2	HSMC	30
2.	U24MA101	Linear Algebra and Calculus	3	1	0	4	BSC	60
3.	U24PY101	Engineering Physics	3	0	0	3	BSC	45
4.	U24CY103	Chemistry for Information Sciences	3	0	0	3	BSC	45
5.	U24GE102	Problem Solving and Programming in C	3	0	0	3	ESC	45
6.	U24HS102	Heritage of Tamils / தமிழர் மரபு	1	0	0	1	HSMC	15
PRACTICAL COURSES								
7.	U24HS111	Communication Skills Laboratory	0	0	2	1	HSMC	30
8.	U24BS111	Physics and Chemistry Laboratory	0	0	4	2	BSC	60
9.	U24GE112	Problem Solving and Programming in C Laboratory	0	0	4	2	ESC	60
MANDATORY COURSES								
10.	U24MC101	Induction Programme	-	-	-	-	MC	-
					Total Credits	**21**		

L-Lecture Hours, T-Tutorial Hours, P–Practical, C– Credits, CAT-Category of Course

HSMC	Humanities, Social Sciences and Management Courses	ESC	Engineering Science Courses
BSC	Basic Science Courses	MC	Mandatory Courses

Approved By

Chairperson - BoS Science & Humanities	Chairperson - BoS CSE, IT & AIDS	Member Secretary Academic Council	Dean - Academics	Chairperson - Academic Council & Principal
Dr. P.Periyasamy	Mrs. R.Bhuvaneswari	Dr.G.Selvaraj	Dr.S.Prakash	Dr.A.Jegan

Courses of Study (Regulations 2024)

B.E. COMPUTER SCIENCE AND ENGINEERING

S. No.	Course Code	Course Title	L	T	P	C	CAT	Total Contact Periods
SEMESTER II								
THEORY COURSES								
1.	U24HS201	Professional Skills	2	0	0	2	HSMC	30
2.	U24MA201	Transforms and its Applications	3	1	0	4	BSC	60
3.	U24GE202	Basic Electrical and Electronics Engineering	3	0	0	3	ESC	45
4.	U24GE203	Engineering Graphics	2	0	2	3	ESC	60
5.	U24GE206	Python Programming	3	0	0	3	ESC	45
6.	U24HS202	Tamils and Technology/ தமிழரும் தொழில்நுட்பமும்	1	0	0	1	HSMC	15
PRACTICAL COURSES								
7.	U24HS211	Professional Skills Laboratory	0	0	2	1	HSMC	30
8.	U24GE111	Engineering Practices Laboratory	0	0	4	2	ESC	60
9.	U24GE212	Python Programming Laboratory	0	0	4	2	ESC	60
MANDATORY COURSES								
10.	U24MC104	Essence of Indian Knowledge Tradition	1	-	-	-	MC	15
					Total Credits	**21**		

L– Lecture Hours, T–Tutorial Hours, P–Practical, C– Credits, CAT–Category of Course

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Courses of Study (Regulations 2024)

B.E. COMPUTER SCIENCE AND ENGINEERING

S.No.	Course Code	Course Title	L	T	P	C	CAT	Total Contact Periods
SEMESTER III								
THEORY COURSES								
1.	U24MG208	Human Values and Ethics	2	0	0	2	HSMC	30
2.	U24MA301	Probability and Statistics	3	1	0	4	BSC	60
3.	U24CS301	Data Structures	3	0	0	3	PCC	45
4.	U24CS302	Computer Organization and Architecture	3	0	0	3	PCC	45
5.	U24IT301	Object Oriented Programming	3	0	0	3	PCC	45
THEORY CUM PRACTICAL COURSES								
6.	U24EC305	Digital Design	3	0	2	4	ESC	75
PRACTICAL COURSES								
7.	U24CS311	Data Structures Laboratory	0	0	4	2	PCC	60
8.	U24IT311	Object Oriented Programming Laboratory	0	0	4	2	PCC	60
		Total Credits				**23**		

L–Lecture Hours, T–Tutorial Hours, P–Practical, C– Credits, CAT–Category of Course

HSMC Humanities, Social Sciences and Management Courses
BSC Basic Science Courses
ESC Engineering Science Courses
PCC Professional Core Courses

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Courses of Study (Regulations 2024)

B.E. COMPUTER SCIENCE AND ENGINEERING

S.No.	Course Code	Course Title	L	T	P	C	CAT	Total Contact Periods
SEMESTER IV								
THEORY COURSES								
1.	U24MA401	Discrete Mathematics	3	1	0	4	BSC	60
2.	U24CS401	Design and Analysis of Algorithms	3	0	0	3	PCC	45
3.	U24CS402	Database Management Systems	3	0	0	3	PCC	45
4.	U24IT401	Foundations of Data Science	3	0	0	3	PCC	45
5.	U24IT402	Operating Systems	3	0	0	3	PCC	45
PRACTICAL COURSES								
6.	U24CS411	Database Management Systems Laboratory	0	0	4	2	PCC	60
7.	U24IT411	Data Science Laboratory	0	0	4	2	PCC	60
8.	U24IT412	Operating Systems Laboratory	0	0	2	1	PCC	30
MANDATORY COURSES								
9.	U24MC103	Environmental Science and Engineering	2	-	-	-	MC	30
					Total Credits	**21**		

L–Lecture Hours, T–Tutorial Hours, P–Practical, C– Credits, CAT–Category of Course

BSC Basic Science Courses

PCC Professional Core Courses

MC Mandatory Courses

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Courses of Study (Regulations 2024)

B.E. COMPUTER SCIENCE AND ENGINEERING

S.No.	Course Code	Course Title	L	T	P	C	CAT	Total Contact Periods
SEMESTER V								
THEORY COURSES								
1.	U24EC405	Microprocessor and Microcontroller	3	0	0	3	ESC	45
2.	U24CS502	Theory of Computation	3	0	0	3	PCC	45
3.	U24CS503	Computer Networks	3	0	0	3	PCC	45
4.		Open Elective – I	3	0	0	3	OEC	45
THEORY CUM PRACTICAL COURSES								
5.	U24IT502	Artificial Intelligence and Machine Learning	3	0	2	4	PCC	75
6.		Professional Elective – I	2	0	2	3	PEC	60
PRACTICAL COURSES								
7.	U24EC413	Microprocessor and Microcontroller Laboratory	0	0	4	2	ESC	60
8.	U24CS511	Computer Networks Laboratory	0	0	2	1	PCC	30
9.	U24CS512	Internship – I*	-	-	-	1	EEC	2 Weeks
MANDATORY COURSES								
10.	U24MC102	Indian Constitution	1	-	-	-	MC	15
					Total Credits	**23**		

*Two weeks Internship carries one credit and it will be done during III / IV semester vacation and same will be evaluated in V semester.

L–Lecture Hours, T–Tutorial Hours, P–Practical, C– Credits, CAT-Category of Course

ESC	Engineering Science Courses	OEC	Open Elective Courses
PCC	Professional Core Courses	MC	Mandatory Courses
PEC	Professional Elective Courses		

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Courses of Study (Regulations 2024)

B.E. COMPUTER SCIENCE AND ENGINEERING

S. No.	Course Code	Course Title	L	T	P	C	CAT	Total Contact Periods
SEMESTER VI								
THEORY COURSES								
1.	U24CS601	Compiler Design	3	0	0	3	PCC	45
2.	U24IT601	Full Stack Web Development	3	0	0	3	PCC	45
3.	U24EC504	Embedded systems and IoT	3	0	0	3	PCC	45
4.		Professional Elective - II	3	0	0	3	PEC	45
5.		Open Elective - II	3	0	0	3	OEC	45
THEORY CUM PRACTICAL COURSES								
6.	U24CS602	Object Oriented Software Engineering	3	0	2	4	PCC	75
PRACTICAL COURSES								
7.	U24IT611	Full Stack Web Development Laboratory	0	0	4	2	PCC	60
8.	U24EC512	Embedded systems and IoT Laboratory	0	0	4	2	PCC	60
		Total Credits				**23**		

L-Lecture Hours, T-Tutorial Hours, P–Practical, C–Credits, CAT-Category of Course

PCC Professional Core Courses

PEC Professional Elective Courses

OEC Open Elective Courses

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Courses of Study (Regulations 2024)

B.E. COMPUTER SCIENCE AND ENGINEERING

S.No.	Course Code	Course Title	L	T	P	C	CAT	Total Contact Periods
SEMESTER VII								
THEORY COURSES								
1.	U24CS701	Distributed Systems	3	0	0	3	PCC	45
2.	U24IT701	Cryptography and Network Security	3	0	0	3	PCC	45
3.		Elective - Management	3	0	0	3	HSMC	45
4.		Professional Elective - III	3	0	0	3	PEC	45
5.		Open Elective - III	3	0	0	3	OEC	45
PRACTICAL COURSES								
6.	U24IT712	Security Practices Laboratory	0	0	4	2	PCC	60
7.	U24CS711	Project Work – Phase I	0	0	8	4	EEC	120
8.	U24CS712	Internship – II*	-	-	-	1	EEC	2 Weeks
					Total Credits	**22**		

*Two weeks Internship carries one credit and it will be done during V/ VI semester vacation and same will be evaluated in VII semester.

L - Lecture Hours, T - Tutorial Hours, P – Practical, C – Credits, CAT - Category of Course

HSMC Humanities, Social Sciences and Management Courses
PCC Professional Core Courses
PEC Professional Elective Courses
OEC Open Elective Courses
EEC Employability Enhancement Courses

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Courses of Study (Regulations2024)

B.E. COMPUTER SCIENCE AND ENGINEERING

S.No.	Course Code	Course Title	L	T	P	C	CAT	Total Contact Periods
SEMESTER VIII								
THEORY COURSES								
1.		Professional Elective - IV	3	0	0	3	PEC	45
PRACTICAL COURSES								
2.	U24CS811	Project Work – Phase II	0	0	20	10	EEC	300
					Total Credits	**13**		

L-Lecture Hours, T-Tutorial Hours, P–Practical, C–Credits, CAT-Category of Course

PEC Professional Elective Courses

EEC Employability Enhancement Courses

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Credit Distribution

(For the candidates admitted from 2024-2025 onwards)

B.E. – Computer Science and Engineering - R 2024

S.No.	Course Category	Credits per Semester								Total Credit	Credit %
		I	II	III	IV	V	VI	VII	VIII		
1	HSMC	4	4	2	-	-	-	3	-	13	**07.78**
2	BSC	12	4	4	4	-	-	-	-	24	**14.37**
3	ESC	5	13	4	-	5	-	-	-	27	**16.17**
4	PCC	-	-	13	17	11	17	8	-	66	**39.52**
5	PEC	-	-	-	-	3	3	3	3	12	**07.18**
6	OEC	-	-	-	-	3	3	3	-	9	**05.38**
7	EEC	-	-	-	-	1	-	5	10	16	**09.58**
8	MC	NC	NC	-	NC	NC	-	-	-	-	**-**
Total		**21**	**21**	**23**	**21**	**23**	**23**	**22**	**13**	**167**	**100**

CAT	Category of Courses	**HSMC**	Humanities, Social Sciences and Management Courses	**EEC**	Employability Enhancement Courses
CP	Contact Periods	**BSC**	Basic Science Courses	**NCC**	Non-Credit Courses
L	Lecture Hours	**ESC**	Engineering Science Courses	**IA**	Internal Assessment
T	Tutorial Hours	**PCC**	Professional Core Courses	**ESE**	End Semester Examination
P	Practical Hours	**PEC**	Professional Elective Courses	**MC**	Mandatory Courses
C	Credits	**OEC**	Open Elective Courses		

HUMANITIES, SOCIAL SCIENCES AND MANAGEMENT COURSES (HSMC)

S. No.	Course Code	Course Title	L	T	P	C	CAT	Total Contact Periods
1	U24HS101	Communication Skills	2	0	0	2	HSMC	30
2	U24HS102	Heritage of Tamils/தமிழர் மரபு	1	0	0	1	HSMC	15
3	U24HS111	Communication Skills Laboratory	0	0	2	1	HSMC	30
4	U24HS201	Professional Skills	2	0	0	2	HSMC	30
5	U24HS202	Tamils and Technology/ தமிழரும் தொழில்நுட்பமும்	1	0	0	1	HSMC	15
6	U24HS211	Professional Skills Laboratory	0	0	2	1	HSMC	30
7	U24MG208	Human Values and Professional Ethics	2	0	0	2	HSMC	30
8		Elective - Management	3	0	0	3	HSMC	45
					TOTAL CREDITS	13		

BASIC SCIENCE COURSES (BSC)

S. No.	Course Code	Course Title	L	T	P	C	CAT	Total Contact Periods
1	U24MA101	Linear Algebra and Calculus	3	1	0	4	BSC	60
2	U24PY101	Engineering Physics	3	0	0	3	BSC	45
3	U24CY103	Chemistry for Information Sciences	3	0	0	3	BSC	45
4	U24BS111	Physics and Chemistry Laboratory	0	0	4	2	BSC	60
5	U24MA201	Transforms and its Applications	3	1	0	4	BSC	60
6	U24MA301	Probability and Statistics	3	1	0	4	BSC	60
7	U24MA401	Discrete Mathematics	3	1	0	4	BSC	60
					TOTAL CREDITS	24		

ENGINEERING SCIENCE COURSES (ESC)

S. No.	Course Code	Course Title	L	T	P	C	CAT	Total Contact Periods
1	U24GE102	Problem Solving and Programming in C	3	0	0	3	ESC	45
2	U24GE112	Problem Solving and Programming in C Laboratory	0	0	4	2	ESC	60
3	U24GE202	Basic Electrical and Electronics Engineering	3	0	0	3	ESC	45

4	U24GE203	Engineering Graphics	2	0	2	3	ESC	60
5	U24GE206	Python Programming	3	0	0	3	ESC	45
6	U24GE111	Engineering Practices Laboratory	0	0	4	2	ESC	60
7	U24GE212	Python Programming Laboratory	0	0	4	2	ESC	60
8	U24EC305	Digital Design	3	0	2	4	ESC	75
9	U24EC405	Microprocessor and Microcontroller	3	0	0	3	PCC	45
10	U24EC413	Microprocessor and Microcontroller Laboratory	0	0	4	2	PCC	60
					TOTAL CREDITS	**27**		

PROFESSIONAL CORE COURSES (PCC)

S. No.	Course Code	Course Title	L	T	P	C	CAT	Total Contact Periods
1	U24CS301	Data Structures	3	0	0	3	PCC	45
2	U24CS302	Computer Organization and Architecture	3	0	0	3	PCC	45
3	U24IT301	Object Oriented Programming	3	0	0	3	PCC	45
4	U24CS311	Data Structures Laboratory	0	0	4	2	PCC	60
5	U24IT311	Object Oriented Programming Laboratory	0	0	4	2	PCC	60
6	U24CS401	Design and Analysis of Algorithms	3	0	0	3	PCC	45
7	U24CS402	Database Management Systems	3	0	0	3	PCC	45
8	U24IT401	Foundations of Data Science	3	0	0	3	PCC	45
9	U24IT402	Operating Systems	3	0	0	3	PCC	45
10	U24CS411	Database Management Systems Laboratory	0	0	4	2	PCC	60
11	U24IT411	Data Science Laboratory	0	0	4	2	PCC	60
12	U24IT412	Operating Systems Laboratory	0	0	2	1	PCC	30
13	U24CS502	Theory of Computation	3	0	0	3	PCC	45
14	U24CS503	Computer Networks	3	0	0	3	PCC	45
15	U24IT502	Artificial Intelligence and Machine Learning	3	0	2	4	PCC	75
16	U24CS511	Computer Networks Laboratory	0	0	2	1	PCC	30
17	U24CS601	Compiler Design	3	0	0	3	PCC	45

18	U24IT601	Full Stack Web Development	3	0	0	3	PCC	45
19	U24EC504	Embedded systems and IoT	3	0	0	3	PCC	45
20	U24CS602	Object Oriented Software Engineering	3	0	2	4	PCC	75
21	U24EC512	Embedded systems and IoT Laboratory	0	0	4	2	PCC	60
22	U24IT611	Full Stack Web Development Laboratory	0	0	4	2	PCC	60
23	U24CS701	Distributed Systems	3	0	0	3	PCC	45
24	U24IT701	Cryptography and Network Security	3	0	0	3	PCC	45
25	U24IT712	Security Practices Laboratory	0	0	4	2	PCC	60
		TOTAL CREDITS				**66**		

PROFESSIONAL ELECTIVE COURSES (PEC)
SEMESTER V
PROFESSIONAL ELECTIVE – I

S. No.	Course Code	Course Title	L	T	P	C	CAT	Total Contact Periods
1	U24CSP11	Software Testing and Automation	2	0	2	3	PEC	60
2	U24CSP12	Game Development	2	0	2	3	PEC	60
3	U24CSP13	Data Warehousing and Data Mining	2	0	2	3	PEC	60
4	U24CSP14	DevOps	2	0	2	3	PEC	60
5	U24CSP15	App Development	2	0	2	3	PEC	60
6	U24CSP16	Web Technologies	2	0	2	3	PEC	60
7	U24ITP11	Digital Marketing and Promotion	2	0	2	3	PEC	60
8	U24ADP12	UI and UX design	2	0	2	3	PEC	60
9	U24ADP13	Augmented Reality/ Virtual Reality	2	0	2	3	PEC	60

SEMESTER VI
PROFESSIONAL ELECTIVE – II

S. No.	Course Code	Course Title	L	T	P	C	CAT	Total Contact Periods
1	U24CSP21	Computer Vision and Image Processing	3	0	0	3	PEC	45

2	U24CSP22	Cloud Computing	3	0	0	3	PEC	45
3	U24CSP23	Soft Computing	3	0	0	3	PEC	45
4	U24CSP24	Principles of Programming Languages	3	0	0	3	PEC	45
5	U24ITP21	Network Security	3	0	0	3	PEC	45
6	U24ITP22	Business Analytics	3	0	0	3	PEC	45
7	U24ITP23	Storage Technologies	3	0	0	3	PEC	45
8	U24ADP22	Neural Networks and Deep Learning	3	0	0	3	PEC	45

SEMESTER VII
PROFESSIONAL ELECTIVE – III

S. No.	Course Code	Course Title	L	T	P	C	CAT	Total Contact Periods
1	U24CSP31	Web Application Security	3	0	0	3	PEC	45
2	U24CSP32	Multimedia and Animation	3	0	0	3	PEC	45
3	U24ITP31	Security and Privacy in Cloud	3	0	0	3	PEC	45
4	U24ITP32	Social Network Security	3	0	0	3	PEC	45
5	U24ITP33	Software Defined Networks	3	0	0	3	PEC	45
6	U24ADP31	Image and Video Analytics	3	0	0	3	PEC	45
7	U24ADP32	Robotic Process Automation	3	0	0	3	PEC	45
8	U24ADP34	Big Data Analytics	3	0	0	3	PEC	45

SEMESTER VIII
PROFESSIONAL ELECTIVE – IV

S. No.	Course Code	Course Title	L	T	P	C	CAT	Total Contact Periods
1	U24CSP41	Green Computing	3	0	0	3	PEC	45
2	U24CSP42	Software Project Management	3	0	0	3	PEC	45
3	U24ITP41	Cyber Security and its Applications	3	0	0	3	PEC	45
4	U24ITP42	Digital and Mobile Forensics	3	0	0	3	PEC	45

5	U24ITP43	Crypto currency and Block chain Technologies	3	0	0	3	PEC	45
6	U24ADP41	Introduction to Natural Language Processing	3	0	0	3	PEC	45
7	U24ADP42	Cognitive science	3	0	0	3	PEC	45

OPEN ELECTIVE COURSES OFFERED TO OTHER DEPARTMENTS (OEC)
(Offered by Department of CSE, IT and AI&DS)

S. No.	Course Code	Course Title	L	T	P	C	CAT	Total Contact Periods
1	U24CSO11	Web Technology	3	0	0	3	OEC	45
2	U24CSO12	Digital Marketing	3	0	0	3	OEC	45
3	U24CSO13	Cyber Security	3	0	0	3	OEC	45
4	U24ITO11	Industrial Internet of Things	3	0	0	3	OEC	45
5	U24ITO12	Full Stack Development	3	0	0	3	OEC	45
6	U24ITO13	Agile Technology	3	0	0	3	OEC	45
7	U24ITO14	Block Chain Technology	3	0	0	3	OEC	45
8	U24ADO11	Data Science Fundamentals	3	0	0	3	OEC	45
9	U24ADO12	Natural Language Processing	3	0	0	3	OEC	45

OPEN ELECTIVE COURSES (OE)
SEMESTER V
OPEN ELECTIVE– I

S. No.	Course Code	Course Title	L	T	P	C	CAT	Total Contact Periods
1	U24BTO11	Genetics	3	0	0	3	OEC	45
2	U24BTO12	General Microbiology	3	0	0	3	OEC	45
3	U24BMO11	Pharmaceutical Nanotechnology	3	0	0	3	OEC	45
4	U24BMO12	Holistic Nutrition	3	0	0	3	OEC	45
5	U24BMO13	Nutraceuticals	3	0	0	3	OEC	45
6	U24CEO11	Air Pollution Control and Management	3	0	0	3	OEC	45

7	U24CEO12	Solid Waste Management	3	0	0	3	OEC	45
8	U24ECO11	Wireless Broad Band Networks	3	0	0	3	OEC	45
9	U24ECO12	Resource Management Techniques	3	0	0	3	OEC	45
10	U24EEO11	Basics of Protection Circuits	3	0	0	3	OEC	45
11	U24EEO12	Sensors and Actuators	3	0	0	3	OEC	45
12	U24EEO13	Energy Conservation and Management	3	0	0	3	OEC	45
13	U24MEO11	Renewable Sources of Energy	3	0	0	3	OEC	45
14	U24MEO12	Industrial Safety Engineering	3	0	0	3	OEC	45
15	U24MEO13	3D Printing and Design	3	0	0	3	OEC	45
16	U24GEO15	Biodiversity and Conservation	3	0	0	3	OEC	45

SEMESTER VI
OPEN ELECTIVE – II

S. No.	Course Code	Course Title	L	T	P	C	CAT	Total Contact Periods
1	U24BTO13	Poultry Science and Management	3	0	0	3	OEC	45
2	U24BTO14	Food Science and Nutrition	3	0	0	3	OEC	45
3	U24BMO14	Biotechnology in Healthcare	3	0	0	3	OEC	45
4	U24BMO15	Fundamentals of Cell and Molecular Biology	3	0	0	3	OEC	45
5	U24BMO16	Introduction to food processing	3	0	0	3	OEC	45
6	U24CEO13	Energy Efficient Buildings	3	0	0	3	OEC	45
7	U24CEO14	Remote Sensing and GIS	3	0	0	3	OEC	45
8	U24ECO13	Reverse Engineering	3	0	0	3	OEC	45
9	U24ECO14	Introduction to PLC Programming	3	0	0	3	OEC	45
10	U24EEO14	Electric Vehicle Architecture	3	0	0	3	OEC	45
11	U24EEO15	Energy Technology	3	0	0	3	OEC	45
12	U24EEO16	Batteries and Management system	3	0	0	3	OEC	45
13	U24MEO14	Robotics	3	0	0	3	OEC	45

14	U24MEO15	Fire Safety Engineering	3	0	0	3	OEC	45
15	U24MEO16	Maintenance Engineering	3	0	0	3	OEC	45
16	U24GEO14	Air pollution and Control Engineering	3	0	0	3	OEC	45

SEMESTER VII
OPEN ELECTIVE – III

S. No.	Course Code	Course Title	L	T	P	C	CAT	Total Contact Periods
1	U24BTO15	Bio-energy Conversion Technologies	3	0	0	3	OEC	45
2	U24BTO16	Medical informatics	3	0	0	3	OEC	45
3	U24BMO17	IPR for Pharma Industry	3	0	0	3	OEC	45
4	U24BMO18	Multivariate Data Analysis	3	0	0	3	OEC	45
5	U24CEO15	Environmental Impact Assessment	3	0	0	3	OEC	45
6	U24CEO16	Hazardous Waste Management	3	0	0	3	OEC	45
7	U24ECO15	Space Vehicles	3	0	0	3	OEC	45
8	U24ECO16	Radar Technologies	3	0	0	3	OEC	45
9	U24EEO17	SMPS and UPS	3	0	0	3	OEC	45
10	U24EEO18	Electric and Hybrid Vehicle	3	0	0	3	OEC	45
11	U24MEO17	Refrigeration & Air Conditioning	3	0	0	3	OEC	45
12	U24MEO18	Energy Auditing and Management	3	0	0	3	OEC	45
13	U24MEO19	Energy conservation in HVAC system	3	0	0	3	OEC	45
14	U24GEO11	English for Competitive Examinations	3	0	0	3	OEC	45
15	U24GEO12	Operations Research	3	0	0	3	OEC	45
16	U24GEO13	Industrial waste water treatment	3	0	0	3	OEC	45

SEMESTER VII
ELECTIVE – MANAGEMENT COURSES (HSMC)

S. No.	Course Code	Course Title	L	T	P	C	CAT	Total Contact Periods
1	U24MG201	Principles of Management	3	0	0	3	HSMC	45
2	U24MG203	Total Quality Management	3	0	0	3	HSMC	45
3	U24MG204	Human Resource Management	3	0	0	3	HSMC	45
4	U24MG205	Industrial Management	3	0	0	3	HSMC	45
5	U24MG206	Engineering Economics and Financial Accounting	3	0	0	3	HSMC	45
6	U24MG207	Knowledge Management	3	0	0	3	HSMC	45

SEMESTER VII
MANDATORY COURSES (MC)

S. No.	Course Code	Course Title	L	T	P	C	CAT	Total Contact Periods
1	U24MC101	Induction Programme	-	-	-	-	MC	-
2	U24MC104	Essence of Indian Knowledge Tradition	1	-	-	-	MC	15
3	U24MC103	Environmental Sciences & Sustainability	2	-	-	-	MC	30
4	U24MC102	Indian Constitution	1	-	-	-	MC	15

EMPLOYABILITY ENHANCEMENT COURSES (EEC)

S. No.	Course Code	Course Title	L	T	P	C	CAT	Total Contact Periods
1	U24CS512	Internship – I	-	-	-	1	EEC	2 Weeks
2	U24CS711	Project Work-Phase I	0	0	8	4	EEC	120
3	U24CS712	Internship - II	-	-	-	1	EEC	2 Weeks
4	U24CS811	Project Work– Phase II	0	0	20	10	EEC	300
					TOTAL CREDITS	16		

U24HS101	COMMUNICATION SKILLS	L	T	P	C
		2	0	0	2

COURSE OUTCOMES:

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

CO1	Use grammar and vocabulary suitable for general context.
CO2	Comprehend the nuances of spoken and written communication
CO3	Use descriptive and analytical words and phrases and sentence structures in written communication.
CO4	Read different types of texts and comprehend their denotative and connotative meanings.
CO5	Write different types of texts using appropriate formats.

UNIT I	BASICS OF COMMUNICATION	6

Listening – Telephone conversation & Writing message, gap filling; Reading – Telephone message, Introduction to Phonetics; Writing – Personal profile, Dialogue Writing; Grammar –Present Tense, Asking questions (wh-questions), Yes / No questions; Vocabulary – Synonyms and Antonyms.

UNIT II	NARRATION	6

Listening – Travel podcast/ Watching a travel documentary; Reading – An excerpt from a travelogue, Newspaper Report; Writing – Narrative (Event, personal experience etc.); Grammar- Subject-verb agreement, Past Tense; Vocabulary – One word substitution, Word formation (prefix and suffix)

UNIT III	DESCRIPTION	6

Listening – Conversation, Radio/TV advertisement; Reading –A tourist brochure and planning an itinerary, descriptive article / excerpt from literature; Writing – Definitions, Descriptive writing, Checklists; Grammar- Future Tense, Articles, Preposition; Vocabulary – Noun, Pronoun, Verbs

UNIT IV	CLASSIFICATION	6

Listening – Announcements and filling a table; Reading –An article, social media posts and classifying (channel conversion-text to table); Writing – Principles of clear writing, a classification paragraph; Grammar- Connectives, Transition words; Vocabulary – Contextual vocabulary, Adjectives, Adverbs and Conjunctions, Redundancies.

UNIT V	EXPRESSION OF VIEWS	6

Listening – Debate / Discussion; Reading –Formal letters, Letters to Editor, Opinion articles/Blogs; Writing – Letter writing/Email writing (Enquiry/Permission, Letter to Editor); Grammar- Question tags, Error Spotting; Vocabulary – Compound words, Phrasal verbs.

TOTAL: 30 PERIODS

TEXT BOOKS:

1	"English for Engineers and Technologists" Volume I by Orient Blackswan, 2022.

2	"English for Science & Technology - I" by Cambridge University Press, 2023.
3	"Communicative English", Shoba K.N.and Lopurdes Joavani Rayen, Cambridge University Press, 2021.

REFERENCES:

1	Communication Skills. Sanjay Kumar and Pushp Lata. Oxford University Press, 2015.
2	Practical English Usage. Michael Swan. Oxford University Press, 2016.
3	English Grammar in Use. Raymond Murphy. Cambridge University Press, 2020.
4	https://learnenglish.britishcouncil.org
5	https://www.englishgrammar.org

Mapping of COs with POs and PSOs

COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs')														
	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	1	-	-	2	1	2	3	3	1	3	-	-	-
CO2	-	-	1	-	-	2	1	2	3	3	1	3	-	-	-
CO3	-	-	1	-	-	2	1	2	3	3	1	3	-	-	-
CO4	-	-	1	-	-	2	1	2	3	3	1	3	-	-	-
CO5	-	-	1	-	-	2	1	2	3	3	1	3	-	-	-

CO/PO, PSO Mapping (3/2/1 indicates the strength of correlation)

3-Strong, 2-Medium, 1-Weak, '-' No correlation

U24MA101	LINEAR ALGEBRA AND CALCULUS	L	T	P	C
		3	1	0	4

COURSE OUTCOMES:

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

CO1	Know about Eigen values and Eigen vectors and its role in the system of equations.
CO2	Apply the concepts of vector spaces and linear transformations in real world applications.
CO3	Apply differential calculus tools in solving various application problems.
CO4	Evaluate area and volume in Cartesian coordinates using double and triple integrals and also using Mathematical software.
CO5	Evaluate gradient, divergence and curl and solve engineering problems involving cubes, rectangular parallelepipeds by applying various integral theorems. Apply mathematical software to find gradient, Divergence and curl.

UNIT I	EIGEN VALUES AND EIGEN VECTORS	9+3

Eigen values and Eigen vectors of real matrices – Properties of eigenvalues and eigenvectors – Cayley-Hamilton theorem – Diagonalization of real symmetric matrices

UNIT II	VECTOR SPACE	9+3

Vector space – Linear independence and dependence of vectors – Basis – Dimension – Linear transformations (maps) – Matrix associated with a linear map – Range map and kernel of a linear map.

UNIT III	DIFFERENTIAL CALCULUS	9+3

Functions of two variables – Limits and continuity – Partial derivatives – Total derivatives – Extreme values and saddle points – Lagrange multipliers – Taylor's series for two variables.

UNIT IV	MULTIPLE INTEGRALS	9+3

Double integrals – Change of order of integration – Double integrals in polar coordinates – Area enclosed by plane curves – Triple integrals – Volume of Solids – Change of variables in double and triple integrals.

UNIT V	VECTOR CALCULUS	9+3

Gradient and directional derivative of a scalar field – Divergence and curl of a vector field – Integration in vector field – Line integrals – Path independence of line integrals –Green's theorem in the plane – Gauss Divergence theorem and Stoke's theorem (excluding proof)

TOTAL: 60 PERIODS

TEXT BOOKS:

1	T.Veerarajan "Linear Algebra and Partial Differential Equations", McGraw Hill Publishers, 2018
2	Grewal B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 2017.
3	Joel Hass, Christopher Heil, Maurice D.Weir "Thomas'Calculus",Pearson Education.,New Delhi, 2018.

REFERENCES:	
1	James Stewart, "Calculus with Early Transcendental Functions",Cengage Learning, New Delhi, 2013.
2	Jain R.K. and Iyengar S.R.K., "Advanced Engineering Mathematics",Narosa Publications, New Delhi, 2017.
3	Narayanan S and Manica vachagom Pillai T.K., "Calculus", Volume I and II,S.Viswanathan Publishers Pvt. Ltd., Chennai, 2009.
4	Peter V.O'Neil, "Advanced Engineering Mathematics", Cengage Learning India Pvt., Ltd, New Delhi, 2012.
5	Ramana B.V. "Higher Engineering Mathematics", Tata McGraw Hill Co.Ltd., New Delhi, 2010.
6	https://archive.nptel.ac.in/courses/111/101/111101115/

Mapping of COs with POs and PSOs

COs	**Programme Outcomes (POs) and Programme Specific Outcomes (PSOs')**														
	POs												**PSOs**		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	1	1	-	-	-	-	2	-	2	3	-	-	-
CO2	3	3	1	1	-	-	-	-	2	-	2	3	-	-	-
CO3	3	3	1	1	-	-	-	-	2	-	2	3	-	-	-
CO4	3	3	1	1	-	-	-	-	2	-	2	3	-	-	-
CO5	3	3	1	1	-	-	-	-	2	-	2	3	-	-	-

CO/PO, PSO Mapping (3/2/1 indicates the strength of correlation)
3-Strong, 2-Medium, 1-Weak, '-' No Correlation

U24PY101	ENGINEERING PHYSICS	L	T	P	C
		3	0	0	3

COURSE OUTCOMES:

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

CO1	To understand the importance of Crystals.
CO2	Express their knowledge in the magnetic materials.
CO3	Understand the Basics and importance of quantum mechanics.
CO4	Know the basics of optics and lasers and its applications.
CO5	Express the knowledge of Semiconducting materials.

UNIT I	CRYSTALLOGRAPHY AND ENGINEERING MATERIALS	9

Lattice parameters - Crystal systems - Packing factors of cubic and HCP crystal systems - Miller indices - Linear and planar density of atoms – Debye - Scherer method of crystal structure determination - Crystal imperfections - point, line and surface defects and their role in electrical - mechanical and optical properties of materials - Growth of crystal of biological molecules - Factors affecting crystallization of organic molecules - XRD of molecules and proteins.

UNIT II	MAGNETIC MATERIALS	9

Basic definitions - Magnetic moment - Magnetic field Magnetic field intensity - Magnetic permeability Magnetization Intensity of magnetization - Magnetic susceptibility - Types of magnetic materials - Dia, Para and Ferromagnetic materials Domain theory of ferromagnetism Origin of domains Antiferromagnetic materials - Ferrites - Structure, properties and applications - Hysteresis - Hard and soft magnetic materials.

UNIT III	QUANTUM MECHANICS	9

Black body radiation (Qualitative) - Planck's hypothesis - Einstein's theory of Radiation - Matter waves-de Broglie hypothesis - Electron microscope - Uncertainty Principle - The Schrodinger Wave equation (time-independent and time-dependent) - Meaning and Physical significance of wave function - Normalization - Particle in an infinite potential well-particle in a three-dimensional box - Degenerate energy states - Barrier penetration and quantum tunneling - Tunneling microscope.

UNIT IV	OPTICS AND LASERS	9

Interference - Thin film interference - Air wedge- Applications - Interferometers-Michelson Interferometer - Diffraction CD as diffraction grating - Diffraction by crystals -Polarization - polarizer's - Laser - characteristics Spontaneous and Stimulated emission - population – inversion - Metastable states - optical feedback - Nd-YAG laser, CO_2 laser, Semiconductor laser - Industrial and medical applications - Optical Fibers - Total internal reflection - Numerical aperture and acceptance angle - Fiber optic communication Fiber sensors - Fiber lasers.

UNIT V	SEMICONDUCTING MATERIALS AND DEVICES	9
Elemental and compound semiconductors. Intrinsic and extrinsic semiconductors - P-N junction - VI Characteristics of PN junction diode and Zener diode - Hall Effect – Rectifiers - Half wave and Full wave - Bipolar junction transistors - Field Effect Transistors - FET amplifier- UJT- RC coupled amplifier - Concept of Positive and Negative feedback - Wien Bridge Oscillator.		
		TOTAL: 45 PERIODS

TEXT BOOKS:

1	N. Garcia, A. Damask and S. Schwarz, Physics for Computer Science Students, Springer-Verlag,2012.
2	D. Halliday, R. Resnick and J. Walker, Principles of Physics. John Wiley & Sons, 10th Edition,2015
3	B D. K. Bhattacharya, PoonamTandon "Engineering Physics", Oxford University Press, 2017.
4	Gaur R K, Gupta S L, "Engineering Physics", DhanpatRai Publications, 2017

REFERENCES:

1	Arthur Beiser, ShobhitMahajan, S. RaiChoudhury, "Concepts of Modern Physics", McGraw-Hill (Indian Edition), 2017.
2	K.Thyagarajan and A.Ghatak Lasers: Fundamentals and Applications, Laxmi Publications, (Indian Edition), 2019.
3	R. Wolfson, Essential University Physics. Volume 1 & 2. Pearson, 2016.
4	D.Halliday, R.Resnick and J.Walker. Principles of Physics, Wiley (Indian Edition), 2015.

Mapping of COs with POs and PSOs

COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs')														
	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	1	2	1	-	-	-	-	-	-	-	-	-	-
CO2	2	2	1	2	1	-	-	-	-	-	-	-	-	-	-
CO3	2	2	2	2	1	-	-	-	-	-	-	-	-	-	-
CO4	2	1	1	1	1	-	-	-	-	-	-	-	-	-	-
CO5	2	2	2	2	1	-	-	-	-	-	-	-	-	-	-

CO/PO, PSO Mapping (3/2/1 indicates the strength of correlation)
3-Strong, 2-Medium, 1-Weak, '-' No correlation

U24CY103	CHEMISTRY FOR INFORMATION SCIENCES	L	T	P	C
		3	0	0	3

COURSE OUTCOMES:

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

CO1	Demonstrate the knowledge of water and their quality in using at different industries.
CO2	Understand the principle, applications of electro chemistry.
CO3	Recognize different forms of energy resources and apply them for suitable applications in energy sectors.
CO4	Analyze the principles and properties of protection techniques.
CO5	Analyze the need of e-waste management and disposal methods across the globe.

UNIT I	WATER TECHNOLOGY	9

Water- Sources and impurities- Water quality parameters: colour, odour, pH, hardness, alkalinity, TDS, COD, BOD and heavy metals, Internal conditioning - Phosphate, calgon and carbonate treatment, External conditioning- Demineralization, Municipal water treatment (screening, sedimentation, coagulation, filtration and disinfection- Ozonolysis, UV treatment, chlorination), Reverse Osmosis.

UNIT II	ELECTRO CHEMISTRY	9

Electrode potential-Nernst equation- Derivation and Problems based on single electrode potential calculation- Reference electrode- Standard hydrogen electrode-Calomel electrode-Glass electrode-Measurement of pH-Electrochemical series - Significance - Potentiometric titrations (Redox Fe2+ Vs Dichromate) - Conductometric titrations (HCl Vs NaOH).

UNIT III	POWER SOURCES	9

Batteries- Performance characteristics, materials, construction, reactions, characteristics of lechlanche cell, primary lithium batteries, lead-acid battery and lithium-ion batteries. Super capacitors – Fundamentals, electrode materials, electrolytes, pseudo capacitors and its applications.

UNIT IV	ELECTRONICS PACKAGING AND PROTECTION	9

Packaging materials- Encapsulates and under fills - Adhesives- Chemical types, application methods, factors influencing adhesion, soldering alloys- Phase diagrams, lead free alloys, phase change materials for cooling. Conducting inks for printed electronics - Metal and carbon based - Graphite, CNT-Synthesis, structure, electrical properties and its applications

UNIT V	E-WASTE AND ITS MANAGEMENT	9

Introduction-E- Waste - Definition - Sources of e-waste- Hazardous substances in e-waste - Effects of e-waste on environment and human health - Need for e-waste management– E-waste handling rules - Waste minimization techniques for managing e-waste - Recycling of e-waste -Disposal treatment methods of e-waste.

TOTAL: 45 PERIODS

TEXT BOOKS:	
1	P.C.Jain and Monica Jain, "Engineering Chemistry", 17th Edition, Dhanpat Rai Publishing Company Private Limited, New Delhi, 2018.
2	Sivasankar B., "Engineering Chemistry", Tata McGraw-Hill Publishing Company Ltd, New Delhi, 2008.
3	S.S. Dara, "A Text book of Engineering Chemistry", S. Chand Publishing, 12th Edition, 2018.
REFERENCES:	
1	O.G. Palanna, "Engineering Chemistry" McGraw Hill Education (India) Private Limited, 2nd Edition, 2017.
2	Friedrich Emich, "Engineering Chemistry", Scientific International PVT, LTD, New Delhi, 2014.
3	Shikha Agarwal, "Engineering Chemistry-Fundamentals and Applications", Cambridge University Press, Delhi, Second Edition, 2019.
4	O.V. Roussak and H.D. Gesser, Applied Chemistry-A Text Book for Engineers and Technologists, Springer Science Business Media, New York, 2nd Edition, 2013.
5	https://nptel.ac.in/courses/105105169
6	https://archive.nptel.ac.in/courses/108/102/108102047/

Mapping of COs with POs and PSOs

COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs')														
	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	-	-	2	1	2	-	-	-	-	-	-	-	1
CO2	3	2	1	-	2	1	-	-	-	-	-	-	-	-	1
CO3	3	2	1	-	1	1	-	-	-	-	-	-	-	-	1
CO4	3	2	1	-	3	-	2	-	-	-	-	-	-	-	1
CO5	3	3	2	-	2	2	1	-	-	-	-	-	-	-	1

CO/PO, PSO Mapping (3/2/1 indicates the strength of correlation)
3-Strong, 2-Medium, 1-Weak, '-' No Correlation

U24GE102	PROBLEM SOLVING AND PROGRAMMING IN C	L	T	P	C
		3	0	0	3

COURSE OUTCOMES:

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

CO1	Develop algorithmic solutions to simple computational problems
CO2	Demonstrate and write simple C programs using basic constructs
CO3	Design and develop applications using arrays and strings
CO4	Develop Modular applications in C using functions and pointers
CO5	Develop and execute applications using structures, Unions and Files

UNIT I	COMPUTATIONAL THINKING AND PROBLEM SOLVING	9

Basics of Computing - Computational Thinking - Problem-Solving and decomposition - Patterns and generalizations - Algorithms - Building blocks of algorithms (statements, state, control flow, functions) - Notation (pseudo code, flowchart, programming language), algorithmic problem solving, Decomposition - Strategies (iteration, recursion).

UNIT II	BASICS OF C PROGRAMMING	9

Introduction to C Programming - C Program Structure - Program Compilation & Execution - Character Set - Identifiers, Variables, Delimiters - Data Types - Constants and its types-Keywords - Statements - Operators: Types - Precedence and Associativity - Expressions - Decision Making and Branching - Looping Statements.

UNIT III	ARRAYS AND STRINGS	9

Arrays - Declaration and Initialization – Single - and Two-Dimensional Arrays - Multidimensional Arrays - Matrix operations (Addition, Subtraction, Multiplication) - Sort (Insertion and Selection) - Search (Linear and Binary Search). Strings: Defining and Initialization of strings - String operations - Array of Strings.

UNIT IV	FUNCTIONS AND POINTERS	9

Modular programming - Functions - Library Functions - User Defined Function - Function Declaration - Function Definition - Function Call - Recursion - Scope rules - Return statement - Parameter Passing (call by value, call by reference) - Passing Arrays to Function. Pointers - Declaration and Initialization - Arrays and Pointers - Array of Pointers - Arithmetic Pointers.

UNIT V	STRUCTURES, UNION AND FILE PROCESSING	9

Defining Structures and Unions: Definition - Array of Structure - Pointer and Structures - Passing Structure to Functions - Self-Referential Structures - Nested Structures - Unions - typedef – Enum. Introduction to Files - File - Access - File Organization - File Operations. Preprocess or Directives - Macros - Command Line Arguments - Dynamic Memory Allocation.

TOTAL: 45 PERIODS

TEXT BOOKS:	
1.	Karl Beecher, "Computational Thinking – A beginner's Guide to Problem Solving and Programming", British Computer Society (BCS), 2017.
2.	Reema Thareja, "Programming in C", Oxford University Press, Second Edition, 2016.
REFERENCES:	
1.	Kernighan, B. Wand Ritchie, D.M, "The C Programming language", Second Edition, Pearson Education, 2015.
2.	Yashwant Kanetkar, Let us C,17th Edition, BPB Publications, 2020.
3.	Pradip Dey, Manas Ghosh, "Computer Fundamentals and Programming in C", Second Edition, Oxford University Press, 2013.
4.	Ashok N Kamthane, Programming in C, Pearson, Third Edition,2020
5.	Paul Deitel and Harvey Deitel, "C How to Program with an Introduction to C++", Eighth edition, Pearson Education, 2018.
6.	Byron S. Gottfried, "Schaum's Outline of Theory and Problems of Programming with C"' McGraw-Hill Education, 1996.
7.	Anita Goeland Ajay Mittal," Computer Fundamentals and Programming in C",1st Edition, Pearson Education, 2013.

Mapping of COs with POs and PSOs

COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs')														
	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	2	-	-	-	-	-	2	2	3	3	-
CO2	2	2	2	1	2	1	1	1	2	-	3	3	2	2	-
CO3	2	3	2	1	2	1	1	1	2	-	3	2	2	2	-
CO4	3	2	2	1	3	1	1	1	2	-	3	3	2	2	-
CO5	2	3	3	2	2	1	2	1	2	-	3	2	2	3	-

CO/PO, PSO Mapping (3/2/1 indicates the strength of correlation)
3-Strong, 2-Medium, 1-Weak, '-' No Correlation

U24HS102	தமிழர் மரபு	L	T	P	C
		1	0	0	1

அலகு I	மொழி மற்றும் இலக்கியம்	3

இந்திய மொழிக் குடும்பங்கள் - திராவிட மொழிகள் - தமிழ் ஒரு செம்மொழி- தமிழ் செவ்விலக்கியங்கள்- சங்க இலக்கியத்தின்சமய சார்பற்ற தன்மை-சங்க இலக்கியத்தில் பகிர்தல் அறம்-திருக்குறளின் மேலாண்மை கருத்துக்கள் -தமிழ் காப்பியங்கள் -தமிழகத்தில் சமண பௌத்த சமயங்களின் தாக்கம்-பக்தி இலக்கியம் ஆழ்வார்கள் மற்றும் நாயன்மார்கள்-சிற்றிலக்கியங்கள்-தமிழில் நவீன இலக்கியத்தின் வளர்ச்சி-தமிழ் இலக்கிய வளர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசன் ஆகியோரின் பங்களிப்பு.

அலகு II	மரபு-பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை சிற்பக்கலை	3

நடுக்கல் முதல் நவீன சிற்பங்கள் வரை-ஐம்பொன் சிலைகள்-பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினைப் பொருட்கள் பொம்மைகள்-தேர் செய்யும் கலை-சுடுமண் சிற்பங்கள்-நாட்டுப்புற தெய்வங்கள்-குமரி முனையில் திருவள்ளுவர் சிலை-இசைக்கருவிகள்-மிருதங்கம் -பறை -வீணை -யாழ் - நாதஸ்வரம் தமிழர்களில் சமூக பொருளாதார வாழ்வில் கோயில்களின் பங்கு.

அலகு III	நாட்டுப்புற கலைகள் மற்றும் வீர விளையாட்டுகள்	3

தெருக்கூத்து- கரகாட்டம் -வில்லுப்பாட்டு -கணியான் கூத்து –ஒயிலாட்டம்- தோல்பாவை கூத்து - சிலம்பாட்டம் -வளரி -புலியாட்டம் -தமிழர்களின் விளையாட்டுகள்.

அலகு IV	தமிழர்களின் திணை கோட்பாடுகள்	3

தமிழகத்தின் தாவரங்களும் விலங்குகளும்-தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக் கோட்பாடுகள்-தமிழர்கள் போற்றிய அறக்கோட்பாடு-சங்ககாலத்தில் தமிழகத்தில் எழுத்தறிவும் கல்வியும்-சங்க கால நகரங்களும் துறைமுகங்களும்-சங்ககாலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி-கடல் கடந்த நாடுகளில் சோழர்களின் வெற்றி.

அலகு V	இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு.	3

இந்திய விடுதலைப் போரில் தமிழர்களின் பங்கு-இந்தியாவின் பிற்பகுதிகளில் தமிழ் பண்பாட்டின் தாக்கம்-சுயமரியாதை இயக்கம்-இந்திய மருத்துவத்தில் சித்த மருத்துவத்தின் பங்கு-கல்வெட்டுகள் -கையெழுத்து படிகள்-தமிழ் புத்தகங்களின் அச்சு வரலாறு.

TOTAL: 15 PERIODS

TEXT-CUM-REFERECE BOOKS	
1	கே- கே பிள்ளை, "தமிழக வரலாறு மக்களும் பண்பாடும்", வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்.
2	முனைவர் இல. சுந்தரம், "கணினித் தமிழ்", விகடன் பிரசுரம்.
3	"கீழடி -வைகை நதிக்கரையில் சங்க கால நகர நாகரிகம்", தொல்லியல் துறை வெளியீடு.
4	"பொருநை ஆற்றங்கரை நாகரிகம்", தொல்லியல் துறை வெளியீடு.
5	Dr.K.K.Pillay , "Social Life of Tamils", A joint publication of TNTB & ESC and RMRL .
6	Dr.S.Singaravelu, "Social Life of the Tamils - The Classical Period", Published by International Institute of Tamil Studies.
7	Dr.S.V.Subatamanian , Dr.K.D.Thirunavukkarasu, "Historical Heritage of the Tamils", Published by International Institute of Tamil Studies.
8	Dr.M.Valarmathi, "The Contributions of the Tamils to Indian Culture", Published by International Institute of Tamil Studies.
9	"Keeladi - Sangam City Civilization on the banks of river Vaigai", Jointly Published by Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu.
10	Dr.K.K.Pillay, "Studies in the History of India with Special Reference to Tamil Nadu", Published by The Author.
11	"Porunai Civilization", Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu.
12	R. Balakrishnan, "Journey of Civilization Indus to Vaigai" Published by RMRL – Reference Book.

U24HS102	HERITAGE OF TAMILS	L	T	P	C
		1	0	0	1

UNIT I	LANGUAGE AND LITERATURE	3

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

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

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

UNIT III	FOLK AND MARTIAL ARTS	3

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

UNIT IV	THINAI CONCEPT OF TAMILS	3

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

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

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

TOTAL: 15 PERIODS

TEXT-CUM-REFERECE BOOKS

1	கே- கே பிள்ளை, "தமிழக வரலாறு மக்களும் பண்பாடும்", வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்.
2	முனைவர் இல. சுந்தரம், "கணினித் தமிழ்", விகடன் பிரசுரம்.
3	"கீழடி -வைகை நதிக்கரையில் சங்க கால நகர நாகரிகம்", தொல்லியல் துறை வெளியீடு.
4	"பொருநை ஆற்றங்கரை நாகரிகம்", தொல்லியல் துறை வெளியீடு.
5	Dr.K.K.Pillay , "Social Life of Tamils", A joint publication of TNTB & ESC and RMRL .
6	Dr.S.Singaravelu, "Social Life of the Tamils - The Classical Period", Published by International Institute of Tamil Studies.
7	Dr.S.V.Subatamanian , Dr.K.D. Thirunavukkarasu, "Historical Heritage of the Tamils", Published by International Institute of Tamil Studies.
8	Dr.M.Valarmathi, "The Contributions of the Tamils to Indian Culture", Published by International Institute of Tamil Studies.
9	"Keeladi - Sangam City Civilization on the banks of river Vaigai", Jointly Published by Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu.
10	Dr.K.K.Pillay, "Studies in the History of India with Special Reference to Tamil Nadu", Published by The Author.
11	"Porunai Civilization", Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu.
12	R. Balakrishnan, "Journey of Civilization Indus to Vaigai" Published by RMRL – Reference Book.

U24HS111	COMMUNICATION SKILLS LABORATORY	L	T	P	C
		0	0	2	1

COURSE OUTCOMES:

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

CO1	Communicate effectively in formal and informal contexts.
CO2	Narrate stories fluently with correct pronunciation.
CO3	Converse appropriately and confidently with different people.
CO4	Make an effective oral presentation in general context.
CO5	Express their opinions assertively in group discussions.

SELF-INTRODUCTION	**6**
Introducing oneself-Telephone conversation-Relaying telephone message	
NARRATION	**6**
Narrating one's personal experience in front of a group (formal and informal context) Ex.: First day in college / vacation / first achievement etc- Narrating a Story	
CONVERSATION	**6**
Making Conversation (formal and informal) - Turn taking and Turn giving - Small talk	
SHORT SPEECH	**6**
Giving short speeches on topics like College Clubs and their activities in the college / Campus Facilities / native place and its major attractions - Pronunciation-learning Speech sounds – Oral Presentation on a general topics	
DISCUSSION	**6**
Taking part in a group discussion on general topics - Debating on topics of interest and relevance	
TOTAL: 30 PERIODS	

Mapping of COs with POs and PSOs															
COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs')														
	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	2	1	2	3	3	-	3	-	-	-
CO2	-	-	-	-	-	2	1	2	3	3	-	3	-	-	-
CO3	-	-	-	-	-	2	1	2	3	3	-	3	-	-	-
CO4	-	-	-	-	-	2	1	2	3	3	-	3	-	-	-
CO5	-	-	-	-	-	2	1	2	3	3	-	3	-	-	-
CO/PO, PSO Mapping (3/2/1 indicates the strength of correlation) *3-Strong, 2-Medium, 1-Weak, - No correlation*															

U24BS111	PHYSICS AND CHEMISTRY LABORATORY	L	T	P	C
		0	0	4	2

COURSE OUTCOMES:

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

CO1	Determine various module of elasticity, thermal properties of materials and viscosity of liquids.
CO2	Determine the velocity of ultrasonic waves in Liquids.
CO3	Analyze the water quality parameters for domestic and industrial purposes.
CO4	Determine the amount of molecular weight of water soluble polymer.
CO5	Analyze quantitatively the impurities in solution by electro analytical techniques.

LIST OF EXPERIMENTS

SUBJECT: PHYSICS LABORATORY

Any SIX Experiments

1. Acoustic grating-Determination of the velocity of ultrasonic waves in liquids.
2. Ultrasonic interferometer – determination of sound velocity and liquids compressibility.
3. Determination of coefficient of viscosity of liquid by Poiseuille's method.
4. Laser-Determination of the wavelength of the laser using grating.
5. Air wedge -Determination of the thickness of a thin sheet/wire.
6. Optical fibre -Determination of Numerical Aperture and acceptance angle.
7. Spectrometer-Determination of the wavelength of light using grating.
8. Spectrometer-Determination of the wavelength of light using Prism.

SUBJECT: CHEMISTRY LABORATORY

Any SIX Experiments

1. Determination of types and amount of alkalinity in water sample.
2. Determination of total, temporary and permanent hardness of water by EDTA method.
3. Determination of molecular weight and degree of Polymerization by Viscometry.
4. Conductometric precipitation titration using BaCl2 and Na2SO4.
5. Determination of strength of given hydrochloric acid using pH meter.
6. Determination of strength of acids in a mixture of acids using conductivity meter.
7. Estimation of iron content of the given solution using potentiometer.
8. Determination of Ferric ion content by using Spectrophotometry.

TOTAL: 60 PERIODS

TEXT BOOK:

1	J. Mendham, R. C. Denney, J.D. Barnes, M. Thomas and B. Sivasankar, Vogel's Textbook of Quantitative Chemical Analysis (2009).

Mapping of COs with POs and PSOs

COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs')														
	POs												PSOs		
	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO 3
CO1	2	1	1	2	1	-	-	-	-	-	-	-	-	-	-
CO2	2	2	1	2	1	-	-	-	-	-	-	-	-	-	-
CO3	2	2	2	2	1	-	-	-	-	-	-	-	-	-	-
CO4	2	1	1	1	1	-	-	-	-	-	-	-	-	-	-
CO5	2	2	2	2	1	-	-	-	-	-	-	-	-	-	-

CO/PO, PSO Mapping (3/2/1 indicates the strength of correlation)
3-Strong, 2-Medium, 1-Weak, '-' No Correlation

U24GE112	PROBLEM SOLVING AND PROGRAMMING IN C LABORATORY	L	T	P	C
		0	0	4	2

COURSE OUTCOMES:

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

CO1	Apply the concepts of Algorithmic Problem Solving
CO2	Write simple C programs using basic constructs
CO3	Design and develop C programs using arrays and strings
CO4	Develop Modular applications using functions and pointers
CO5	Develop and execute applications using pointers, structures and Unions and Files

LIST OF EXPERIMENTS

1. Develop algorithm and flow chart for the following:
   a) Electricity billing
   b) Sin series
   c) Weight of a motorbike
   d) Compute electrical current in three phase ac circuit

2. Develop C program using i/o statements and expressions:
   a) Solving quadratic equation
   b) Compute square root of a number
   c) Display student information

3. Write a C program using decision making constructs:
   a) Leap year
   b) Electricity bill
   c) Calculator operations

4. Develop C program using looping statements:
   a) Number patterns
   b) Sum of digits in a number
   c) Checking a number is palindrome or not

5. Develop C program using one dimensional array for:
   a) Linear search
   b) Binary search

6. Develop C program to perform matrix operations:
   a) Addition
   b) Multiplication

7. Write a C Program to perform various string operations.
8. Develop C program using recursion: a) Fibonacci series b) Factorial
9. Develop a C program to perform swapping using call by value and call by reference.
10. Implement file handling concept to read and write the content from existing file into another file.
TOTAL: 60 PERIODS

Mapping of COs with POs and PSOs

COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs')														
	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	2	1	2	1	1	1	2		3	3	2	2	2
CO2	2	3	2	1	2	1	1	1	2		3	2	2	2	2
CO3	2	3	2	1	3	1	1	1	2		3	3	2	3	3
CO4	2	3	3	1	2	1	2	1	2		3	2	2	2	2
CO5	2	3	3	2	1	2			2	1	2	2	2	2	2

CO/PO, PSO Mapping (3/2/1 indicates the strength of correlation)
3-Strong, 2-Medium, 1-Weak

U24HS201	PROFESSIONAL SKILLS	L	T	P	C
		2	0	0	2

COURSE OUTCOMES:

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

CO1	Identify and report cause and effects in events, industrial processes through technical texts
CO2	Compare and contrast products and ideas in technical texts.
CO3	Analyze problems in order to arrive at feasible solutions and communicate them in the written format.
CO4	Present their ideas and opinions in a planned and logical manner.
CO5	Draft effective resumes in the context of job search.

UNIT I	CAUSE AND EFFECT	6

Listening – Radio / TV / Podcast Interview (survivors tale) and framing a set of instructions/Do's and Don'ts; Reading – Excerpts of Literature (short stories), Journal articles on issues like Global warming; Writing – Official letter/ email (Request for internship / Industrial visit); Grammar – If conditionals, Imperatives; Vocabulary – Cause and effect expressions, Idioms.

UNIT II	COMPARE AND CONTRAST	6

Listening – Product reviews and gap fill exercises, Short Talk (like TED Talks) for specific information; Reading – Graphical content (table/chart/graph) and making inferences; Writing – Compare and Contrast Essay; Grammar- Degrees of Comparison, Mixed tenses; Vocabulary – Types of Adjectives, Numerical adjectives, Auxiliary verbs.

UNIT III	PROBLEM AND SOLUTION	6

Listening – Group discussion(case study); Reading –Visual content(pictures on social issues/natural disasters) for comprehension, Editorial; Writing – Picture description, Problem and Solution Essay; Grammar- Modal verbs, Active and Passive voice; Vocabulary – Signal words for problem and solution, Uses of phrases and clauses in sentence.

UNIT IV	REPORTING	6

Listening – Oral news report; Reading –Newspaper report on survey findings; Writing – Accident and Survey report, Making recommendations; Grammar- Direct and Indirect speech, Relative pronouns; Vocabulary – Reporting verbs, Abbreviations and Acronyms.

UNIT V	PRESENTATION	6

Listening – Job interview, Telephone interview; Reading –Job advertisement and company profile and making inferences; Writing – Job application (Cover letter and Resume); Grammar- Prepositional phrases; Vocabulary – Fixed expressions, Collocations

TOTAL: 30 PERIODS

TEXT BOOKS:	
1	"English for Engineers and Technologists" Volume II by Orient Blackswan, 2022.
2	"English for Science & Technology - II" by Cambridge University Press, 2023.
3	"Intermediate English Grammar",Raymond Murphy, Cambridge University Pre ss., New Delhi,2020.
REFERENCES:	
1	"Communicative English for Engineers and Professionals" by Bhatnagar Nitin, Pearson India, 2010.
2	"English for Engineers" by Sudharsana N.P. and Savitha C., Cambridge University Press, New York, 2018.
3	"Writing Skills" by Anne Laws Orient Black Swan.,Hyderabad, 2011.
4	https://www.perfect-english-grammar.com/about.html
5	https://www.grammarly.com

Mapping of COs with POs and PSOs

COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs')														
	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	3	2	-	3	1	2	3	3	1	3	-	-	-
CO2	-	-	3	2	-	3	1	2	3	3	1	3	-	-	-
CO3	-	-	3	2	-	3	1	2	3	3	1	3	-	-	-
CO4	-	-	3	2	-	3	1	2	3	3	1	3	-	-	-
CO5	-	-	3	2	-	3	1	2	3	3	1	3	-	-	-

CO/PO, PSO Mapping (3/2/1 indicates the strength of correlation)

3-Strong, 2-Medium, 1-Weak, - No correlation

U24MA201	TRANSFORMS AND ITS APPLICATIONS	L	T	P	C
		3	1	0	4

COURSE OUTCOMES:

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

CO1	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.
CO2	Apply the Fourier transforms techniques in solving engineering problems.
CO3	Understand Laplace transform and inverse transform of simple functions, properties and various related theorems.
CO4	Apply the concept of Laplace transform for modeling and finding solutions to Engineering problems.
CO5	Apply the Z-transforms techniques in solving difference equations.

UNIT I	FOURIER SERIES	9+3

Dirichlet's conditions – General Fourier series – Odd and even functions – Half range sine series and cosine series – Root mean square value – Parseval's identity – Complex form of Fourier series – Harmonic analysis.

UNIT II	FOURIER TRANSFORMS	9+3

Fourier integral theorem – Fourier transform pair – Fourier sine and cosine transforms – Properties – Transform of elementary functions – Convolution theorem (without proof).

UNIT III	LAPLACE TRANSFORMS	9+3

Laplace transform – Inverse Laplace Transform – Linearity – s-Shifting – Transforms of derivatives and integrals – Unit step function – t-Shifting – Dirac's delta function – Transform of periodic functions – Initial and final value theorem.

UNIT IV	APPLICATION OF LAPLACE TRANSFORMS	9+3

Convolution – Inverse Laplace transform by Partial fraction method – Solving differential equations with constant coefficients – Integral Equations – Systems of ODEs by using Laplace transform technique.

UNIT V	Z TRANSFORMS	9+3

Z-transforms – Elementary properties – Initial and final value theorems – Inverse Z-transform using partial fraction – Solution of difference equations using Z-transforms.

TOTAL: 60 PERIODS

TEXT BOOKS:

1	Grewal B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 2017.
2	Ramana B.V. "Higher Engineering Mathematics", Tata McGraw Hill Co.Ltd., New Delhi, 2010.

REFERENCES:

1	N.P. Bali and Manish Goyal, "A text book of Engineering Mathematics", Laxmi Publications, 2008.
2	Greenberg M.D "Advanced Engineering Mathematics", Pearson Education, Delhi, 2009.

3	Jain R.K. and Iyengar S.R.K., "Advanced Engineering Mathematics",Narosa Publications, New Delhi, 2017.
4	Peter V.O'Neil, "Advanced Engineering Mathematics", Cengage Learning India Pvt., Ltd, New Delhi, 2012.
5	Erwin Kreyszig, "Advanced Engineering Mathematics", Wiley India Pvt Ltd., New Delhi, 2015.
6	https://archive.nptel.ac.in/courses/111/106/111106046/
7	https://archive.nptel.ac.in/courses/111/106/111106139/

Mapping of COs with POs and PSOs

COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs')														
	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	1	1	-	-	-	-	2	-	-	3	-	-	-
CO2	3	3	1	1	-	-	-	-	2	-	-	3	-	-	-
CO3	3	3	1	1	-	-	-	-	2	-	-	3	-	-	-
CO4	3	3	1	1	-	-	-	-	2	-	-	3	-	-	-
CO5	3	3	1	1	-	-	-	-	2	-	-	3	-	-	-

CO/PO, PSO Mapping (3/2/1 indicates the strength of correlation)

3-Strong, 2-Medium, 1-Weak, '-' No Correlation

U24GE202	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING	L	T	P	C
		3	0	0	3

COURSE OUTCOMES:

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

CO1	Apply the basic circuit laws and calculate the various circuit parameters of DC and AC circuits
CO2	Impart knowledge in magnetic circuits and Electrical Installations
CO3	Interpret the working principle and applications of electrical machines
CO4	Describe the working principles and Characteristics of semiconductor devices
CO5	Understand the concepts of UPS and operational amplifiers

UNIT I	DC AND AC FUNDAMENTALS	9

DC Circuits: Current – Voltage – Power – Energy - Basic Circuit elements – Ohm's Law - Kirchhoff's Laws – Series and parallel Circuits – Faradays law – Lenz's Law - Fleming's Rules - Statically and dynamically induced EMF. AC Circuits: AC Fundamentals: Waveforms, Average value, RMS Value, Instantaneous power, real power, reactive power and apparent power, power factor – Steady state analysis of RLC circuits.

UNIT II	MAGNETIC CIRCUITS AND ELECTRICAL INSTALLATIONS	9

Magnetic circuits-MMF, flux, reluctance, magnetic field intensity, flux density, fringing, self and mutual inductances. Domestic wiring, types of wires and cables, earthing, protective devices- switch fuse unit-Miniature circuit breaker-moulded case circuit breaker- earth leakage circuit breaker, safety precautions and First Aid.

UNIT III	ELECTRICAL MACHINES	9

DC Machines: Construction, Working principle, Types and Applications of DC Generator and Motor - EMF and Torque equation. AC machines: Construction, Working and Applications of Transformer - EMF equation – Types – Transformation ratio. Construction and Working principle of Alternator, Three Phase and Single Phase Induction Motor– BLDC Motor.

UNIT IV	SEMICONDUCTOR DEVICES AND APPLICATIONS	9

Introduction to Semiconductors – PN Junction Diode, Zener Diode , BJT- Operation of NPN and PNP Transistors, Biasing - Construction, Working principle of SCR, MOSFET,IGBT I-V Characteristics – Diode Rectifiers: Working Principle of half wave and full wave rectifiers.

UNIT V	POWER SUPPLY AND OPERATIONAL AMPLIFIERS	9

UPS: Components of UPS – Working Principle of UPS – Types of UPS – Applications. SMPS – Block Diagram – Principle of operation – Applications. OPAMPS: Ideal characteristics of operational amplifier – Inverting Amplifier, Non inverting amplifier – Voltage Follower – Summing Amplifier.

TOTAL: 45 PERIODS

TEXT BOOKS:	
1	Kothari DP and I.J Nagrath, "Basic Electrical and Electronics Engineering", Second Edition, McGraw Hill Education, 2020
2	James A .Svoboda, Richard C. Dorf, "Dorf's Introduction to Electric Circuits", Wiley, 2018.
3	V K Metha, Rohit Metha, "Principle of Electrical Engineering and Electronics", Third Edition, S Chand Company Ltd.,, 2014.
4	David A. Bell, "Electronic devices and circuits", Oxford University higher education, First edition 2010.
5	William D.Stanley, John R.Hackworth Richard L.Jones, "Fundamental of Electrical Engineering and Electronics, India Edition, 2007.
REFERENCES:	
1	Kothari DP and I.J Nagrath, "Basic Electrical Engineering", Fourth Edition, McGraw Hill Education, 2019.
2	Mahmood Nahvi and Joseph A. Edminister, "Electric Circuits", Schaum' Outline Series, McGraw Hill, 2002.
3	B.R.Gupta, 'Fundamental of Electric Machines' New age International Publishers,3rd Edition, Reprint 2015.
4	V.K.Metha Rohit Metha,"Principle of Electrical Engineering and Electronics S.Chand & Company Limited, 2008.
5	https://archive.nptel.ac.in/courses/108/105/108105112/
6	https://nptel.ac.in/courses/108108076
7	https://archive.nptel.ac.in/courses/108/108/108108122/

Mapping of COs with POs and PSOs

COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs')														
	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	-	-	-	-	-	-	-	-	1	1	1	2
CO2	3	2	1	-	-	-	-	-	-	-	-	1	1	1	2
CO3	3	2	1	-	-	-	-	-	-	-	-	1	1	1	2
CO4	3	2	1	-	-	-	-	-	-	-	-	1	1	1	2
CO5	3	2	1	-	-	-	-	-	-	-	-	1	1	1	2

CO/PO, PSO Mapping (3/2/1 indicates the strength of correlation)

3-Strong, 2-Medium, 1-Weak, '-' No Correlation

U24GE203	ENGINEERING GRAPHICS	L	T	P	C
		2	0	2	3

COURSE OUTCOMES:

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

CO1	Sketch the plane curves, projections of points and straight lines.
CO2	Construct projection of planes and solids.
CO3	Construct section of solids and development of surfaces.
CO4	Demonstrate knowledge about isometric projections.
CO5	Construct the orthographic projections.

Concepts and conventions (Not for examination)
Importance of graphics in engineering application, use of drafting instrument, BIS conventions and specifications- size, layout and folding of drawing sheets, lettering and dimension.

UNIT I	PLANE CURVES, PROJECTION OF POINTS AND LINES	12

Basic Geometrical constructions, Curves used in engineering practices: Conics - Construction of ellipse, parabola and hyperbola by eccentricity method. Projection of points (Not for examination).
Projection of straight lines (only First quadrant) inclined to both the principal planes - Determination of true lengths and true inclinations by rotating line method.

UNIT II	PROJECTION OF PLANES AND SOLIDS	12

Projection of planes (polygonal and circular surfaces) inclined to both the principal planes by rotating object method. Projection of simple solids like prisms - pyramids - cylinder and cone when the axis is inclined to one reference plane (Only first quadrant) by rotating object method.

UNIT III	SECTIONING OF SOLIDS AND DEVELOPMENT OF SURFACE	12

Sectioning of above solids in simple vertical position when the cutting plane is inclined to the one of the principal planes and perpendicular to the other - obtaining true shape of section (Not for examination).
Development of lateral surfaces of simple and sectioned solids - Prisms, pyramids cylinders and cones.
Practicing three dimensional modeling of simple truncated objects by CAD Software (Not for examination)

UNIT IV	ISOMETRIC PROJECTION	12

Principles of Isometric Projection - Isometric Scale - Isometric Projections of Simple and Truncated Solids Like Prisms, Pyramids, Cylinders and Cones.
Creating isometric model of simple objects from orthographic projections using CAD software (Not for examination).

UNIT V	ORTHOGRAPHIC PROJECTION	12

Representation of Three - Dimensional objects - General principles of orthographic projection - Need for importance of multiple views and their placement - First angle projection - layout views - Developing visualization skills through free hand sketching of multiple views from pictorial views of objects.

TOTAL: 60 PERIODS

TEXT BOOKS:	
1	Natarajan.K.V. "A Textbook of Engineering Graphics",35th Edition, Dhanalakshmi Publishers, Chennai, 2022.
2	Bhatt N.D., Panchal V.M. & Ingle P.R., "Engineering Drawing", Charotar Publishing. 2014.
REFERENCES:	
1	Venugopal K. and Prabhu Raja V., "Engineering Graphics", 16th Edition, New Age International Publishers, Chennai, 2022
2	Basant Agrawal, Agrawal C.M., "Engineering Drawing", 3rd Edition, McGraw Hill Education, 2019.
3	Parthasarathy N.S., Vela Murali. "Engineering Drawing", 1st Edition, Oxford University Press, 2015
4	https://nptel.ac.in/courses/112103019
5	www.engineeringdrawing.org/2012/04/solids-section-problem-7-4
6	en.wikipedia.org/wiki/Plane_curve
7	https://nptel.ac.in/courses/112102304

Mapping of COs with POs and PSOs

COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs')														
	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	2	-	2	-	-	-	-	3	-	2	2	1	-
CO2	3	1	2	-	2	-	-	-	-	3	-	2	2	1	-
CO3	3	1	2	-	2	-	-	-	-	3	-	2	2	1	-
CO4	3	1	2	-	2	-	-	-	-	3	-	2	2	1	-
CO5	3	1	2	-	2	-	-	-	-	3	-	2	2	1	-

CO/PO, PSO Mapping (3/2/1 indicates the strength of correlation)
3-Strong, 2-Medium, 1-Weak, - No Correlation

U24GE206	PYTHON PROGRAMMING	L	T	P	C
		3	0	0	3

COURSE OUTCOMES:

Upon completion of the course, students will be able to

CO1	Develop and execute simple Python programs using conditionals and looping statements.
CO2	Decompose a Python program into functions and can write programs using strings, modules and packages.
CO3	Represent Compound data using Python lists, tuples, dictionaries, sets.
CO4	Perform I/O handling and file operations in Python.
CO5	Implement Object Oriented Programming concepts in Python programming.

UNIT I	BASIC CONCEPTS IN PYTHON	9

Introduction - Python Interpreter - Debugging - Variables, expressions and statements: Values and Data types, variables, Statements, Operators and operands, order of operations, Expressions - Comments - Conditionals and recursion: Boolean expressions, logical operators, conditional (if), alternative (if - else), chained conditionals (if - elif - else), nested conditionals - Iteration: while, for, break, continue.

UNIT II	FUNCTIONS, STRINGS, MODULES AND PACKAGES	9

Functions - Function calls, Composition, Flow of Execution, Parameters and arguments - Fruitful Functions - local and global scope - recursion. Strings: Definition, String slices, Immutability, Searching, Looping and Counting, String Methods,String Comparison - Python modules - Packages.

UNIT III	LIST, TUPLES, DICTIONARIES, AND SETS IN PYTHON	9

Lists: List operations, slices and methods - List Comprehension - mutability, aliasing, cloning lists, List Loop. Tuples - Immutability, Tuple assignment, tuples as return value, variable-length argument tuple, Lists and Tuples. Dictionaries - Dictionaries and Lists - Dictionaries and Tuples – Sequences of sequences -Sets - Sets Basics - Set Operations - Case Study - Data Structure Selection.

UNIT IV	FILES AND EXCEPTION HANDLING	9

Files and exceptions: text files, reading and writing files, File names and paths, format operator, Command line arguments, errors and exceptions, handling exceptions - Databases - Pickling - Pipes - Writing modules.

UNIT V	OBJECT ORIENTED PROGRAMMING CONCEPTS	9

Classes and Objects - Classes and functions - Classes and methods - Object-oriented features - _init_() method - _str_ () method - Operator Overloading - Type-based dispatch - Polymorphism - Inheritance.

TOTAL: 45 PERIODS

TEXT BOOKS:	
1	Allen B. Downey, "Think Python: How to Think like a Computer Scientist", 2nd Edition, O'Reilly Publishers, 2016.
2	Paul Deitel and Harvey Deitel, "Python for Programmers", Pearson Education, 1st Edition, 2021.
REFERENCES:	
1	Karl Beecher, "Computational Thinking: A Beginner's Guide to Problem Solving and Programming", 1st Edition, BCS Learning & Development Limited, 2017
2	G Venkatesh and Madhavan Mukund, "Computational Thinking: A Primer for Programmers and Data Scientists", 1st Edition, Notion Press, 2021
3	John V Guttag, "Introduction to Computation and Programming Using Python: With Applications to Computational Modeling and Understanding Data", Third Edition, MIT Press, 2021
4	Eric Matthes, "Python Crash Course, A Hands - on Project Based Introduction to Programming", 2nd Edition, No Starch Press, 2019.
5	https://www.python.org/
6	Martin C. Brown, "Python: The Complete Reference", 4th Edition, Mc-Graw Hill, 2018.

Mapping of COs with POs and PSOs

COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs')														
	POs												PSOs		
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CO1	3	3	3	3	2	-	-	-	-	-	2	2	3	1	-
CO2	2	2	2	2	2	-	-	-	-	-	1	1	3	1	-
CO3	2	2	2	1	1	-	-	-	-	-	1	1	2	1	-
CO4	2	2	1	1	2	-	-	-	-	-	1	1	2	1	-
CO5	3	2	2	1	1	1	-	-	-	-	2	1	2	2	-

CO/PO, PSO Mapping (3/2/1 indicates the strength of correlation)
3-Strong, 2-Medium, 1-Weak, '-' No Correlation

U24HS202	தமிழரும் தொழில்நுட்பமும்	L	T	P	C
		1	0	0	1

அலகு I	நெசவு மற்றும் பானைத் தொழில்நுட்பம்	3

சங்க இலக்கியத்தில் நெசவு தொழில்- பானைத் தொழில்நுட்பம் - கருப்பு-சிவப்பு மண்பாண்டங்கள்- பாண்டங்களில் கீறல் குறியீடுகள்.

அலகு II	வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம்	3

சங்ககாலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் மற்றும் சங்ககாலத்தில் வீட்டுப் பொருட்களில் வடிவமைப்பு-சங்க காலத்தில் கட்டுமான பொருட்களும் நடுக்கல்லும் சிலப்பதிகாரத்தில் மேடை அமைப்பு பற்றி விவரங்கள்-மாமல்லபுரச் சிற்பங்களும் கோயில்களும்-சோழர் காலத்து கோயில்களும் மற்றும் பிற வழிபாட்டுத்தலங்கள்-நாயக்கர் கால கோயில்கள் மாதிரி கட்டமைப்புகள் பற்றிய அறிதல் மதுரை மீனாட்சி அம்மன் ஆலயம் மற்றும் திருமலை நாயக்கர் மஹால்- செட்டிநாட்டு வீடுகள்- பிரிட்டிஷ் காலத்தில் சென்னையில் இந்தோ--சரோ செனிக்கட்டிடக்கலை.

அலகு III	உற்பத்தித் தொழில்நுட்பம்	3

கப்பல்கட்டும் கலை உலோகவியல் -இரும்புத் தொழிற்சாலை-இரும்பை உருவாக்குதல்-எஃகு வரலாற்றுச் சான்றுகளாக செம்பு மற்றும் தங்க நாணயங்கள்-நாணயங்கள் அச்சடித்தல் -மணி உருவாக்கும் தொழிற்சாலைகள் -கல்மணிகள் -கண்ணாடி மணிகள் -சுடுமணிகள் -சங்கு மணிகள் - எலும்பு துண்டுகள்- தொல்லியல் சான்றுகள் - சிலப்பதிகாரத்தில் மணிகளின் வகைகள்.

அலகு IV	வேளாண்மை மற்றும் நீர்ப்பாசனத் தொழில்நுட்பம்	3

அணை-ஏரி-குளங்கள்-மதகு-சோழர்கால குமிழித்தூம்பின் முக்கியத்துவம்-கால்நடை பராமரிப்பு-கால்நடைகளுக்காக வடிவமைக்கப்பட்ட கிணறுகள்- வேளாண்மை மற்றும் வேளாண்மைச் சார்ந்த செயல்பாடுகள்-கடல்சார் அறிவு- மீன்வளம்- முத்து மற்றும் முத்து குளித்தல்-பெருங்கடல் குறித்த பண்டைய அறிவு- அறிவு சார் சமூகம்.

அலகு V	அறிவியல் தமிழ் மற்றும் கணினித் தமிழ்	3

அறிவியல் தமிழின் வளர்ச்சி- கணினித் தமிழ் வளர்ச்சி- தமிழ் நூல்களை மின் பதிப்பு செய்தல்- தமிழ் மென்பொருட்கள் உருவாக்கம்-தமிழ் இணையக் கல்விக் கழகம்-தமிழ் மின் நூலகம்- இணையத்தில் தமிழ் அகராதிகள்-சொற்குவைத் திட்டம்.

TOTAL: 15 PERIODS

TEXT-CUM-REFERECE BOOKS

1	கே- கே பிள்ளை, "தமிழக வரலாறு மக்களும் பண்பாடும்", வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்.
2	முனைவர் இல. சுந்தரம், "கணினித் தமிழ்", விகடன் பிரசுரம்.

3	"கீழடி -வைகை நதிக்கரையில் சங்க கால நகர நாகரிகம்", தொல்லியல் துறை வெளியீடு.
4	"பொருநை ஆற்றங்கரை நாகரிகம்", தொல்லியல் துறை வெளியீடு.
5	Dr.K.K.Pillay , "Social Life of Tamils", A joint publication of TNTB & ESC and RMRL .
6	Dr.S.Singaravelu, "Social Life of the Tamils - The Classical Period", Published by International Institute of Tamil Studies.
7	Dr.S.V.Subatamanian , Dr.K.D. Thirunavukkarasu, "Historical Heritage of the Tamils", Published by International Institute of Tamil Studies.
8	Dr.M.Valarmathi, "The Contributions of the Tamils to Indian Culture", Published by International Institute of Tamil Studies.
9	"Keeladi - Sangam City Civilization on the banks of river Vaigai", Jointly Published by Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu.
10	Dr.K.K.Pillay, "Studies in the History of India with Special Reference to Tamil Nadu", Published by The Author.
11	"Porunai Civilization", Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu.
12	R. Balakrishnan, "Journey of Civilization Indus to Vaigai" Published by RMRL – Reference Book.

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		1	0	0	1

UNIT I	WEAVING AND CERAMIC TECHNOLOGY	3

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

UNIT II	DESIGN AND CONSTRUCTION TECHNOLOGY	3

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

UNIT III	MANUFACTURING TECHNOLOGY	3

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

UNIT IV	AGRICULTURE AND IRRIGATION TECHNOLOGY	3

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

UNIT V	SCIENTIFIC TAMIL AND TAMIL COMPUTING	3

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

TOTAL: 15 PERIODS

TEXT-CUM-REFERECE BOOKS

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

7	Dr.S.V.Subatamanian , Dr.K.D. Thirunavukkarasu, "Historical Heritage of the Tamils", Published by International Institute of Tamil Studies.
8	Dr.M.Valarmathi, "The Contributions of the Tamils to Indian Culture", Published by International Institute of Tamil Studies.
9	"Keeladi - Sangam City Civilization on the banks of river Vaigai", Jointly Published by Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu.
10	Dr.K.K.Pillay, "Studies in the History of India with Special Reference to Tamil Nadu", Published by The Author.
11	"Porunai Civilization", Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu.
12	R. Balakrishnan, "Journey of Civilization Indus to Vaigai" Published by RMRL – Reference Book.

U24HS211	PROFESSIONAL SKILLS LABORATORY	L	T	P	C
		0	0	2	1

COURSE OUTCOMES:

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

CO1	Answer the questions in a job interview confidently.
CO2	Develop persuasive skills required for the workplace.
CO3	Organize official events effectively in workplace or institution.
CO4	Comprehend and transcode visual content appropriately.
CO5	Make an effective presentation on a given topic in a formal context.

INTERVIEW IN SOCIAL CONTEXT	**6**
Asking questions and answering - Conducting an interview (of an achiever/survivor)-Role play.	
PERSUASIVE SKILLS	**6**
Speaking about specifications of a product (Eg. Home appliances) - Persuasive Talk - Just a Minute session (JAM)	
ORGANIZING EVENTS	**6**
Master of Ceremonies-Hosting official events – Proposing Welcome Address and Vote of Thanks.	
VISUAL INTERPRETATION	**6**
Describing visual content (Pictures/Table/Chart) using appropriate descriptive language - Making appropriate inferences and giving recommendations – Presentation of Newspaper Articles.	
PRESENTATION	**6**
Making presentation with visual component (PPT slides), / Job interview / Project / Innovative product presentation.	
TOTAL: 30 PERIODS	

Mapping of COs with POs and PSOs															
COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs')														
	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	3	1	2	3	3	2	3	-	-	-
CO2	-	-	-	-	-	3	1	2	3	3	2	3	-	-	-
CO3	-	-	-	-	-	3	1	2	3	3	2	3	-	-	-
CO4	-	-	-	-	-	3	1	2	3	3	2	3	-	-	-
CO5	-	-	-	-	-	3	1	2	3	3	2	3	-	-	-
CO/PO, PSO Mapping (3/2/1 indicates the strength of correlation) *3-Strong, 2-Medium, 1-Weak, '-' No correlation*															

U24GE111	ENGINEERING PRACTICES LABORATORY	L	T	P	C
		0	0	4	2

COURSE OUTCOMES:

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

CO1	Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household wood work.
CO2	Weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, tapping in parts; Assemble simple mechanical assembly of common household equipments; Make a tray out of metal sheet using sheet metal work.
CO3	Wire various electrical joints in common household electrical wire work.
CO4	Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB.

LIST OF EXPERIMENTS/EXERCISES:

GROUP – A (MECHANICAL& CIVIL)

CIVIL ENGINEERING PRACTICES — **15**

A) PLUMBING WORK:

a) Study of plumbing tools and Components.

b) Connecting various basic pipe fittings like valves, taps, coupling, unions, reducers, elbows and other components which are commonly used in household.

c) Laying pipe connection to the suction side of a pump.

d) Laying pipe connection to the delivery side of a pump.

e) Connecting pipes of different materials: Metal, plastic and flexible pipes used in household appliances.

B) WOOD WORK:

a) Study of carpentry tools and its applications.

b) Preparation of Cross Lap, T-Joint and Dove Tail Joints.

MECHANICAL ENGINEERING PRACTICES — **15**

A) WELDING WORK:

a) Study of different types of Welding and its applications.

b) Welding of Butt Joints, Lap Joints, and Tee Joints using arc welding.

B) BASIC MACHINING WORK:

a) Study of Lathe and Drilling Operations.

a) Simple Turning.

b) Simple Drilling and Tapping.

C) SHEET METAL WORK & GENERAL STUDY:

a) Study of sheet metal work.

b) Making of Rectangular (Dust Pan type), Square Trays.

c) Study of a centrifugal pump.

d) Study of an air conditioner.

D) FOUNDRY WORK:

a) Demonstrating basic foundry operations.

GROUP – B (ELECTRICAL & ELECTRONICS)	
ELECTRICAL ENGINEERING PRACTICES	**15**
a) Introduction to switches, fuses, indicators and lamps - Basic switch board wiring with lamp, fan and three pin socket. b) Staircase wiring. c) Fluorescent Lamp wiring with introduction to CFL and LED types. d) Measurement of energy using single phase energy meter. e) Measurement of resistance to earth of electrical equipment. f) Study of Iron Box wiring and assembly. g) Study of Fan Regulator (Resistor type and Electronic type using Diac /Triac /quadrac). h) Study of emergency lamp wiring/Water heater.	
ELECTRONICS ENGINEERING PRACTICES	**15**
a) Soldering practice – Components Devices and Circuits – Using general purpose PCB. b) Measurement of ripple factor of HWR and FWR. c) Study of Electronic components and equipments – Resistor, color coding measurement of AC signal parameter. d) Study an element of smart phone and LED TV.	
	TOTAL: 60 PERIODS

REFERENCE/LAB MANUAL/SOFTWARE:

1	Dr.V.Ramesh babu "Engineering Practices Laboratory Manual"", VRB Publisher Pvt. Ltd., Chennai, 11th edition, 2020.
2	Ramesh Singh "Applied Welding: Process, Codes and Standards", Elsevier material, First edition 2012.
3	Michael A Joyce, Ray Holder"Residential Construction Academy: Plumbing" Residential construction Academy USA.
4	https://nptel.ac.in/courses/112106286
5	https://in.coursera.org/learn/engineering-mechanics-statics

Mapping of COs with POs and PSOs

COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs')														
	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1
CO2	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1
CO3	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1
CO4	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1

CO/PO, PSO Mapping (3/2/1 indicates the strength of correlation)
3-Strong, 2-Medium, 1-Weak, '-' No Correlation

U24GE212	PYTHON PROGRAMMING LABORATORY	L	T	P	C
		0	0	4	2

COURSE OUTCOMES:

On completion of the course, students will be able to:

CO1	Develop and execute simple Python programs
CO2	Implement programs in Python using conditionals and loops for solving problems
CO3	Deploy functions to decompose a Python program
CO4	Process compound data using Python data structures
CO5	Utilize Python packages in developing software applications

LIST OF EXPERIMENTS

1. Develop Python programming using simple statements and expressions:
i) Exchange the values of two variables
ii) Circulate the values of N variables
iii) Distance between two points

2. Write Python programming using conditionals and iterative statements:
i) Number series
ii) Number patterns

3. Implement real-time/technical applications using:
i) Lists
ii) Tuples
iii) Dictionaries

4. Develop Python programs using functions:
i) Factorial
ii) Largest number in a list
iii) Area of a shape

5. Write program in Python using strings concepts:
i) Reverse a String
ii) Palindrome
iii) Character Count

6. Develop Python programs using written modules and python standard libraries:
i) Pandas
ii) Numpy

iii) Matplotlib iv) Scipy
7. Implement file handling constructs for developing python programs for: i) Copy from one file to another ii) Counting number of words in a file. iii) Finding longest word
8. Using exception handling develop real-time/technical applications: i) Divide by zero error ii) Voter's age validity iii) Student mark range validation
9. Exploring Pygame tool.
10. Develop a game activity using Pygame: i) Bouncing bal ii) Car race
TOTAL: 60 PERIODS

Mapping of COs with POs and PSOs

COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs')														
	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	2	-	-	-	-	-	2	2	3	3	-
CO2	3	3	3	3	2	-	-	-	-	-	2	-	3	3	-
CO3	2	2	-	2	2	-	-	-	-	-	1	-	3	-	-
CO4	1	2	-	-	1	-	-	-	-	-	1	-	2	-	-
CO5	2	2	-	-	2	-	-	-	-	-	1	-	2	-	
Average	2	3	3	3	2	-	-	-	-	-	2	2	3	3	-

CO/PO, PSO Mapping (3/2/1 indicates the strength of correlation)
3-Strong, 2-Medium, 1-Weak, '-' No Correlation

U24MC104	ESSENCE OF INDIAN KNOWLEDGE TRADITION	L	T	P	C
		1	0	0	0

COURSE OUTCOMES:

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

CO1	Understand the concept of Traditional knowledge and its importance
CO2	Know the need and importance of protecting traditional knowledge
CO3	Know the various enactments related to the protection of traditional knowledge
CO4	Understand the concepts of Intellectual property to protect the traditional knowledge
CO5	Understand the traditional knowledge in different sectors

UNIT I	INTRODUCTION TO TRADITIONAL KNOWLEDGE	3

Traditional knowledge: Define traditional knowledge, nature and characteristics, scope and importance, kinds of traditional knowledge, Indigenous Knowledge (IK), characteristics, traditional knowledge vis-a-vis indigenous knowledge, traditional knowledge Vs western knowledge traditional knowledge.

UNIT II	PROTECTION OF TRADITIONAL KNOWLEDGE	3

The need for protecting traditional knowledge, Significance of TK Protection, the value of TK in the global economy, Role of Government to harness TK.

UNIT III	LEGAL FRAMEWORK AND TRADITIONAL KNOWLEDGE	3

The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, Plant Varieties Protection and Farmers Rights Act, 2001 (PPVFR Act); The Biological Diversity Act 2002 and Rules 2004, the protection of traditional knowledge bill, 2016. Geographical indications act 2003.

UNIT IV	TRADITIONAL KNOWLEDGE AND INTELLECTUAL PROPERTY	3

Systems of traditional knowledge protection, Certain non IPR mechanisms of traditional knowledge protection, Patents and traditional knowledge, Strategies to increase protection of traditional knowledge, global legal FORA for increasing protection of Indian Traditional Knowledge

UNIT V	TRADITIONAL KNOWLEDGE IN DIFFERENT SECTORS	3

Traditional knowledge and engineering, Traditional medicine system, TK and biotechnology, TK in agriculture, Traditional societies depend on it for their food and healthcare needs, Importance of conservation and sustainable development of environment, Management of biodiversity, Food security of the country and protection of TK

TOTAL: 15 PERIODS

TEXT BOOKS:

1 Amit Jha , "Traditional Knowledge System in India", Atlantic Publishers and Distributors, 2009

2	Basanta Kumar Mohanta and Vipin Kumar Singh, "Traditional Knowledge System and Technology in India", Pratibha Prakashan 2012
REFERENCES:	
1	"Traditional Knowledge System in India" Amit Jha Atlantic publishers, 2002
2	Kapil Kapoor1, Michel Danino2, "Knowledge Traditions and Practices of India"