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

BIOMEDICAL 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 BIOMEDICAL 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

SCT will endeavor to:

✓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 graduates in biomedical engineering who adhere to high ethical standards and ensure professionalism in the healthcare sector through research and core principle education.

Mission of the Department

✓To develop engineering principles to raise industry standards in the healthcare sector.

✓To create a multidisciplinary team of biomedical engineers to advance technologies through innovation, development and research.

✓ To build competence in core and interdisciplinary areas for employability and entrepreneurship.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)	
PEO1:	To enable the graduates to demonstrate their skills in design and develop medical devices for health care system through the core foundation and knowledge acquired in engineering and biology.
PEO2:	To enable the graduates to exhibit leadership in health care team to solve health care problems and make decisions with societal and ethical responsibilities.
PEO3:	To Carryout multidisciplinary research, addressing human healthcare problems and sustain technical competence with ethics, safety and standards.
PEO4:	To ensure that graduates will recognize the need for sustaining and expanding their technical competence and engage in learning opportunities throughout their careers.
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 professionalengineering 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 sustainabledevelopment.
PO8:	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms ofthe engineering practice.
PO9:	Individual and team work: Function effectively as an individual, and as a member or leader in diverseteams, and in multidisciplinary settings.
PO10:	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11:	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12:	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs)	
Engineering Graduates will be able to:	
PSO1:	To design and develop diagnostic and therapeutic devices that reduces physician burnout and enhances the quality of life for the end user by applying fundamentals of Biomedical Engineering.
PSO2:	To apply software skills in developing algorithms for solving healthcare related problems in various fields of medical sector.
PSO3:	To adapt to emerging information and communication technologies (ICT) to innovate ideas and solutions for current societal and scientific issues thereby developing indigenous medical instruments that are on par with the existing technology.

Courses of Study and Scheme of Assessment (Regulations 2024)								
B.E. Biomedical 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	U24CY102	Chemistry for Electronic Materials	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 ECE & BME	Member Secretary Academic Council	Dean - Academics	Chairperson - Academic Council & Principal
Dr.P.Periyasamy	Dr.G.Charulatha	Dr.G.Selvaraj	Dr.S.Prakash	Dr.A.Jegan

Courses of Study and Scheme of Assessment (Regulations 2024)

B.E. BIOMEDICAL 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	U24MA202	Transforms and Numerical Methods	3	1	0	4	BSC	60
3	U24GE205	Basics of Electrical Engineering	3	0	0	3	ESC	45
4	U24GE203	Engineering Graphics	2	0	2	3	ESC	60
5	U24BM201	Anatomy and Human Physiology	3	0	0	3	PCC	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	U24BM211	Anatomy and Human Physiology Laboratory	0	0	4	2	PCC	60
MANDATORY COURSES								
10	U24MC105	Sports and Yoga	1	-	-	-	MC	15
					Total Credits	**21**		

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ESC Engineering Science Courses
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Courses of Study and Scheme of Assessment (Regulations 2024)								
B.E. BIOMEDICAL ENGINEERING								
S.No.	**Course Code**	**Course Title**	**L**	**T**	**P**	**C**	**CAT**	**Total Contact Periods**
SEMESTER III								
THEORY COURSES								
1	U24MA302	Probability and Stochastic Processes	3	1	0	4	BSC	60
2	U24BM301	Electronic Devices and Circuits	3	0	0	3	PCC	45
3	U24BM302	Sensors and Measurements	3	0	0	3	PCC	45
4	U24BM303	Electric Circuit Analysis	3	0	0	3	PCC	45
5	U24GE206	Python Programming	3	0	0	3	ESC	45
THEORY CUM PRACTICAL COURSE								
6	U24BM304	Biosciences for Medical Engineering	3	0	2	4	PCC	75
PRACTICAL COURSES								
7	U24GE212	Python Programming Laboratory	0	0	4	2	ESC	60
8	U24BM311	Electronic Devices and Circuits Laboratory	0	0	4	2	PCC	60
MANDATORY COURSES								
9	U24MC102	Indian Constitution	1	-	-	-	MC	15
					Total Credits	**24**		

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

BSC Basic Science Courses
ESC Engineering Science Courses
PCC Professional Core Courses

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Courses of Study and Scheme of Assessment (Regulations 2024)								
B.E. BIOMEDICAL ENGINEERING								
S.No.	**Course Code**	**Course Title**	**L**	**T**	**P**	**C**	**CAT**	**Total Contact Periods**
SEMESTER IV								
THEORY COURSES								
1	U24BM401	Biomedical Instrumentation	3	0	0	3	PCC	45
2	U24BM402	Analog and Digital Integrated Circuits	3	0	0	3	PCC	45
3	U24BM403	Biomaterials and Artificial Organs	3	0	0	3	PCC	45
4	U24BM404	Bio Control Systems	3	0	0	3	PCC	45
5	U24IT301	Object Oriented Programming	3	0	0	3	ESC	45
THEORY CUM PRACTICAL COURSE								
6	U24BM405	Biomedical Signal Processing	3	0	2	4	PCC	75
PRACTICAL COURSES								
7	U24BM411	Biomedical Instrumentation Laboratory	0	0	4	2	PCC	60
8	U24BM412	Analog and Digital Integrated Circuits laboratory	0	0	4	2	PCC	60
9	U24IT311	Object Oriented Programming Laboratory	0	0	4	2	ESC	60
MANDATORY COURSES								
10	U24MC103	Environmental Sciences and Engineering	2	-	-	-	-	30
					Total Credits	**25**		

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ESC Engineering Science Courses
PCC Professional Core Courses
MC Mandatory Courses

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Courses of Study and Scheme of Assessment (Regulations 2024)								
B.E. BIOMEDICAL ENGINEERING								
S.No.	**Course Code**	**Course Title**	**L**	**T**	**P**	**C**	**CAT**	**Total Contact Periods**
SEMESTER V								
THEORY COURSES								
1	U24BM501	Medical Device Regulation	3	0	0	3	PCC	45
2	U24BM502	Diagnostic and Therapeutic Equipment	3	0	0	3	PCC	45
3	U24EC405	Microprocessor and Microcontroller	3	0	0	3	PCC	45
4	U24BM503	Human Assist Devices	3	0	0	3	PCC	45
5	U24BM504	Medical Waste Management	3	0	0	3	PCC	45
6	U24BMPXX	Professional Elective – I	3	0	0	3	PEC	45
PRACTICAL COURSES								
7	U24EC413	Microprocessor and Microcontroller laboratory	0	0	4	2	PCC	60
8	U24BM511	Diagnostic and Therapeutic Equipment Lab	0	0	4	2	PCC	60
MANDATORY COURSES								
9	U24MC106	Industrial safety	1	0	0	-	MC	15
					Total Credits	**22**		

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

PCC Professional Core Courses
PEC Professional Elective Courses
MC Mandatory Courses

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Courses of Study and Scheme of Assessment (Regulations 2024)								
B.E. BIOMEDICAL ENGINEERING								
S.No.	**Course Code**	**Course Title**	**L**	**T**	**P**	**C**	**CAT**	**Total Contact Periods**
SEMESTER VI								
THEORY COURSES								
1	U24BM601	Medical Image Processing	3	0	0	3	PCC	45
2	U24BM602	Fundamentals of Healthcare Analytics	3	0	0	3	PCC	45
3	U24BM603	Embedded Systems and IoMT	3	0	0	3	PCC	45
4	U24BMPXX	Professional Elective – II	3	0	0	3	PEC	45
5		Open Elective – I	3	0	0	3	OEC	45
THEORY CUM PRACTICAL COURSE								
6	U24IT503	Artificial Intelligence and Machine Learning	3	0	2	4	PCC	75
PRACTICAL COURSES								
7	U24BM611	Medical Image Processing Laboratory	0	0	4	2	PCC	60
8	U24BM612	Embedded Systems and IoMT Laboratory	0	0	4	2	PCC	60
EMPLOYABILITY ENHANCEMENT								
9	U24BM611	Mini Project	0	0	2	1	EEC	15
					Total Credits	**24**		

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
EEC Employability Enhancement Courses

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Dr.G.Charulatha	Dr.G.Selvaraj	Dr.S.Prakash	Dr.A.Jegan

Courses of Study and Scheme of Assessment (Regulations 2024)								
B.E. BIOMEDICAL ENGINEERING								
S.No.	**Course Code**	**Course Title**	**L**	**T**	**P**	**C**	**CAT**	**Total Contact Periods**
SEMESTER VII								
THEORY COURSES								
1	U24BM701	Medical Informatics	3	0	0	3	PCC	45
2	U24MG20X	Elective Management	3	0	0	3	HSMC	45
3	U24BMPXX	Professional Elective – III	3	0	0	3	PEC	45
4		Open Elective – II	3	0	0	3	OEC	45
5		Open Elective – III	3	0	0	3	OEC	45
PRACTICAL COURSES								
6	U24BM711	Hospital Training	0	0	0	2	EEC	30
					Total Credits	**17**		

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	EEC	Employability Enhancement Courses

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Courses of Study and Scheme of Assessment (Regulations 2024)								
B.E. BIOMEDICAL ENGINEERING								
S.No.	**Course Code**	**Course Title**	**L**	**T**	**P**	**C**	**CAT**	**Total Contact Periods**
SEMESTER VIII								
THEORY COURSES								
1.	U24BMPXX	Professional Elective – IV	3	0	0	3	PEC	45
EMPLOYABILITY ENHANCEMENT								
2.	U24BM811	Project Work	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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Dr.G.Charulatha	Dr.G.Selvaraj	Dr.S.Prakash	Dr.A.Jegan

Credit Distribution

(For the candidates admitted from 2024-2025 onwards)

B.E. - Biomedical 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	-	-	-	-	3	-	11	**6.58**
2	BSC	12	4	4	-	-	-	-	-	20	**11.97**
3	ESC	5	8	5	5	-	-	-	-	23	**13.77**
4	PCC	-	5	15	20	19	17	3	-	79	**47.30**
5	PEC	-	-	-	-	3	3	3	3	12	**7.18**
6	OEC	-	-	-	-	-	3	6	-	9	**5.38**
7	EEC	-	-	-	-	-	1	2	10	13	**7.78**
8	MC	NC	NC	NC	NC	NC	-	-	-	-	-
Total		**21**	**21**	**24**	**25**	**22**	**24**	**17**	**13**	**167**	**100**

HSMC	Humanities, Social Sciences and Management Courses	**OEC**	Open Elective Courses
BSC	Basic Science Courses	**EEC**	Employability Enhancement Courses
ESC	Engineering Science Courses	**MC**	Mandatory Courses
PCC	Professional Core Courses	**ESE**	End Semester Examination
PEC	Professional Elective Courses	**NC**	Non-Credit 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.	U24MG20X	Elective Management	3	0	0	3	HSMC	45
					TOTAL CREDITS	11		

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.	U24CY102	Chemistry for Electronic Materials	3	0	0	3	BSC	45
4.	U24BS111	Physics and Chemistry Laboratory	0	0	4	2	BSC	60
5.	U24MA202	Transforms and Numerical Methods	3	1	0	4	BSC	60
6.	U24MA302	Probability and Stochastic Processes	3	1	0	4	BSC	60
					TOTAL CREDITS	20		

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	U24GE203	Engineering graphics	2	0	2	3	ESC	45
4.	U24GE205	Basic Electrical Engineering	3	0	0	3	ESC	45
5.	U24GE111	Engineering Practices Laboratory	0	0	4	2	ESC	60
6.	U24GE206	Python Programming	3	0	0	3	ESC	45
7.	U24GE212	Python Programming Laboratory	0	0	4	2	ESC	60
8.	U24IT301	Object Oriented Programming	3	0	0	3	ESC	45
9.	U24IT311	Object Oriented Programming Laboratory	0	0	4	2	ESC	60
					TOTAL CREDITS	23		

PROFESSIONAL CORE COURSES (PCC)

S. No.	Course Code	Course Title	L	T	P	C	CAT	Total Contact Periods
1.	U24BM201	Anatomy and Human Physiology	3	0	0	3	PCC	45
2.	U24BM211	Anatomy and Human Physiology laboratory	0	0	4	2	PCC	60
3.	U24BM301	Electronic Devices and Circuits	3	0	0	3	PCC	45
4.	U24BM302	Sensors and Measurements	3	0	0	3	PCC	45
5.	U24BM303	Electric Circuit Analysis	3	0	0	3	PCC	45
6.	U24BM304	Biosciences for Medical Engineering	3	0	2	4	PCC	75
7.	U24BM311	Electronic Devices and Circuits laboratory	0	0	4	2	PCC	60
8.	U24BM401	Biomedical Instrumentation	3	0	0	3	PCC	45
9.	U24BM402	Analog and Digital Integrated Circuits	3	0	0	3	PCC	45
10.	U24BM403	Biomaterials and Artificial Organs	3	0	0	3	PCC	45
11.	U24BM404	Bio Control Systems	3	0	0	3	PCC	45
12.	U24BM405	Biomedical Signal Processing	3	0	2	4	PCC	75
13.	U24BM411	Biomedical Instrumentation Lab	0	0	4	2	PCC	60
14.	U24BM412	Analog and Digital Integrated Circuits laboratory	0	0	4	2	PCC	60
15.	U24BM501	Medical Device Regulation	3	0	0	3	PCC	45
16.	U24BM502	Diagnostic and Therapeutic Equipment	3	0	0	3	PCC	45
17.	U24EC405	Microprocessor and Microcontroller	3	0	0	3	PCC	45
18.	U24BM503	Human Assist Devices	3	0	0	3	PCC	45
19.	U24BM504	Medical waste Management	3	0	0	3	PCC	45
20.	U24EC413	Microprocessor and Microcontroller Laboratory	0	0	4	2	PCC	60
21.	U24BM511	Diagnostic and Therapeutic Equipment Laboratory	0	0	4	2	PCC	60
22.	U24BM601	Medical Image Processing	3	0	0	3	PCC	45
23.	U24BM602	Fundamentals of Healthcare Analytics	3	0	0	3	PCC	45
24.	U24BM603	Embedded Systems and IoMT	3	0	0	3	PCC	45
25.	U24IT503	Artificial Intelligence and Machine Learning	3	0	2	4	PCC	75
26.	U24BM611	Medical Image Processing Laboratory	0	0	4	2	PCC	60
27.	U24BM612	Embedded Systems and IoMT Laboratory	0	0	4	2	PCC	60
28.	U24BM701	Medical Informatics	3	0	0	3	PCC	45
					TOTAL CREDITS	79		

PROFESSIONAL ELECTIVE COURSES (PEC) PROFESSIONAL ELECTIVE - I

S. No	Course Code	Course Title	L	T	P	C	CAT	Total Contact Periods
1.	U24BMP01	Biomechanics	3	0	0	3	PEC	45
2.	U24BMP02	Rehabilitation Engineering	3	0	0	3	PEC	45
3.	U24BMP03	Assistive Technology	3	0	0	3	PEC	45
4.	U24BMP04	Neural Engineering	3	0	0	3	PEC	45
5.	U24BMP05	Genetic Engineering	3	0	0	3	PEC	45

PROFESSIONAL ELECTIVE - II

S. No	Course Code	Course Title	L	T	P	C	CAT	Total Contact Periods
1.	U24BMP06	Medical Device Design	3	0	0	3	PEC	45
2.	U24BMP07	Patient Safety, Standards and Ethics	3	0	0	3	PEC	45
3.	U24BMP08	Hospital Planning and Management	3	0	0	3	PEC	45
4.	U24BMP09	Clinical Engineering	3	0	0	3	PEC	45
5.	U24BMP10	Forensic Science in Healthcare	3	0	0	3	PEC	45

PROFESSIONAL ELECTIVE - III

S. No	Course Code	Course Title	L	T	P	C	CAT	Total Contact Periods
1.	U24BMP11	Communication Systems	3	0	0	3	PEC	45
2.	U24BMP12	Wearable Devices	3	0	0	3	PEC	45
3.	U24BMP13	Body Area Networks	3	0	0	3	PEC	45
4.	U24BMP14	Virtual Reality and Augmented Reality in Healthcare	3	0	0	3	PEC	45
5.	U24BMP15	Telehealth Technology	3	0	0	3	PEC	45

PROFESSIONAL ELECTIVE - IV

S. No	Course Code	Course Title	L	T	P	C	CAT	Total Contact Periods
1.	U24BMP16	Bio MEMS	3	0	0	3	PEC	45
2.	U24BMP17	Critical Care Equipment	3	0	0	3	PEC	45
3.	U24BMP18	Advancements in Health care Technology	3	0	0	3	PEC	45
4.	U24BMP19	Robotics in Medicine	3	0	0	3	PEC	45
5.	U24BMP20	Pattern Recognition and Neural Networks	3	0	0	3	PEC	45

OPEN ELECTIVE COURSES (OEC) OPEN ELECTIVES - I

S. No.	Course Code	Course Title	L	T	P	C	CAT	Total Contact Periods
1.	U24GEO11	English for Competitive Examinations	3	0	0	3	OEC	45
2.	U24GEO12	Operations Research	3	0	0	3	OEC	45
3.	U24GEO13	Industrial waste water treatment	3	0	0	3	OEC	45
4.	U24GEO14	Air pollution and Control Engineering	3	0	0	3	OEC	45
5.	U24GEO15	Biodiversity and Conservation	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.	U24CEO13	Energy Efficient Buildings	3	0	0	3	OEC	45
9.	U24CEO14	Remote Sensing and GIS	3	0	0	3	OEC	45
10.	U24CEO15	Environmental Impact Assessment	3	0	0	3	OEC	45
11.	U24CEO16	Hazardous Waste Management	3	0	0	3	OEC	45
12.	U24BTO11	Genetics	3	0	0	3	OEC	45
13.	U24CSO13	Cyber Security	3	0	0	3	OEC	45
14.	U24ITO14	Block Chain Technology	3	0	0	3	OEC	45
15.	U24BMO17	IPR for Pharma Industry	3	0	0	3	OEC	45
16.	U24BMO18	Multivariate Data Analysis	3	0	0	3	OEC	45

OPEN ELECTIVES - II

S. No.	Course Code	Course Title	L	T	P	C	CAT	Total Contact Periods
1.	U24ECO11	Wireless Broad Band Networks	3	0	0	3	OEC	45
2.	U24ECO12	Resource Management Techniques	3	0	0	3	OEC	45
3.	U24ECO13	Reverse Engineering	3	0	0	3	OEC	45
4.	U24ECO14	Introduction to PLC Programming	3	0	0	3	OEC	45
5.	U24ECO15	Space Vehicles	3	0	0	3	OEC	45
6.	U24ECO16	Radar Technologies	3	0	0	3	OEC	45
7.	U24MEO11	Renewable Sources of Energy	3	0	0	3	OEC	45
8.	U24MEO12	Industrial Safety Engineering	3	0	0	3	OEC	45
9.	U24MEO13	3D Printing and Design	3	0	0	3	OEC	45
10.	U24MEO14	Robotics	3	0	0	3	OEC	45
11.	U24MEO15	Fire Safety Engineering	3	0	0	3	OEC	45
12.	U24MEO16	Maintenance Engineering	3	0	0	3	OEC	45
13.	U24MEO17	Refrigeration & Air Conditioning	3	0	0	3	OEC	45
14	U24MEO18	Energy Auditing and Management	3	0	0	3	OEC	45
15.	U24MEO19	Energy conservation in HVAC system	3	0	0	3	OEC	45

OPEN ELECTIVES – III

S. No	Course Code	Course Title	L	T	P	C	CAT	Total Contact Periods
1.	U24ADO11	Data Science Fundamentals	3	0	0	3	OEC	45
2.	U24ADO12	Natural Language Processing	3	0	0	3	OEC	45
3.	U24ITO11	Industrial Internet of Things	3	0	0	3	OEC	45
4.	U24ITO12	Full Stack Development	3	0	0	3	OEC	45
5.	U24ITO13	Agile Technology	3	0	0	3	OEC	45
6.	U24CSO11	Web Technology	3	0	0	3	OEC	45
7.	U24CSO12	Digital Marketing	3	0	0	3	OEC	45
8.	U24BTO12	General Microbiology	3	0	0	3	OEC	45
9.	U24BTO13	Poultry Science and Management	3	0	0	3	OEC	45
10.	U24BTO14	Food Science and Nutrition	3	0	0	3	OEC	45

11.	U24BTO15	Bio-energy Conversion Technologies	3	0	0	3	OEC	45
12.	U24BTO16	Medical informatics	3	0	0	3	OEC	45
13.	U24BMO11	Pharmaceutical Nanotechnology	3	0	0	3	OEC	45
14.	U24BMO12	Holistic Nutrition	3	0	0	3	OEC	45
15.	U24BMO13	Nutraceuticals	3	0	0	3	OEC	45
16.	U24BMO14	Biotechnology in Healthcare	3	0	0	3	OEC	45
17.	U24BMO15	Fundamentals of Cell and Molecular Biology	3	0	0	3	OEC	45
18.	U24BMO16	Introduction to food processing	3	0	0	3	OEC	45

MANDATORY COURSES (MC)

S. No.	Course Code	Course Title	L	T	P	C	CAT	Total Contact Periods
1	U24MC101	Induction Programme	-	-	-	-	MC	-
2	U24MC102	Indian Constitution	1	-	-	-	MC	15
3	U24MC103	Environmental Science & Sustainability	2	-	-	-	MC	30
4	U24MC105	Sports and Yoga	1	-	-	-	MC	15
5	U24MC106	Industrial Safety	1	-	-	-	MC	15

EMPLOYABILITY ENHANCEMENT COURSES (EEC)

S. No	Course Code	Course Title	L	T	P	C	CAT	Total Contact Periods
1	U24BM611	Mini project	0	0	2	1	EEC	15
2	U24BM711	Hospital Training	0	0	0	2	EEC	30
3	U24BM811	Project Work	0	0	20	10	EEC	300
					TOTAL CREDITS	13		

ELECTIVE – MANAGEMENT COURSES

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

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 eigen values and eigen vectors – 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 Sand 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	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

U24CY102	CHEMISTRY FOR ELECTRONIC MATERIALS	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 industry.
CO2	Recognize and applying basic knowledge on suitable corrosion technique.
CO3	Understand different forms of energy resources and apply them for suitable applications in energy sectors.
CO4	Apply the knowledge of polymers and composites for material selection requirements.
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	ELECTROCHEMISTRY AND CORROSION SCIENCE	9

Electrochemical cell, Redox reaction, Electrode potential - - Measurement and its applications , Nernst equation - Introduction to corrosion - Chemical and electrochemical corrosions - Mechanism of chemical and electrochemical corrosions - Concentration cell corrosion, Types of corrosion - Soil, Pitting, Inter-granular, Water line, Stress and microbiological corrosions - Passivity - Galvanic series - Factors influencing corrosion – Measurement of corrosion rate; Potentio dynamic polarization test only - Electrochemical protection - Sacrificial anodic protection and impressed current cathodic protection.

UNIT III	ENERGY STORAGE DEVICES	9

Performance characteristics of batteries, construction, reactions, characteristics of Zn-Carbon, lithium primary cells, Lead - acid battery and lithium-ion secondary batteries, Super capacitors - Fundamentals, electrode materials, electrolytes, pseudo capacitors, fuel cell-working principles of proton exchange membrane and direct methanol fuel cells, specialty batteries for satellites and torpedoes.

UNIT IV	POLYMER CHEMISTRY	9

Introduction: Functionality-Degree of polymerization. Classification of polymers (Source, Structure, Synthesis and Intermolecular forces), Mechanism of free radical addition polymerization, Properties of polymers: Tg, tacticity, molecular weight viscosity average and polydispersity index (Problems). Techniques of polymerization: Bulk, emulsion, solution and suspension. Some Important Polymers-PAN, PVC & Nylon 6 6, Bio degradable polymers.

UNIT V	E-WASTE AND ITS MANAGENMENT	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, 2 nd Edition, 2017.
2	Friedrich Emich, "Engineering Chemistry", Scientific International PVT, LTD, New Delhi, 2014.
3	ShikhaAgarwal, "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://onlinecourses.nptel.ac.in/noc23_cy19/preview
6	https://archive.nptel.ac.in/courses/105/105/105105169/

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	-	-	-	-	-	-	-	-
CO2	3	2	1	-	2	1	-	-	-	-	-	-	2	-	-
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

6	Social life of the Tamils- The Classical Period (Dr. S. Singaravelu) (Published by International Institute of Tamil Studies.
7	Historical Heritage of the Tamils (Dr.S.V.Subatamanian,Dr.K.D.
8	The Contributions of the Tamils to Indian Culture (Dr. M. Valarmathi) (Published by: Department of A RCHACOLOGY & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu.)
9	Keeladi – Sangam City Civization on the banks of river Vaigai"(Jointly Published by: Department of Archacology &Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10	Studies in the HISTORY OF India with Special Reference to Tamil Nadu (Dr.K.K.Pilay) (Published by:The Author)
11	Poruni Civlization (Jointly Published by: Department of Archalogy & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
12	Journey of Civilization Indus to Vaigai (R. Balakrishnan) (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		
	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

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

U24MA202	TRANSFORMS AND NUMERICAL METHODS	L	T	P	C
		3	1	0	4

COURSE OUTCOMES:

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

CO1	Understand the Fourier transforms techniques in solving engineering problems.
CO2	Apply Laplace transform techniques in solving linear differential equations.
CO3	Understand the Z–transforms techniques in solving difference equations.
CO4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.
CO5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.

UNIT I	FOURIER TRANSFORMS	9+3

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

UNIT II	LAPLACE TRANSFORMS	9+3

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 – Inverse Laplace Transform – Solving differential equations with constant coefficients.

UNIT III	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.

UNIT IV	INTERPOLATION, NUMERICAL DIFFERENTIATION AND INTEGRATION	9+3

Lagrange's and Newton's divided difference interpolations – Numerical Differentiation – Newton's forward and backward difference Interpolation – Numerical single and double integrations using Trapezoidal and Simpson's 1/3 rules.

UNIT V	NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS	9+3

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

TOTAL : 60 PERIODS

TEXT BOOKS:

1 Grewal B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 2017.

2	Grewal, B.S., and Grewal, J.S., "Numerical Methods in Engineering and Science", Khanna Publishers, New Delhi, 2015.

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	Burden, R.L and Faires, J.D, "Numerical Analysis", Cengage Learning, 2016.
4	Gerald. C.F. and Wheatley. P.O. "Applied Numerical Analysis" Pearson Education, Asia, New Delhi, 2007.
5	https://archive.nptel.ac.in/courses/111/106/111106046/
6	https://archive.nptel.ac.in/courses/111/107/111107105/

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	1	-	-	-	2	-	2	3	-	-	-
CO5	3	3	1	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

U24GE205	BASICS OF ELECTRICAL 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 :	Understand the construction details and working principle of DC machines
CO4 :	Interpret the working principle and applications of AC machines
CO5 :	Elucidate the principle and working of Special machines used in various applications

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- definitions-MMF, flux, reluctance, magnetic field intensity, flux density, fringing, self and mutual inductances-simple problems. 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	DC MACHINES	9

DC Generator: Construction, Working principle, Types and Applications of DC Generator - EMF and Torque equation. DC Motor: Construction, Working principle, Types and Applications of DC motors – Back EMF – Speed Torque Characteristics – Starting, Speed Control, Braking.

UNIT- IV	AC MACHINES	9

Transformer: Construction and Working principle of Transformer - EMF equation – Types – Transformation ratio – Applications. Construction and Working principle of Alternator, Three Phase and Single Phase Induction Motor – Speed Torque Characteristics - Starting, Speed Control, Braking.

UNIT- V	SPECIAL MACHINES	9

Stepper Motor: Types-Construction-Principle of operation-Characteristics- Control Circuits – Applications, Servo Motor: Servo Types – Servomechanism – Principle of Operation – Control Circuits – Applications, Brushless DC Motor.

TOTAL PERIODS : 45 HOURS

TEXT BOOKS:

1	Kothari DP and I.J Nagrath, "Basic Electrical and Electronics Engineering", First Edition, McGraw Hill Education, 2014.
2	S.K.Bhattacharya "Basic Electrical and Electronics Engineering", Pearson Education, First Edition, 2012.
3	James A .Svoboda, Richard C. Dorf, "Dorf's Introduction to Electric Circuits", Nineth Edition Wiley, 2014.
4	Vincent DelTORO "Electrical Engineering Fundamentals" Second Edition" Pearson Education PHI Learning Pvt.Limited, New Delhi 2012.
5	S B Lal Seksena & Kaustur Dasgupta "Fundamental of Electrical Engineering" Cambridge University Press, 2016.
REFERENCES:	
1	Kothari DP and I.J Nagrath, "Basic Electrical Engineering", Third Edition, McGraw Hill Education, 2010.
2	D.P.Kothari, I.J. Nagarath, 'Power System Engineering', Mc Graw-Hill Publishing Company limited, New Delhi, Second Edition, 2008.
3	Mahmood Nahvi and Joseph A. Edminister, "Electric Circuits", Schaum' Outline Series, McGraw Hill, Fifth Edition 2003.
4	Bent Sorensen "Renewable Energy" Fifth Edition "Academic Press Pvt. Limited, 2017.
5	R.K.Rajput "Electrical Engineering" Lakshmi Publications, New Delhi 2007.
6	https://archive.nptel.ac.in/courses/108/105/108105112/
7	https://nptel.ac.in/courses/108108076

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

U24BM201	ANATOMY AND HUMAN PHYSIOLOGY	L	T	P	C
		3	0	0	3

COURSE OUTCOMES:

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

CO1	Identify and explain basic elements of human body
CO2	Explain the functions of skeletal and muscular system
CO3	Describe the structure, function of cardiovascular system and respiratory system
CO4	Discuss the structure of digestive and excretory system.
CO5	Describe the physiological process of Nervous and sensory system

UNIT I	BASIC ELEMENTS OF HUMAN CELL AND TISSUE	9

Cell – Cell Structure and organelles - Functions of each component in the cell. Cell membrane – transport across membrane - Action potential (Nernst, Goldman equation), Homeostasis. Tissue:Types, functions.

UNIT II	SKELETAL AND MUSCULAR SYSTEM	9

Skeletal: Types of Bone and function – Physiology of Bone formation – Division of Skeleton -Types of joints and function – Types of cartilage and function. –Types of muscles – Structure and Properties of Skeletal Muscle- Changes during muscle contraction- Neuromuscular junction.

UNIT III	CARDIOVASCULAR AND RESPIRATORY SYSTEM	9

Cardiovascular System: Structure – Conduction System of heart – Cardiac Cycle – Cardiac output. Blood: Composition – Functions - Haemostasis – Blood groups and typing. Blood Vessels – Structure and types - Blood pressure - Respiratory system: Parts of respiratory system – Respiratory physiology -Lung volumes and capacities – Gaseous exchange.

UNIT IV	DIGESTIVE AND EXCRETORY SYSTEMS	9

Structure and functions of gastrointestinal system - secretory functions of the alimentary tract - digestion and absorption in the gastrointestinal tract - structure of nephron - mechanism of urine formation - skin and sweat gland - temperature regulation.

UNIT V	NERVOUS AND SENSORY SYSTEM	9

Structure and function of nervous tissue – Brain and spinal cord – Functions of CNS – Nerve conduction and synapse – Reflex action – Somatic and Autonomic Nervous system. Physiology of Vision, Hearing, Integumentary, Olfactory systems. Taste buds.

TOTAL : 45 PERIODS

TEXT BOOKS:	
1	Elaine.N. Marieb, "Essential of Human Anatomy and Physiology", Ninth Edition, PearsonEducation, New Delhi, 2018.
2	Gopal B. Saha "Physics and Radiobiology of Nuclear Medicine", Fourth edition Springer, 2013.(Unit 2,3,4).
REFERENCES:	
1	J Guyton & Hall, "Text book of Medical Physiology", 13th Edition, Saunders, 2015.
2	Ranganathan T S, "Text book of Human Anatomy", S.Chand & Co. Ltd., New Delhi, 2012.
3	SaradaSubramanyam, K MadhavanKutty, Singh H D, "Textbook of Human Physiology", S Chand and Company Ltd, New Delhi, 2012.
4	https://onlinecourses.nptel.ac.in/noc24_bt05/preview

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

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.

U24HS202	TAMILS AND TECHNOLOGY	L	T	P	C
		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 & 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	தமிழக வரலாறு மக்களும் பண் பாடும்- கக- கக -(பிள்ளள (வவளியீடு தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்.)
2	கணினித் தமிழ்- முளனவர் இல. சுந்தரம். (விகடன் பிரசுரம்)
3	கீழடி -ளவளக நதிக்களரயில் சங்க கால நகர நாகரிகம்(வதால்லியல் துளற வவளியீடு
4	"வபாருளந ஆற்றங்களர நாகரிகம் –(வதால்லியல் துளற வவளியீடு).
5	Social life of the Tamils-(Dr.K.K.Pilay) A Joint publication of TNTB&ESC and RMRL – (in print)
6	Social life of the Tamils- The Classical Period (Dr. S. Singaravelu) (Published by International Institute of Tamil Studies.

7	Historical Heritage of the Tamils (Dr.S.V.Subatamanian,Dr.K.D.
8	The Contributions of the Tamils to Indian Culture (Dr. M. Valarmathi) (Published by: Department of A RCHACOLOGY & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu.)
9	Keeladi – Sangam City Civization on the banks of river Vaigai"(Jointly Published by: Department of Archacology &Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10	Studies in the HISTORY OF India with Special Reference to Tamil Nadu (Dr.K.K.Pilay) (Published by:The Author)
11	Poruni Civlization (Jointly Published by: Department of Archalogy & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
12	Journey of Civilization Indus to Vaigai (R. Balakrishnan) (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

U24BM211	ANATOMY AND HUMAN PHYSIOLOGY LABORATORY	L	T	P	C
		0	0	4	2

COURSE OUTCOMES:

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

CO1	Identification and enumeration of blood cells.
CO2	Identification of blood groups.
CO3	Enumeration of hematological parameters.
CO4	Analysis of Hearing Test.
CO5	Analysis of Visual test.

LIST OF EXPERIMENTS

1. Collection of Blood Samples.
2. Identification of Blood groups (Forward and Reverse)
3. Bleeding and Clotting time.
4. Estimation of Hemoglobin.
5. Total RBC and WBC Count.
6. Differential count of Blood cells.
7. Estimation of ESR, PCV, MCH, MCV, MCHC
8. Hearing test – Tuning fork.
9. Visual Activity – Snellen's Chart and Jaeger's Chart.

TOTAL : 60 PERIODS

REFERENCES:

1	Elaine.N. Marieb, Lori A. Smith, "Human Anatomy & Physiology Laboratory Manual", 12th Edition, Pearson 2021.
2	Stuart Ira Fox, "Human Physiology: Laboratory Guide" 13th Edition, McGraw-Hill Inc.,US 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	2	2	-	2	1	-	1	-	-	-	1	1	-	-
CO2	3	2	2	-	2	1	-	1	-	-	-	1	1	-	-
CO3	3	2	2	-	2	1	-	1	-	-	-	1	1	-	-
CO4	3	2	3	-	2	1	-	1	-	-	-	1	1	-	-
CO5	3	2	3	-	2	1	-	1	-	-	-	1	1	-	-
Average	3	2	2	-	2	1	-	1	-	-	-	1	1	-	-

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