CMS COLLEGE OF ENGINEERING AND TECHNOLOGY
(AN AUTONOMOUS INSTITUTION)
(Affiliated to Anna University | Approved by AICTE |Accredited by NAAC – 'A' Grade)
Appachigoundenpathy, Kummittipathi (PO), Coimbatore – 641 032.

REGULATIONS 2026

Curriculum & Syllabus.

B.E. – Mechanical Engineering.

Applicable to the students admitted during the Academic year 2026 – 2027 onwards.

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DEPARTMENT OF MECHANICAL ENGINEERING

B.E- Mechanical Engineering

CHOICE BASED CREDIT SYSTEM (CBCS)

Regulations 2026

Curriculum & Syllabus

Chairman - Board of Studies
Department of Mechanical Engineering
CMS College of Engineering and Technology
(Autonomous)
Kumittipathi, Coimbatore- 641 032

INSTITUTION VISION:

A Centre of excellence, capable of empowering seekers of knowledge through holistic education.

INSTITUTION MISSION:

Create worthy citizens by providing holistic, qualitative, value based education and makes them creative members of global society.

DEPARTMENT OF MECHANICAL ENGINEERING

VISION:

To groom Motivated, Environmental friendly, Self-esteemed, Creative and Technology Oriented Mechanical Engineers.

MISSION:

- To impart quality education with strong fundamentals and emerging technologies to develop competent mechanical engineers.
- Foster experiential learning, industry collaboration, innovation, and entrepreneurship to enhance employability and professional excellence.
- To Promote research, sustainable engineering, and interdisciplinary solutions to address industrial and societal challenges.
- To inculcate ethical values, leadership qualities, teamwork, and a commitment to lifelong learning, enabling students to become globally competent and socially responsible engineering professionals

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UNDERGRADUATE AUTONOMOUS CURRICULUM

Programme: B.E. Mechanical Engineering **Regulations:2026**

Abbreviations:

BS – Basic Science
HUM–Humanities and Management
ES – Engineering Science
G –General
PC – Programme Core
PE – Programme Elective
OE – Open Elective
MC – Mandatory Course
SL –Self-Learning
SD – Skill Development
OC – Off Campus Courses
SBP- Societal Need Based Projects
SDL - Self-Directed Learning Course
T – Theory Course
L – Laboratory Course
LIT – Laboratory Integrated Theory
LITP – Laboratory Integrated Theory with Project Component
PW – Project Work
CDP – Capstone Design Project
TCP – Total Contact Period(s)

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO1: Graduates will build successful careers in mechanical and allied engineering by applying engineering knowledge to solve industrial and societal problems

PEO2: Graduates will work effectively with industry, academia, and society while demonstrating professionalism, ethical values, and a commitment to lifelong learning.

PEO3: Graduates will contribute to research, innovation, and entrepreneurship by developing engineering solutions for emerging challenges.

PEO4: Graduates will apply teamwork and technical knowledge to develop sustainable solutions for engineering, environmental, and societal needs.

PEO5: Graduates will demonstrate ethical leadership and professional excellence, making meaningful contributions to industry, academia, entrepreneurship, and society.

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PROGRAM OUTCOMES (POs)

1. **Engineering Knowledge**: Apply math, science, and engineering fundamentals to complex problems.
2. **Problem Analysis:** Identify and analyze complex problems using research and sustainability principles.
3. **Design Solutions:** Design systems and processes considering health, safety, cost, culture, and environment.
4. **Investigations:** Use experiments, modelling, and data analysis to reach valid conclusions.
5. **Engineering Tools:** Apply modern tools for modelling and problem-solving, recognizing their limits.
6. **Society & Environment:** Assess societal, legal, and environmental impacts of engineering solutions.
7. **Ethics:** Commit to ethics, human values, diversity, and legal compliance.
8. **Teamwork:** Work effectively as an individual and in multidisciplinary teams.
9. **Communication:** Communicate clearly in reports, presentations, and documentation across diverse groups.
10. **Management & Finance:** Apply management and economic principles in projects and teamwork.
11. **Lifelong Learning:** Engage in continuous learning, adapt to new technologies, and think critically.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1: Apply the knowledge gained in Mechanical Engineering for design and development and manufacture of engineering systems.

PSO2: Apply the knowledge acquired to investigate research-oriented problems in mechanical engineering with due consideration for environmental and social impacts.

PSO3: Use the engineering analysis and data management tools for effective management of multidisciplinary projects.

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B.E. MECHANICAL ENGINEERING

REGULATIONS 2026

CURRICULUM AND SYLLABUS

CHOICE BASED CREDIT SYSTEM (CBCS)

SEMESTER – I

S.No.	Course Code	Course Name	Course Type	L - T - P - J	TCP	Credits	Category
1		Induction Programme	-	-	-	-	MC
2	26UHM101	Classical Tamil Heritage - I	T	1 - 0 - 0 - 0	1	1	HUM
3	26UMA101	Matrices and Calculus	LIT	3 - 0 - 2 - 0	5	4	BS
4	26UPH101	Engineering Physics - I	LIT	2 - 0 - 2 - 0	4	3	BS
5	26UCY101	Engineering Chemistry	LIT	2 - 0 - 2 - 0	4	3	BS
6	26UCS101	Computer Programming : C	LIT	2 - 0 - 2 - 0	4	3	ES(G)
7	26UME101	Engineering Drawing	LIT	2 - 0 - 4 - 0	6	4	ES(G)
8	26UHM102	Functional English - I	LIT	1 - 0 - 2 - 0	3	2	HUM
9	26UME111	Engineering Practices Laboratory	L	0 - 0 - 4 - 0	4	2	ES(G)
10	26UHM103	Physical Education - I	-	0 - 0 - 2 - 0	2	1	HUM
					33	**23**	

SEMESTER – II

S.No.	Course Code	Course Name	Course Type	L - T - P - J	TCP	Credits	Category
1	26UPH201	Engineering Physics - II	T	3 - 0 - 0 - 0	3	3	BS
2	26UHM201	Classical Tamil Heritage - II	T	1 - 0 - 0 - 0	1	1	HUM
3	26UME201	Engineering Mechanics	T	3 - 1 - 0 - 0	4	4	ES(G)
4	26UMA201	Statistics and Numerical Methods	LIT	3 - 0 - 2 - 0	5	4	BS
5	26UME202	Manufacturing Processes	LIT	2 - 0 - 2 - 0	4	3	ES(PC)
6	26UHM202	Functional English - II	LIT	1 - 0 - 2 - 0	3	2	HUM
7	26UME211	Integrated Engineering Design Laboratory	L	0 - 0 - 4 - 0	4	2	ES(G)
8		Foreign Language	T	1 - 0 - 0 - 0	1	1	HUM
9	26UHM203	Physical Education - II	-	0 - 0 - 2 - 0	2	1	HUM
10		NCC / NSS / NSO / YRC / CLUBS	-	-	-	-	MC
					27	**21**	

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SEMESTER – III

S.No.	Course Code	Course Name	Course Type	L - T - P - J	TCP	Credits	Category
1	26UMA302	Transforms and Partial Differential Equations	T	3 - 1 - 0 - 0	4	4	BS
2	26UME301	Engineering Thermodynamics	T	3 - 1 - 0 - 0	4	4	ES(PC)
3	26UME302	Engineering Materials and Metallurgy	T	3 - 0 - 0 - 0	3	3	ES(PC)
4	26UME303	Strength of Materials for Mechanical Engineers	LIT	3 - 0 - 2 - 0	5	4	ES(PC)
5	26UME304	Manufacturing Technology	LIT	2 - 0 - 2 - 0	4	3	ES(PC)
6	26UEE305	Electrical and Electronic Systems	LIT	2- 0 - 2- 0	4	3	ES(G)
7	26UME311	Computer Aided Machine Drawing	L	0 - 0 - 4 - 0	4	2	ES(PC)
8	26UMES01	Skill Development Course - I	-	1 - 0 - 2 - 0	3	2	SD
					31	**25**	

SEMESTER – IV

S.No.	Course Code	Course Name	Course Type	L - T - P - J	TCP	Credits	Category
1	26UME401	Theory of Machines	T	3 - 1 - 0 - 0	4	4	ES(PC)
2	26UME402	Metrology and Measurements	T	3 - 0 - 0 - 0	3	3	ES(PC)
3	26UME403	Fluid Mechanics and Machinery	LIT	3 - 0 - 2 - 0	5	4	ES(PC)
4	26UME404	Mechatronics and IoT	LIT	2 - 0 - 2 - 0	4	3	ES(PC)
5	26UAD403	Data Science for Mechanical Engineers	LIT	2- 0 - 2 - 0	4	3	ES(PC)
6	26UME411	Metrology and Dynamics Laboratory	L	0 - 0 - 4 - 0	4	2	ES(PC)
7	26UMES02	Skills Development Course-II	LIT	1 - 0 - 2 - 0	3	2	SD
8	26UMES03	Societal Impact Based Project - Mini Project - I	-	-	-	1	SD
9	26UMX401	Disaster Risk Reduction and Management	T	2 - 0 - 0 - 0	2	-	MC
					29	**22**	

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SEMESTER – V

S.No.	Course Code	Course Name	Course Type	L - T - P - J	TCP	Credits	Category
1	26UME501	Design of Machine Elements	T	3 - 1 - 0 - 0	4	4	ES(PC)
2	-	Programme Elective - I	T	3 - 0 - 0 - 0	3	3	ES(PE)
3	-	Programme Elective - II	T	3 - 0 - 0 - 0	3	3	ES(PE)
4	-	Open Elective - I	T	3 - 0 - 0 - 0	3	3	OE
5	26UME502	Thermal Engineering	LIT	3 - 0 - 2 - 0	5	4	ES(PC)
6	26UME503	CAD/CAM	LIT	3 - 0 -2 - 0	5	4	ES(PC)
7	26UMES04	Skills Development Course - III	LIT	1 - 0 - 2 - 0	3	2	SD
8	26UMES05	Industry Oriented Course - I	-	-	-	1	SD
9	26UMES06	Internship-I	-	-	-	1	SD
10	26UMEL01	Self-Learning Course	-	-	-	1	SL
					26	**26**	

Note - Students Should Undergo Minimum 15days internship during summer.

SEMESTER – VI

S.No.	Course Code	Course Name	Course Type	L - T - P - J	TCP	Credits	Category
1	26UME601	Design of Transmission System	T	3 - 1 - 0 - 0	4	4	ES(PC)
2	-	Programme Elective - III	T	3 - 0 - 0 - 0	3	3	ES(PE)
3	-	Programme Elective - IV	T	3 - 0 - 0 - 0	3	3	ES(PE)
4	-	Open Elective - II	T	3 - 0 - 0 - 0	3	3	OE
5	26UME602	Heat and Mass Transfer	LIT	3 - 0 - 2 - 0	5	4	ES(PC)
6	26UCS602	Artificial Intelligence and Machine Learning Concepts	LIT	2 - 0 - 2 - 0	4	3	ES(PC)
7	26UMES07	Industry Oriented Course - II	-	-	-	1	SD
8	26UMES08	Mini Project - II	-	-	-	1	SD
					22	**22**	

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SEMESTER – VII

S.No.	Course Code	Course Name	Course Type	L - T - P - J	TCP	Credits	Category
1	26UME701	Industrial Engineering and Management	T	3 - 0 - 0- 0	3	3	ES(PC)
2	-	Programme Elective - V	T	3 - 0 - 0- 0	3	3	ES(PE)
3	-	Programme Elective - VI	T	3 - 0 - 0- 0	3	3	ES(PE)
4	26UHM701	Professional Ethics and Human Value	T	2 - 0 - 0- 0	2	2	HUM
5	26UME702	Finite Element Analysis	LIT	3 - 1 - 2 - 0	6	5	ES(PC)
6	26UMES09	Internship-II	-	-	-	1	SD
					17	**17**	

Note - Students Should Undergo Minimum 15days internship during summer.

SEMESTER – VIII

S.No.	Course Code	Course Name	Course Type	L - T - P - J	TCP	Credits	Category
1	26UMES10	Project Work	PW	0 - 0 - 0 - 16	**16**	**8**	SD

Total Credits: 164

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PROGRAMME ELECTIVE COURSES: VERTICALS

VERTICAL 1 **Modern Mobility Systems**	VERTICAL 2 **Product and Process Development**	VERTICAL 3 **Robotics and Automation**	VERTICAL 4 **Digital and Green Manufacturing**	VERTICAL 5 **Diversified Courses**	VERTICAL 6 **Computational Engineering**
26MEP101 Automotive Materials, Components, Design & Testing	**26MEP201** Value Engineering	**26MEP301** Sensors and Instrumentation	**26MEP401** Digital Manufacturing and IoT	**26MEP501** Automobile Engineering	**26MEP601** Product Design and Development
26MEP102 Renewable Powered Off-Highway Vehicles and Emission Control Technology	**26MEP202** Design for Manufacturing & Assembly (DFMA)	**26MEP302** Embedded Systems and Programming	**26MEP402** Lean Manufacturing	**26MEP502** Design Concepts in Engineering	**26MEP602** Smart Manufacturing
26MEP103 Vehicle Health Monitoring, Maintenance and Safety	**26MEP203** Additive Manufacturing	**26MEP303** Smart Mobility and Intelligent Vehicles	**26MEP403** Environment Sustainability and Impact Assessment	**26MEP503** Composite Materials	**26MEP603** Engineering Optimization Techniques
26MEP104 CAE and CFD Approach in Future Mobility	**26MEP204** Product Life Cycle Management (PLM)	**26MEP304** Fluid Power Systems and Industrial Automation	**26MEP404** Energy Saving Machinery and Components	**26MEP504** Power Plant Engineering	**26MEP604** Computational Manufacturing Systems
26MEP105 Hybrid and Electric Vehicle Technology	**26MEP205** Reverse Engineering	**26MEP305** Drone Technologies	**26MEP405** Industry 4.0 Technologies	**26MEP505** Refrigeration and Air Conditioning	**26MEP605** Engineering Data Analytics
26MEP106 Connected Vehicle Technologies	**26MEP206** Production Planning and Control	**26MEP306** Industrial Automation and PLC	**26MEP406** Sustainable Manufacturing Systems	**26MEP506** Industrial Safety	**26MEP606** Computational Tribology

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VERTICAL 1: MODERN MOBILITY SYSTEMS

S.No	Course Code	Course Name	Course Type	L– T–P –J	TCP	Credits	Category
1	26MEP101	Automotive Materials, Components, Design & Testing	T	3 - 0 - 0- 0	3	3	ES(PE)
2	26MEP102	Renewable Powered Off-Highway Vehicles and Emission Control Technology	T	3 - 0 - 0- 0	3	3	ES(PE)
3	26MEP103	Vehicle Health Monitoring, Maintenance and Safety	T	3 - 0 - 0- 0	3	3	ES(PE)
4	26MEP104	CAE and CFD Approach in Future Mobility	T	3 - 0 - 0- 0	3	3	ES(PE)
5	26MEP105	Hybrid and Electric Vehicle Technology	T	3 - 0 - 0- 0	3	3	ES(PE)
6	26MEP106	Connected Vehicle Technologies	T	3 - 0 - 0- 0	3	3	ES(PE)

VERTICAL 2: PRODUCT AND PROCESS DEVELOPMENT

S.No	Course Code	Course Name	Course Type	L– T–P –J	TCP	Credits	Category
1	26MEP201	Value Engineering	T	3 - 0 - 0- 0	3	3	ES(PE)
2	26MEP202	Design for Manufacturing & Assembly	T	3 - 0 - 0- 0	3	3	ES(PE)
3	26MEP203	Additive Manufacturing	T	3 - 0 - 0- 0	3	3	ES(PE)
4	26MEP204	Product Life Cycle Management	T	3 - 0 - 0- 0	3	3	ES(PE)
5	26MEP205	Reverse Engineering	T	3 - 0 - 0- 0	3	3	ES(PE)
6	26MEP206	Production Planning and Control	T	3 - 0 - 0- 0	3	3	ES(PE)

VERTICAL 3: ROBOTICS AND AUTOMATION

S.No	Course Code	Course Name	Course Type	L– T–P –J	TCP	Credits	Category
1	26MEP301	Sensors and Instrumentation	T	3 - 0 - 0- 0	3	3	ES(PE)
2	26MEP302	Embedded Systems and Programming	T	3 - 0 - 0- 0	3	3	ES(PE)
3	26MEP303	Smart Mobility and Intelligent Vehicles	T	3 - 0 - 0- 0	3	3	ES(PE)
4	26MEP304	Fluid Power Systems and Industrial Automation	T	3 - 0 - 0- 0	3	3	ES(PE)
5	26MEP305	Drone Technologies	T	3 - 0 - 0- 0	3	3	ES(PE)
6	26MEP306	Industrial Automation and PLC	T	3 - 0 - 0- 0	3	3	ES(PE)

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VERTICAL 4: DIGITAL AND GREEN MANUFACTURING

S.No	Course Code	Course Name	Course Type	L– T–P –J	TCP	Credits	Category
1	26MEP401	Digital Manufacturing and IoT	T	3 - 0 - 0- 0	3	3	ES(PE)
2	26MEP402	Lean Manufacturing	T	3 - 0 - 0- 0	3	3	ES(PE)
3	26MEP403	Environment Sustainability and Impact Assessment	T	3 - 0 - 0- 0	3	3	ES(PE)
4	26MEP404	Energy Saving Machinery and Components	T	3 - 0 - 0- 0	3	3	ES(PE)
5	26MEP405	Industry 4.0 Technologies	T	3 - 0 - 0- 0	3	3	ES(PE)
6	26MEP406	Sustainable Manufacturing Systems	T	3 - 0 - 0- 0	3	3	ES(PE)

VERTICAL 5: DIVERSIFIED COURSES

S.No	Course Code	Course Name	Course Type	L– T–P –J	TCP	Credits	Category
1	26MEP501	Automobile Engineering	T	3 - 0 - 0- 0	3	3	ES(PE)
2	26MEP502	Design Concepts in Engineering	T	3 - 0 - 0- 0	3	3	ES(PE)
3	26MEP503	Composite Materials	T	3 - 0 - 0- 0	3	3	ES(PE)
4	26MEP504	Power Plant Engineering	T	3 - 0 - 0- 0	3	3	ES(PE)
5	26MEP505	Refrigeration and Air Conditioning	T	3 - 0 - 0- 0	3	3	ES(PE)
6	26MEP506	Industrial Safety	T	3 - 0 - 0- 0	3	3	ES(PE)

VERTICAL 6: COMPUTATIONAL ENGINEERING

S.No	Course Code	Course Name	Course Type	L– T–P –J	TCP	Credits	Category
1	26MEP601	Product Design and Development	T	3 - 0 - 0- 0	3	3	ES(PE)
2	26MEP602	Smart Manufacturing	T	3 - 0 - 0- 0	3	3	ES(PE)
3	26MEP603	Engineering Optimization Techniques	T	3 - 0 - 0- 0	3	3	ES(PE)
4	26MEP604	Computational Manufacturing Systems	T	3 - 0 - 0- 0	3	3	ES(PE)
5	26MEP605	Engineering Data Analytics	T	3 - 0 - 0- 0	3	3	ES(PE)
6	26MEP606	Computational Tribology	T	3 - 0 - 0- 0	3	3	ES(PE)

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CATEGORY WISE OPEN ELECTIVE SELECTIONS

(In addition to all the verticals of other programmes)

OPEN ELECTIVE-I

S.No	Course Code	Course Name	Course Type	L– T–P –J	Credits	TCP	Category
1	26HMO101	Project Report Writing	T	3 - 0 - 0- 0	3	3	OE
2	26ADO101	AI For Everyone	T	3 - 0 - 0- 0	3	3	OE
3	26CSO102	Cloud Computing	T	3 - 0 - 0- 0	3	3	OE
4	26CBO102	Mobile and Digital Forensics	T	3 - 0 - 0- 0	3	3	OE
5	26ITO101	Web Technology Essentials	T	3 - 0 - 0- 0	3	3	OE
6	26EEO101	Energy Management and Auditing	T	3 - 0 - 0- 0	3	3	OE

OPEN ELECTIVE-II

S.No	Course Code	Course Name	Course Type	L– T–P –J	Credits	TCP	Category
1	26HMO201	Human Resource Management	T	3 - 0 - 0- 0	3	3	OE
2	26ALO201	AI in Healthcare	T	3 - 0 - 0- 0	3	3	OE
3	26ITO201	Fundamentals of Digital Marketing	T	3 - 0 - 0- 0	3	3	OE
4	26CSO203	Social Engineering and Cyber Awareness	T	3 - 0 - 0- 0	3	3	OE
5	26CSO204	Augmented Reality and Virtual Reality	T	3 - 0 - 0- 0	3	3	OE
6	26EEO204	Industrial Electrical Systems	T	3 - 0 - 0- 0	3	3	OE

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26UHM101	CLASSICAL TAMIL HERITAGE - I	T	L	T	P	J
			1	0	0	0

Course Objectives:

1	Understand the evolution, ethical values, and management principles found in classical and modern Tamil literature.
2	Appreciate the rich heritage of Tamil art, sculptures, temple architecture, and musical instruments.
3	Explore traditional Tamil folk arts, martial arts, and sports.
4	Examine the socio-economic life, global trade, and ecological 'Thinai' concept of ancient Tamils.
5	Recognize the vital contributions of Tamils to the Indian freedom struggle, social reforms, and indigenous knowledge systems.

Syllabus:

LANGUAGE AND LITERATURE	**3 Hours**
Language and Literature: Language Families in India, Dravidian Languages, Tamil as a Classical Language - Classical Literature in Tamil – Secular Nature of Sangam Literature, Distributive Justice in Sangam Literature, Management Principles in Thirukural, Tamil Epics and Impact of Buddhism & Jainism in Tamil Land, Bakthi Literature Azhwars and Nayanmars - Forms of minor Poetry - Development of Modern literature in Tamil, Contribution of Bharathiyar and Bharathidhasan.	
HERITAGE - ROCK ART PAINTINGS TO MODERN ART – SCULPTURE	**3 Hours**
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.	
FOLK AND MARTIAL ARTS	**3 Hours**
Folk and Martial Arts: Therukoothu, Karagattam, Villu Pattu, Kaniyan Koothu, Oyillattam, Leather puppetry, Silambattam, Valari, Tiger dance - Sports and Games of Tamils.	
THINAI CONCEPT OF TAMILS	**3 Hours**
Thinai Concept of Tamils : Flora and Fauna of Tamils & Aham and Puram Concept from Tholkappiyam and Sangam Literature, Aram Concept of Tamils, Education and Literacy during Sangam Age - Ancient Cities and Ports of Sangam Age, Export and Import during Sangam Age - Overseas Conquest of Cholas.	
CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE	**3 Hours**
Contribution of Tamils to Indian National Movement and Indian Culture: 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 Lecture Periods: 15 Hours	

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Text Books:	
1	Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. hirunavukkarasu) (Published by: International Institute of Tamil Studies).
2	The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)

References:	
1	Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – in print.
2	Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
3	Keeladi - 'Sangam City C ivilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu).
4	Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Publishedby: The Author).
5	Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu).
E-Resources:	
1	www.tamilvu.org
2	www.tnarch.gov.in
3	www.indianculture.gov.in
4	www.tamilheritage.org
5	www.tnarchives.tn.gov.in

Course Outcomes: Upon successful completion of the course, students will be able to	
CO No.	**Course Outcomes**
1	Describe the historical significance of the Tamil language and apply the ethical and management principles found in classical Tamil literature to modern contexts.
2	Identify and evaluate various forms of Tamil heritage, including the evolution of sculptures, traditional handicrafts, and the socio-economic role of temples.
3	Recognize and distinguish between the various folk arts, martial arts, and traditional games native to the Tamil land.
4	Analyze the 'Thinai' concept to understand the relationship between ancient Tamils and their environment, and summarize the educational and economic prosperity of the Sangam age.
5	Assess the cultural and historical contributions of Tamil Nadu to the broader Indian freedom struggle, social reform movements, and indigenous knowledge systems.

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CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
1	-	-	-	-	-	1	3	-	2	2	1	-	-	1
2	-	-	-	-	-	2	1	-	-	-	1	-	-	-
3	-	-	-	-	-	1	-	2	-	-	1	-	-	-
4	-	-	-	-	-	3	1	-	-	1	1	-	-	-
5	-	-	-	-	-	2	2	-	1	-	1	-	-	1
Avg	-	-	-	-	-	1.8	1.75	2.0	1.5	1.5	1.0	-	-	1.0

"3"- High, "2"- Medium, "1"- Low,"-" No Correlation

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26UMA101	MATRICES AND CALCULUS	LIT	L	T	P	J	C
			3	0	2	0	4

Course Objectives:

1	To develop the use of matrix algebra techniques that are needed by engineers for practical applications.
2	To familiarize the students with differential calculus.
3	To familiarize the student with functions of several variables. This is needed in many branches of engineering.
4	To make the students understand various techniques of integration.
5	To acquaint the student with mathematical tools needed in evaluating multiple integrals and their applications.

Syllabus:

MATRICES — **15 Hours**

Eigenvalues and Eigenvectors of a real matrix – Characteristic equation–Properties of Eigenvalues and Eigenvectors – Cayley - Hamilton theorem – Diagonalization of matrices by orthogonal transformation – Reduction of a quadratic form to canonical form by orthogonal transformation – Nature of quadratic Forms.

Activities: Problems on Eigenvalues, Cayley–Hamilton theorem, Matrix Diagonalization and Quadratic forms. Quiz: Objective -Type test.

Practicals:

1. Matrix Operations - Addition, Multiplication, Transpose, Inverse.
2. Eigenvalues and Eigenvectors of a real matrix.

DIFFERENTIAL CALCULUS — **15 Hours**

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

Activities: Problems on Limits, Differentiation Techniques and Applications of Derivatives. Quiz: Objective -Type test.

Practicals:

1. Solving Derivative Problems Using Differentiation Rules.
2. Determining Maxima and Minima of a function of one variable.

FUNCTIONS OF SEVERAL VARIABLES — **15 Hours**

Partial differentiation – Homogeneous functions and Euler's theorem–Total derivative – Change of Variables – Partial differentiation of implicit functions –Applications: Maxima and minima of functions of two variables and Lagrange's method of undetermined multipliers.

Activities:

Problems on Techniques of Integration and Evaluation of Definite Integrals. Quiz: Objective - Type test.

Practicals:

1. Solving Problems Using Partial Differentiation
2. Determining Maxima and Minima of a function of two variables.

INTEGRAL CALCULUS — **15 Hours**

Definite and Indefinite integrals - Substitution rule - Techniques of Integration: Integration by parts, Integration of rational functions by partial fraction, Integration of irrational functions.

Activities: Problems on Double Integrals, Triple Integrals and Applications to Area and

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Volume. Quiz: Objective -Type test. **Practicals:** 1. Evaluation of definite Integrals. 2. Evaluation of Indefinite Integrals.	
MULTIPLE INTEGRALS	**15 Hours**
Double integrals – Change of order of integration – Double integrals in polar coordinates – Area enclosed by plane curves –Triple integrals – Volume of solids (cylinder, sphere). **Activities:** Problems on Partial Differentiation, Euler's Theorem and Constrained Optimization. Quiz: Objective -Type test. **Practicals:** 1. Area as double integral. 2. Volume as a triple integral.	
Total Lecture Periods: 45 Hours **Total Practical Periods: 30 Hours**	

Text Books:	
1	Kreyszig, E., *Advanced Engineering Mathematics*, 10th Edition (SI Units), John Wiley & Sons, 2019.
2	Grewal, B. S., *Higher Engineering Mathematics*, 46th Edition, Khanna Publishers, New Delhi, 2023.
3	Stewart, J., *Calculus: Early Transcendentals*, 9th Edition, Cengage Learning, 2020. *(For Units II & IV: Sections 1.1, 2.2, 2.3, 2.5, 2.7 (Tangents only), 2.8, 3.1–3.6, 3.11, 4.1, 4.3, 5.1 (Area only), 5.2–5.5, 7.1–7.4,and 7.8.)*
References:	
1	Anton, H., Bivens, I., & Davis, S., *Calculus*, 11th Edition, Wiley, 2019.
2	Jain, R. K., & Iyengar, S. R. K., *Advanced Engineering Mathematics*, 6th Edition, Narosa Publishing House, 2019.
3	Thomas, G. B., Hass, J., Heil, C., & Weir, M. D., *Thomas' Calculus*, 15th Edition, Pearson, 2024.
4	Ramana, B. V., *Higher Engineering Mathematics*, McGraw Hill Education, 2023.
5	Bali, N. P., Goyal, M., & Watkins, C., *Advanced Engineering Mathematics*, 7th Edition, Firewall Media, 2009.
E-Resources:	
1	https://www.scribd.com/document/605383865/Unit-1-Matrices
2	https://www.khanacademy.org/math/calculus-1
3	https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_ma130
4	https://tutorial.math.lamar.edu/Classes/CalcII/CalcII.aspx
5	https://www.geogebra.org/3d

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

CO No.	Course Outcome
1	Use the matrix algebra methods for solving practical problems.
2	Apply differential calculus tools in solving various application problems.
3	Able to use differential calculus ideas on several variable functions.

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4	Apply different methods of integration in solving practical problems.
5	Apply multiple integral ideas in solving areas, volumes and other practical problems.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
1	3	3	1	1	-	-	-	-	2	-	2	2	2	-
2	3	3	1	1	-	-	-	-	2	-	2	2	2	-
3	3	3	1	1	-	-	-	-	2	-	2	2	2	-
4	3	3	1	1	-	-	-	-	2	-	2	2	2	-
5	3	3	1	1	-	-	-	-	2	-	2	2	2	-
Avg	3	3	1	1	-	-	-	-	2	-	2	2	2	-

"3" – High, "2" – Medium, "1" – Low, "-" No Correlation.

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26UPH101	ENGINEERING PHYSICS - I	LIT	L	T	P	J	C
			2	0	2	0	3

Course Objectives: –

1	Analyze the elastic behavior of materials and the principles of fluid dynamics and thermal expansion.
2	Understand the mechanisms of oscillations and the propagation of electromagnetic waves.
3	Develop a conceptual framework for quantum mechanics and its technological applications.
4	Explore the principles of optics and photonics, specifically focusing on lasers and fiber optic communication.
5	Examine the structural properties of materials, crystal systems, and the role of defects in material science.

Syllabus:

PROPERTIES OF MATTER — **12 Hours**

Elasticity – Stress-strain diagram and its uses- bending of beams- bending moment of a beam- Cantilever (theory and experiment)-Young's modulus -uniform bending method (theory and experiment) – I-shaped girders – Viscosity –Stokes method – Surface tension – drop weight method– thermal expansion– thermal stress.

Activities: Virtual demonstration of thermal stress.

Practicals:

1. Torsional pendulum - Determination of rigidity modulus of wire and moment of inertia of regular and irregular objects.
2. Non-uniform bending - Determination of Young's modulus.

OSCILLATION AND WAVES — **12 Hours**

Oscillations: Basic Definition-Simple Harmonic motion – Representation of Displacement, velocity and acceleration in SHM-Derivation of time period and frequency for a spring-mass system, Energy in SHM. Damping and resonance in SHM Waves: Waves on a stretched string– Wave equation -standing waves – Ultrasonic waves and generation of ultrasonic waves – Maxwell's equation – Propagation of EM waves in free space.

Activities: Virtual demonstration of propagation of EM waves.

Practicals:

1. Simple harmonic oscillations of cantilever.
2. Determination of thermal conductivity of a bad conductor – Lee's Disc method.

QUANTUM MECHANICS — **12 Hours**

Black body radiation –- Photoelectric effect – de Broglie hypothesis – Heisenberg Uncertainty Principle Schrödinger's wave equation (Time dependent and time independent) – particle in an infinite potential well: 1D Boxes – Barrier penetration and quantum tunneling – scanning tunneling microscope.

Activities: Virtual demonstration of Scanning Transmission Electron Microscope.

Practicals:

1. Compact disc- Determination of width of the grove using laser.
2. Ultrasonic interferometer-determination of the velocity of sound and compressibility of liquids.

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APPLIED OPTICS & LASERS	12 Hours
Introduction to Optics –Lenses and mirrors- image formation- determination of thickness of a thin film by air wedge method, micheloson's interferometer – applications. Adaptive optics– Fiber optics: Structure of a Fiber, Fiber Optic Communication System, Displacement, pressure and Temperature sensor, Spontaneous and stimulated emission– Einstein Co-efficient, Nd: YAG laser, 2 laser (construction, working and applications). **Activities**: Demonstration of sensors and Applications of Lasers. **Practicals:** 1. Laser- Determination of the wavelength of the laser using grating. **2.** Air wedge - Determination of thickness of a thin sheet/wire.	
SOLID STATE PHYSICS	**12 Hours**
Single crystalline, polycrystalline and amorphous materials – single crystals: unit cell, crystal systems, Bravais lattices, directions and planes in a crystal, Miller indices – inter-planar distances - coordination number and packing factor for SC, BCC, FCC, HCP and diamond structures –growth techniques: growth of single crystals- solution and melt crystals. **Activities**: Virtual demonstration of crystal structures. **Practicals:** **1.** Melde's experiment. **2.** Post office box – Determination of bandgap of a semiconductor.	
Total Lecture Periods: 30 Hours **Total Practical Periods: 30 Hours**	

Text Books:	
1	Bhattacharya, D.K. & Poonam, T. "Engineering Physics". Oxford University Press, 2015.
2	Pandey, B.K. &Chaturvedi, S. "Engineering Physics". Cengage Learning India, 2012.
References:	
1	Halliday, D., Resnick, R. & Walker, J. "Principles of Physics". Wiley, 2015.
2	Gaur, R. K., & Gupta, S. L. (2022). Engineering physics. Dhanpat Rai Publication.
3	Mathur, D. S. (2010). Elements of properties of matter. S. Chand Publishing.
4	Griffiths, D. J. (2018). Introduction to quantum mechanics. Cambridge UniversityPress.
5	Silfvast, W. T. (2008). Laser fundamentals. Cambridge University Press.
E-Resources:	
1	https://archive.nptel.ac.in/courses/115/104/115104096/
2	https://onlinecourses.nptel.ac.in/noc24_ee31/preview
3	https://onlinecourses.nptel.ac.in/noc25_ph03/preview
4	https://www.youtube.com/watch?v=WZQ8lvxdzDk
5	https://auece.digimat.in/nptel/courses/video/108106173/L02.html

Course Outcomes: Upon successful completion of the course, students will be able to	
CO No.	**Course Outcome**
1	Evaluate the mechanical properties of materials and solve engineering problems related to stress, strain, bending moments, and thermal stress.

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2	Analyze oscillatory motion and wave propagation, including electromagnetic wave characteristics and the generation of ultrasonic waves.
3	Apply the Schrödinger wave equation to solve problems involving particle confinement, barrier penetration, and quantum tunneling.
4	Demonstrate an understanding of interference phenomena, fiber optic communication systems, and the operating principles of various laser systems.
5	Identify crystal structures using Miller indices, calculate packing factors, and analyze the impact of lattice imperfections on material properties.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
1	3	3	1	1	-	-	-	-	2	-	2	-	2	-
2	3	3	1	1	-	-	-	-	2	-	2	-	3	-
3	3	3	1	1	-	-	-	-	2	-	2	-	1	-
4	3	3	1	1	-	-	-	-	2	-	2	-	3	-
5	3	3	1	1	-	-	-	-	2	-	2	-	-	-
Avg	3	3	1	1	-	-	-	-	2	-	2	-	2.25	-

"3"-High,"2" -Medium,"1"- Low Correlation,"-" No Correlation

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26UCY101	ENGINEERING CHEMISTRY	LIT	L	T	P	J	C
			2	0	2	0	3

Course Objectives:

1	To inculcate sound understanding of water quality parameters and water treatment techniques.
2	To impart knowledge on the basic principles and preparatory methods of nanomaterials.
3	To impart practical applications of chemistry in commonly used engineering devices.
4	To familiarize the students with the sources, working processes and applications of energy conversion.
5	To inculcate the students with the operating principles, working processes and applications of energy storage devices.

Syllabus:

WATER TECHNOLOGY — **12 Hours**

Water: Sources and impurities, Water quality parameters, Municipal water treatment - Break Point Chlorination, Desalination of brackish water: Forward and Reverse Osmosis. Boiler troubles: Scale and sludge, Boiler corrosion, Caustic embrittlement, Priming & foaming, Treatment of boiler feed water - Internal treatment: phosphate, colloidal, sodium aluminate and calgon conditioning. External treatment: Ion-exchange, demineralization and zeolite process.

Activity: Coagulation of water sample using Alum.

Practical:

1. Analysis of alkalinity, hardness and dissolved oxygen.

NANOCHEMISTRY — **12 Hours**

Basics: Distinction between molecules, nanomaterials and bulk materials, Quantum Confinement, Preparation of nanomaterials: Top-down and Bottom-up approach. Size-dependent properties - optical, electrical, mechanical and magnetic. Types of nanomaterials - Definition, properties and uses of nanoparticle, nanocluster, nanorod, nanowire and nanotube. Applications of nanomaterials.

Activity: Flipped Class room.

Practical:

1. Preparation of nanoparticles by Sol-Gel method.

ELECTROCHEMISTRY — **12 Hours**

Basic Principles - Nernst equation, electrochemical series, and cell potential. Electrochemical cell - Reference Electrodes: Calomel electrode and glass electrode (pH measurement). Electrode potential - redox reaction. Conductivity of electrolytes - Factors affecting conductivity.

Activity: Electrochemical cell demonstration.

Practical:

1. Conductometric titrations.

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ENERGY RESOURCES	**12 Hours**
Sources of Energy, Nuclear fission - controlled nuclear fission, differences between nuclear fission and fusion - nuclear chain reactions. Nuclear energy: light water nuclear reactor – components, working, advantages and disadvantages. Energy Conversion: solar, wind and geothermal energy. **Activity:** Energy Auditing & Grid Mapping. **Practical:** 1. Charge and Discharge Characteristics.	
BATTERIES	**12 Hours**
Conventional, Contemporary and Emerging battery storage technologies. Primary Batteries: Dry Cell, Secondary Batteries: Lead-Acid and Li-Ion. Battery Management System: Battery Pack, Battery Materials, Performance Parameters, Testing, Safety aspects. **Activity:** Demonstration of battery pack in e-vehicles. **Practical:** 1. Measurement of EMF, Internal Resistance.	
Total Lecture Periods: 30 Hours **Total Practical Periods: 30 Hours**	

Text Books:	
1	Jain, P. C., & Jain, M. (2015). *Engineering Chemistry*. Dhanpat Rai Publishing Company (P) Ltd.
2	Dara, S. S. (2004). *A Textbook of Engineering Chemistry*. Chand Publications.
References:	
1	B. S. Murty, P. Shankar, Baldev Raj, B. B. Rath and James Murday, "Text book of nanoscience and nanotechnology", Universities Press-IIM Series in Metallurgy and Materials Science, 2018.
2	O.G. Palanna, "Engineering Chemistry" McGraw Hill Education (India) Private Limited, 2nd Edition, 2017.
3	Friedrich Emich, "Engineering Chemistry", Scientific International PVT, LTD, New Delhi, 2014.
4	ShikhaAgarwal, "Engineering Chemistry-Fundamentals and Applications", Cambridge University Press, Delhi, Second Edition, 2019.
5	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.
E-Resources:	
1	https://nptel.ac.in/courses/105106202.
2	https://nptel.ac.in/courses/113106028.
3	https://batteryuniversity.com/articles –
4	https://phet.colorado.edu/en/simulations/nuclear-fission
5	https://nptel.ac.in/courses/115106130

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Course Outcomes: Upon successful completion of the course, students will be able to	
CO No.	**Course Outcome**
1	Infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water.
2	Identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications.
3	Apply the knowledge of electricity and chemical changes for material selection requirements.
4	Examine suitable energy resources for engineering processes and applications.
5	Analyze different forms of energy resources and apply them for suitable applications in energy sectors.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
1	3	2	1	2	-	3	-	-	-	-	1	1	-	-
2	3	1	2	1	-	1	-	-	-	-	2	-	2	-
3	3	2	1	2	-	1	-	-	-	-	1	-	2	-
4	3	2	1	-	-	3	-	-	-	-	2	-	2	-
5	3	3	2	-	-	3	-	-	-	-	2	-	2	-
Avg	3	2	1.4	1.7	-	2.2	-	-	-	-	1.6	1	2	-

"3"- High, "2" - Medium, "1" - Low Correlation, "-" No Correlation

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26UCS101	COMPUTER PROGRAMMING: C	LIT	L	T	P	J	C
			2	0	2	0	3

Course Objectives:

1	To equip students with a strong foundation in C programming by introducing the core concepts of the C language
2	To develop C Programs using basic programming constructs
3	To develop students' ability to organize, manipulate, and process data efficiently using arrays and strings
4	To develop modular applications in C using functions
5	To provide students with the knowledge and skills to develop C applications using structures, pointers, and file handling techniques to perform efficient input/output operations

Syllabus:

INTRODUCTION TO C — **12 Hours**

Overview of C: History of C, Importance of C, Basic Structure of C Programs, Programming Style, Compiling and Executing a 'C' Program. Constants, Variables and Data Types: Character Set, C Tokens, Keywords and Identifiers, Constants, Variables, Data Types, Declaration of Variables, Assigning Values to Variables, Defining Symbolic Constants, declaring a Variables as Constants and Volatile, Input/output Statements in C.

Activity: Quiz / Crossword Puzzle on Constants, Variables, and Data Types

Practical: Create Problem Analysis Charts, Flowcharts and Pseudocode for simple C programs

OPERATORS, CONTROL FLOW & LOOPING IN C PROGRAMMING — **12 Hours**

Operators, Control flow and Looping: Introduction to Operators, Arithmetic Operators, Relational Operators, Logical Operators, Assignment Operators, Increment and Decrement Operators, Conditional Operators. Decision Making, Branching, Looping: Introduction, Decision Making with IF Statement, Simple IF Statement, The IF, ELSE Statement, Nesting of IF..ELSE Statements, The ELSE IF Ladder, The Switch Statement, The ?: Operator, The GOTO Statement, WHILE, DO, FOR, Jumps in LOOPS.

Activity: Problem-Based Learning: Applying Decision-Making and Looping to Design a Simple Calculator and Student Record System

Practical: Usage of conditional logics in programs.

ARRAYS AND STRINGS IN C PROGRAMMING — **12 Hours**

Arrays and Strings: Introduction, Declaration and Initialization of One-dimensional and Two-Dimensional Arrays, Declaring and Initializing String Variables, Example programs using arrays, Reading Strings from Terminal, Writing Strings to Screen, Arithmetic Operations on Characters, Comparison of Two Strings, String-handling Functions.

Activity: Gamified Learning: Applying Array Concepts Through an Interactive Bingo Activity

Practical: Usage of functions ,string manipulations, array operations in programs.

USER-DEFINED FUNCTIONS IN C PROGRAMMING — **12 Hours**

User-defined Functions: Introduction, need for User-defined Functions, A Multi-Functional Program, Elements of User-defined Functions, Definition of Function, Return Values and their Types, Function Calls, Function Declaration, No Arguments and no Return Values, Arguments but no Return Values, Nesting of Functions.

Activity: Think–Pair–Share: Designing a Library Management System and Bank Management System Using User-defined Functions

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Practical: Usage of functions in programs. string manipulations, array operations.	
STRUCTURES, POINTERS & FILE HANDLING IN C PROGRAMMING	**12 Hours**
Structures, Pointers and File Handling**:** Introduction, defining a Structure, Declaring and Accessing Structure Variables and Members, Structure Initialization, Copying and Comparing Structure Variables, Structures vs Unions. Pointers: Introduction, Understanding Pointers, Accessing the Address of Variable, declaring pointer variables, initialization of pointers, accessing variables through its pointer. File Handling and Command-Line Arguments - File I/O Functions: fopen(), fclose(), fread(), fwrite(), fprintf(), fscanf(), Text Files and Binary Files, Command-line Arguments. **Activity:** Code Debugging Challenge: Identifying and Resolving Errors in Structures, Pointers, and File Handling **Practical:** Programs using structures, pointers and files.	
Total Lecture Periods: 30 Hours **Total Laboratory Periods: 30 Hours**	

Text Books:	
1	Balagurusamy, E. (2024). Programming in ANSI C (9th ed.). McGraw Hill Education India
2	Thareja, R. (2023). Programming in C (3rd ed.). Oxford University Press.
References:	
1	Forouzan, B. A., & Gilberg, R. F. (2022). Computer science: A structured programming approach in C (4th ed.). Cengage Learning.
2	Kernighan, B. W., & Ritchie, D. M. (2015). The C programming language (2nd ed.). Prentice Hall of India.
E- resources:	
1	Learn-C.org - https://www.learn-c.org/
2	GeeksforGeeks - C Programming - https://www.geeksforgeeks.org/c-programminglanguage/
3	https://onlinecourses.swayam2.ac.in/e-learning/preview/imb25_mg71

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

CO No.	Course Outcomes
1	Develop and execute simple C programs by applying the fundamental concepts of C programming
2	Apply decision-making and iterative control structures to solve simplereal world computational problems.
3	Develop programs using arrays and string operations to solve real-world problems.
4	Construct user-defined functions to modularize the solution to the given problems.
5	Build programs using structures and pointers for complex data representation and access.

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CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PSO 1	PSO 2	PSO 3
1	3	2	1	1	1	-	-	-	-	-	-	2	1	-
2	3	3	2	1	1	-	-	-	-	-	-	3	1	-
3	2	3	2	2	1	-	-	-	-	-	-	3	2	-
4	2	2	3	1	3	-	-	-	-	-	-	2	3	-
5	2	3	3	2	3	-	-	-	-	-	-	3	3	-
Avg	2.4	2.6	2.2	1.4	1.8	-	-	-	-	-	-	2.6	2	-

"3" -High, "2" -Medium, "1" – Low, "-" – No Correlation

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26UME101	ENGINEERING DRAWING	LIT	L	T	P	J	C
			2	0	4	0	4

Course Objectives:

1	To understand the basics of engineering drawing standards, lettering, dimensioning, and geometric constructions
2	To develop skills in drawing and interpreting conic sections, freehand sketches, and engineering curves
3	To learn the principles of orthographic projection of points, lines, planes, and solids
4	To understand projection of solids, development of surfaces, and isometric drawing techniques
5	To develop CAD skills for creating 2D and 3D engineering drawings and models.

Syllabus:

FUNDAMENTALS — **18 Hours**

Drawing instruments, drawing standards (BIS), Lettering in engineering, Sheet layout, elements of dimensioning, Systems of dimensioning. Free hand sketching of 2D & 3D objects, Conics – Ellipse, Parabola and Hyperbola.

Activities: Virtual Demonstration of Conics and Cycloids.

Practicals:

1. Study of Drawing Instruments, BIS Standards, Lettering and Dimensioning.
2. Freehand Sketching of 2D and 3D Engineering Objects.
3. Construction of Engineering Curves – Ellipse, Parabola and Hyperbola using standard methods.

ORTHOGRAPHIC PROJECTION — **18 Hours**

First angle projection, Projection of points, straight lines and planes

Activities: 3D Object to Orthographic Drawing Activity **Practicals:**

1. Draw the front view and top view of points located in different quadrants.
2. Draw the projections of a straight line inclined to one or both principal planes (HP and VP), and determine its true length and true inclinations.
3. Draw the orthographic projections (front view, top view, and side view where required) of solids such as a prism, pyramid, cylinder, cone, or cube placed in different orientations (e.g., resting on HP, inclined to HP or VP).

PROJECTION OF SOLIDS — **18 Hours**

Practicals:

1. **Projection of Solids in Simple Positions**
   Draw the orthographic projections of **prisms, pyramids, and cubes** when their axes are perpendicular or parallel to the principal planes (HP and VP).
2. **Projection of Solids in Simple Positions**
   Draw the orthographic projections of **cylinders and cones** when their axes are perpendicular or parallel to the principal planes (HP and VP).

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3. **Projection of Solids in Inclined Positions**
   Draw the orthographic projections of **prisms, pyramids, cylinders, and cones** with their axes inclined to one principal plane and parallel to the other, using the change-of-position method.

SECTIONING AND DEVELOPMENT OF SOLIDS	**18 Hours**

Section of Solids, Development of Surfaces.
Activities: Conversion of 3D into 2D orthographic views, CAD modelling of 3D objects.
Practicals:

1. **Sectioning of Solids**
   Draw the sectional views and determine the true shape of the section for **prisms and pyramids** cut by section planes in different orientations.
2. **Sectioning of Solids**
   Draw the sectional views and determine the true shape of the section for **cylinders and cones** cut by section planes in different orientations.
3. **Development of Surfaces of Solids**
   Draw the development (unfolded surface) of **prisms, pyramids, cylinders, and cones,** including truncated solids obtained after sectioning.

PICTORIAL PROJECTIONS	**18 Hours**

Isometric Projection of solids, Perspective projection of simple solids **Activities:**
Virtual demonstration of perspective views.
Practicals:

1. **Isometric Projection and Isometric View**
   Draw the isometric projection and isometric view of **simple engineering objects** using the isometric scale where applicable.
2. **Isometric Projection and Isometric View**
   Draw the isometric projection and isometric view of **combinations of basic solids** using the isometric scale where applicable.
3. **Conversion Between Orthographic and Pictorial Views**
   Construct the isometric view of an object from its given orthographic projections (front, top, and side views), and prepare orthographic views from a given isometric drawing.

Total Periods: 90 Hours

Text Books:	
1	Natarajan, K. V. (2025). A Text Book of Engineering Graphics. Dhanalakshmi Publisher.
2	Ramesh Babu, V., Engineering Graphics, VRB Publishers Pvt. Ltd., Chennai, 2022–23 Edition.
References:	
1	Venugopal, K., & Prabhu Raja, V. (2022). Engineering Drawing + AutoCAD. New Age International Publishers.
2	Dhananjay A. Jolhe, Engineering Drawing with an Introduction to AutoCAD, Tata McGraw-Hill Education, New Delhi.

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3	Basant Agarwal and Agarwal C.M., "Engineering Drawing", McGraw Hill, 2nd Edition, 2019
4	Gopalakrishna K.R., "Engineering Drawing" (Vol. I&II combined), Subhas Publications, Bangalore, 27th Edition, 2017

5	Parthasarathy N. S. and Vela Murali, "Engineering Graphics", Oxford University, Press, New Delhi, 2015.
E- resources:	
1	https://www.wileyindia.com/engineering-graphics-and-design-as-per-aicte.html
2	https://www.iitg.ac.in/kpmech/ME111-2016/ORTHOGRAPHIC%20PROJECTIONS-1%20(2016).pdf
3	https://methodist.edu.in/web/uploads/files/projectionsofsolid.pdf

Course Outcomes: Upon successful completion of the course, students will be able to	
CO No.	**Course Outcomes**
1	Explain the advantages of engineering drawing in engineering applications
2	Apply the concepts of projections in formulating various solid parts in engineering systems.
3	Analyse the various view and interpret the engineering drawings
4	Use CAD tools for creation of various models.
5	Critically think and develop innovative models.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
1	3	1	1	1	1	-	-	-	-	-	-	2	1	-
2	3	2	2	1	1	-	-	-	-	-	-	3	1	-
3	2	3	2	2	1	-	-	-	-	-	-	3	2	-
4	2	2	3	1	3	-	-	-	-	-	-	2	3	-
5	2	2	3	2	3	-	-	-	-	-	-	3	3	-
Avg	2.4	2	2.2	1.4	1.8	-	-	-	-	-	-	2.6	2	-

"3" -High, "2" -Medium, "1" – Low, "-" – No Correlation

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26UHM102	FUNCTIONAL ENGLISH I	LIT	L	T	P	J	C
			1	0	2	0	2

Course Objectives:

1	To refine functional grammatical competence for constructing error-free, precise, and structurally sound professional communications.
2	To expand functional and technical vocabulary metrics tailored for engineering environments.
3	To develop specialized writing skills including structural documentation, interactive correspondence, and graphical data transcoding.
4	To cultivate advanced writing skills for drafting clear process documentation, digital correspondence, and interactive professional artifacts.
5	To equip learners with the linguistic capabilities to transcode complex non-verbal graphical data arrays cleanly into fluent written prose.

Syllabus:

FOUNDATIONS OF TECHNICAL COMMUNICATION — **9 Hours**

Parts of Speech (Functional application); Definite and Indefinite Articles; Subject-Verb Agreement (Concord rules and exceptions). Synonyms and Antonyms (Contextual engineering definitions); Acronyms and Abbreviations (Industrial and technical frameworks). Reading Comprehension (Skimming, scanning, inferential analysis of technical articles).

Activities: Diagnostic grammar drills, technical article skimming/scanning exercises, and contextual vocabulary building activities.

Practicals:

1. Improve vocabulary through contextual word usage.
2. Analyze technical texts for meaning and coherence

ANALYTICAL LISTENING AND INTERACTIVE CORRESPONDENCE — **9 Hours**

Framing Questions (Wh- Questions, Yes/No Questions, and Question Tags). Parsing professional engineering podcasts, tech-panel event narrations, and corporate audio tracks. Delivering experiential presentations; sharing technical insights from personal projects; mastering vocal clarity and articulation.

Activities: Audio tracking analysis, simulated question-and-answer sessions, and short individual presentations on project backgrounds.

Practicals:

1. Conduct pair-work interviews using different question forms.
2. Present a technical topic and answer questions professionally**.**

BUSINESS WRITING — **9 Hours**

Tense Matrix (Present, Past, and Future timelines in technical contexts); Reported Speech (Direct to Indirect discourse conversions for meeting logs). Idioms and Phrases (Professional expressions); Phrasal Verbs common to workplace communication. Paragraph Writing (Descriptive, narrative, and argumentative structures); The Art of Paraphrasing (Avoiding plagiarism in technical abstracts).

Activities: Drafting technical abstracts, transforming direct meeting notes into narrative reports,

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and paragraph structure workshops.

Practicals:

1. Use idioms and phrases in professional communication.
2. Paraphrase technical texts to avoid plagiarism.

WORKPLACE COMMUNICATION	**9 Hours**

Active and Passive Voice (With specific emphasis on the Impersonal Passive Voice for scientific reporting). Homophones and Homonyms (Eliminating lexical ambiguity in documentation). Informal Letter Writing (Interpersonal professional networks); Digital Correspondence (Formal email writing mechanics, subject lines, and professional etiquette). Writing clear, imperative Instructions; Formulating professional Recommendations; Technical Process and Product Descriptions.

Activities: Drafting professional email templates, creating step-by-step user instruction sheets for lab tools, and writing passive-voice process descriptions.

Practicals:

1. Technical Writing - Describe the working of a technical process.
2. Editing and Proofreading- Prepare technical documentation for products and processes.

TECHNICAL WRITING	**9 Hours**

Sentence Typology (Analysis and construction of Simple, Compound, and Complex sentences). Advanced One-Word Substitutions for technical concepts and operational profiles. Transcoding / Information Transfer (translating visual data matrices, tables, pie charts, and bar graphs into fluent prose); Drafting professional Checklists (Safety protocols and pre-operation compliance logs). Formulating tactical "Small Talk" within corporate hubs and networking events

Activities: Chart-to-prose technical analysis exercises, safety checklist design, and corporate elevator pitch simulations.

Practicals:

1. Sentence Construction- Practice networking conversations with peers.
2. Small Talk and Professional Communication - Simulate workplace written conversations for professional information exchange

Total Lecture Periods: 15 Hours

Total Laboratory Periods: 30 Hours

Text Books:	
1	Miller, K. Q., & Wahl, S. T. (2023). Business and Professional Communication: KEYS for Workplace Excellence (5th ed.). SAGE Publications.
2	Kumar, Sanjay & Pushpalatha. (2018). English Language and Communication Skills for Engineers, India: Oxford University Press.
References:	
1	Sharma, S., & Mishra, B. (2024). Communication Skills for Engineers and Scientists (2nd ed.). PHI Learning.
2	Raman, Meenakshi & Sharma, Sangeeta. (2016). Technical Communication – Principles and Practices. New Delhi: Oxford University Press.
3	Rizvi, A. M. (2018). *Effective Technical Communication* (2nd ed.). McGraw Hill Education.

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4	Tyagi, K., & Misra, P. (2011). *Advanced Technical Communication*. PHI Learning.
5	Guffey, M. E., & Loewy, D. (2022). *Essentials of Business Communication* (12th ed.). Cengage Learning.
E – Resources:	
1	https://www.youtube.com/watch?v=jAb4AuW4A_4
2	https://www.youtube.com/watch?v=1GT9IyTVPvw
3	https://youtu.be/RuYACsWJcF4?si=8A3_qghCFukXq0ai
4	https://www.youtube.com/watch?v=6JkhX6YP9hc
5	https://youtu.be/ztFlTZMV_TY?si=qh56EX-fN2wrgbLj

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

CO No.	Course Outcome
1	Apply precise grammar parameters (tenses, concord, sentence structures) to eliminate ambiguity in communication.
2	Author high-impact technical paragraphs, accurate paraphrases, and maintain professional email/letter correspondence.
3	Construct standard checklists, step-by-step process instructions, strategic recommendations, and detailed product descriptions.
4	Transcode complex non-verbal graphical data arrays cleanly into precise, analytical written English.
5	Extract quantitative metrics from advanced technical audio tracks and pitch engineering prototypes with professional verbal fluency.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PSO1	PSO2	PSO3
1	1	1	-	-	-	-	-	-	3	-	-	1	2	-
2	1	2	-	-	-	-	-	-	3	-	-	1	2	-
3	1	2	-	-	-	-	-	-	3	-	-	1	2	-
4	1	2	-	-	-	-	-	-	3	-	-	1	2	-
5	1	2	-	-	-	-	-	-	3	-	-	1	2	-
Avg	1	1.8	-	-	-	-	-	-	3	-	-	1	2	-

"3" - High, "2" - Medium, "1" – Low, "-" – No Correlation

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26UME111	ENGINEERING PRACTICES LABORATORY	LIT	L	T	P	J	C
			0	0	4	0	2

Course Objectives:

1	To understand basic tools and safety used in engineering workshops.
2	To learn dis-assembly and assembly of common mechanical systems like appliances and bicycle.
3	To understand welding processes and perform basic welding operations safely.
4	To gain basic skills in electrical wiring, electronics and simple circuit work.
5	To learn modern manufacturing techniques like CAD Software

Syllabus:

DIS-ASSEMBLY & ASSEMBLY PRACTICES — **12 Hours**

1. Study of Tools and its handling techniques.
2. Home appliances – Grinder, Mixer Grinder, Ceiling Fan, Table Fan &Washing Machine.
3. Air-Conditioners & Refrigerators.
4. Bicycle

WELDING PRACTICES — **12 Hours**

1. Study of Welding Procedure, Selection & Safety Measures.
2. Power source of Arc Welding – Gas Metal Arc Welding & Gas Tungsten Arc Welding processes.
3. Hands-on session of preparing base material & Joint groove for welding.
4. Hands-on session of MAW, GMAW, GTAW on Carbon Steel & Stainless Steel plates/ pipes for fabrication of a simple part.

ELECTRICAL WIRING PRACTICES — **12 Hours**

1. Study of Electrical Installation tools, equipment & safety measures.
2. Hands-on session of basic electrical connections for Fuses, Miniature Circuit Breakers and Distribution Box.
3. Hands-on session of electrical connections for Lightings, Fans, Calling Bells.
4. Hands-on session of electrical connections for Motors & Uninterruptible Power Supply Electrical Wiring Practices

ELECTRONICS COMPONENTS / EQUIPMENT PRACTICES — **12 Hours**

1. Study of Electronic components, equipment & safety measures.
2. Dis-assembly and assembly of Computers.
3. Hands-on session of Soldering Practices in a Printed Circuit Board.
4. Hands-on session of Bridge Rectifier, Op-Amp and Transimpedance amplifier.
5. Hands-on session of integration of sensors and actuators with a Microcontroller.
6. Demonstration of Programmable Logic Control Circuit.

CONTEMPORARY SYSTEMS — **12 Hours**

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1. Study of solid modelling software and basic CAD interface. 2. Demonstration of Solid Modelling of components. 3. Demonstration of Assembly Modelling of components.
Total Periods: 60 Hours

References:	
1	Stephen Christena, Learn to Weld: Beginning MIG Welding and Metal Fabrication Basics, Crestline Books, 2014.line Books, 2014.
2	Code of Practice for Electrical Wiring Installations (IS 732:2019)

Course Outcomes: Upon successful completion of the course, students will be able to	
CO No.	**Course Outcomes**
1	Explain the basic tools, equipment and safetypractices used in engineering workshops.
2	Applyskills in dis-assemblyand assembly of mechanical systems such as home appliances and bicycles.
3	Perform basic welding operations and understand different welding processes safely.
4	Applybasic knowledge of electrical wiring and electronic circuits in simple practical applications.
5	Use modern manufacturing techniques such as CAD for basic design and modelling.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
1	3													-
2	2	2	3	2	1	-	-	-	-	-	-	3	1	-
3	2	2	3	2	1	-	-	-	-	-	-	3	1	-
4	2	2	3	2	3	-	-	-	-	-	-	2	2	-
5	2	2	3	2	3	-	-	-	-	-	-	1	3	-
Avg	2.2	1.8	2.6	1.8	1.8	-	-	-	-	-	-	2.4	1.6	-

"3" -High, "2" -Medium, "1" – Low, "-" – No Correlation

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26UHM103	PHYSICAL EDUCATION - I	L	T	P	J	C
		0	0	2	0	1

Course Objectives:

1	To impart the fundamentals of physical education for development of students' physical, mental, and social well-being.
2	To instill a lifelong appreciation for physical activity towards the development of positive attitude and fostering values of team work and sportsmanship.

Syllabus:

INTRODUCTION TO PHYSICAL EDUCATION	**7 Hours**
Introduction to physical education: Exercise for Good Posture – Conditioning and Calisthenics for Before start, Jogging, Bending, Twisting, Standing, Sitting and Relaxation, Training on First Aid Practices.	
PARTICIPATION OF ATHLETIC EVENTS	**7 Hours**
Rules and regulations of important athletic events, Sprint, Jumps, Throws and Hurdles.	
SKILL DEVELOPMENT IN ANY ONE OF THE FOLLOWING OUTDOOR GAMES	**8 Hours**
Basket Ball, Volley Ball, Ball Badminton, Football, Hockey, Kho-Kho, Kabaddi, Cricket, Hand ball and Tennis.	
SKILL DEVELOPMENT IN ANY ONE OF THE FOLLOWING INDOOR GAMES	**8 Hours**
Shuttle Badminton, Chess and Table Tennis.	
Total Periods: 30 Hours	

References:

1	Singh, A. (2008). Essentials of physical education. Kalyani Publishers.
2	Kamlesh, M. L. (2006). Psychology in physical education and sport (3rd ed.). Metropolitan Book Co. 3. Mangal, S. K. (2009). Psychology of sports performance. Sports Publication
3	Mangal, S. K. (2009). Psychology of sports performance. Sports Publication

E-Resource:

1	https://www.who.int/health-topics/physical-activity

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

CO No.	Course Outcome
1	Understand the importance of physical activity for mental and physical health.
2	Apply basic principles of exercise science in the routine life.
3	Develop teamwork, discipline, and leadership through sports and group activities and collaborate effectively.
4	Demonstrate independent learning in health, nutrition, and fitness-related topics.

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CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
1	1	-	-	-	-	-	-	-	-	-	-	-	-	-
2	3	-	-	-	-	-	-	-	-	-	-	1	-	-
3	-	-	-	-	-	-	-	3	-	-	-	-	-	2
4	-	-	-	-	-	-	-	-	-	-	2	-	-	2
Avg	2	-	-	-	-	-	-	3	-	-	2	1	-	2

"3"- High, "2" - Medium, "1" - Low Correlation, "-" No Correlation

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26UPH201	ENGINEERING PHYSICS - II	T	L	T	P	J	C
			3	0	0	0	3

Course Objectives: –

1	To understand how different magnetic materials work and how they are used to store data in computers.
2	To learn the physics behind semiconductors, how charge carriers move, and how basic electronic components function.
3	Know the concept of thermodynamic equilibrium of a system and the corresponding thermodynamic variables and the relations between them.
4	To explore the world of nanotechnology, understanding how materials behave at the nanoscale and how Nano-devices operate.
5	To grasp the fundamentals of quantum computing, including qubits, quantum gates, and how they differ from classical computers.

Syllabus:

MAGNETIC MATERIALS — **9 Hours**

Magnetic dipole moment – atomic magnetic moments- magnetic permeability and susceptibility – Magnetic material classification: diamagnetism – Para magnetism – ferromagnetism– Domain Theory of Ferromagnetism– Domain Theory of M versus H behaviour –Hysteresis loops- Hard and soft magnetic materials – examples and uses –Magnetic hard disc (GMR sensor). Superconductivity: Properties, types of superconductors (Type I and Type II)- Applications of superconductors.

Activities: Determination of Hysteresis loop for ferromagnetic materials.

ELECTRICAL PROPERTIES OF MATERIALS — **9 Hours**

Classical free electron theory - Expression for electrical conductivity – Thermal conductivity, expression - Wiedemann-Franz law – Success and failures - electrons in metals – degenerate states – Fermi- Dirac statistics – Density of energy states – Electron in periodic potential – Energy bands in solids – tight binding approximation - Electron effective mass – concept of hole.

Activities: Virtual demonstration of Lee Disc's Method.

SEMICONDUCTOR PHYSICS — **9 Hours**

Intrinsic and extrinsic Semiconductors – Energy band diagram – direct and indirect band gap semiconductors– Carrier concentration in intrinsic semiconductors – extrinsic semiconductors – Carrier concentration in N-type & P-type semiconductors – Variation of carrier concentration with temperature – variation of Fermi level with temperature and impurity concentration – Hall effect –Ohmic contacts – Schottky diode.

Activities: Virtual demonstration of Hall effect.

NANO-DEVICES — **9 Hours**

Nanomaterials synthesis Bottom-up and Top-down approach - Precipitation methods -sol gel technique-Nano technology applications-quantum confinement – quantum structures: quantum wells, wires and dots – band gap of nanomaterials. Tunneling- Coulomb blockade - single electron transistor - resonant-tunneling diode- Carbon nanotubes: Properties and applications.

Activities: Virtual demonstration of single electron transistor.

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QUANTUM COMPUTING	9 Hours
Quantum system for information processing - quantum states –classical bits – quantum bits or qubits – Bloch sphere -CNOT gate – Single and multiple qubits – quantum gates _(Pauli – X, Y and Z Gates, Hadamard Gate, Phase gate - T gate, CNOT Gate) – advantage of quantum computing over classical computing. **Activities:** Virtual demonstration of quantum computing.	
Total Lecture Periods: 45 Hours	

Text Books:	
1	Bhattacharya, D.K. & Poonam, T. "Engineering Physics". Oxford University Press, 2015.
2	Pandey, B.K. &Chaturvedi, S. "Engineering Physics". Cengage Learning India, 2012.
References:	
1	Kasap, S. O. (2007). Principles of electronic materials and devices. McGraw-Hill Education.
2	Bernhardt, C. (2019). Quantum computing for everyone. MIT Press.
3	Hanson, G. W. (2009). Fundamentals of Nano electronics. Pearson Education.
E-Resources :	
1	https://youtu.be/MTT729LtB-o?si=RGaEhGgmyWJWcZib
2	https://lab.quantumflytrap.comPage 40 of 54
3	http://vlabs.iitkgp.ac.in/tcad
4	http://www.digimat.in/nptel/courses/video/106106232/L01.html
5	https://www.youtube.com/watch?v=B3U1NDUiwSA

Course Outcome: Upon successful completion of the course, students will be able to	
CO No.	**Course Outcome**
1	Explain the different types of magnetic materials (like dia, para, and ferro) and describe how they are used in modern computer hard drives.
2	Differentiate between intrinsic and extrinsic semiconductors, and analyze how temperature affects their conductivity and Fermi levels.
3	Understand the concept of thermodynamic equilibrium, the thermodynamic variables of a system, and the relationships among these variables.
4	Understand the concept of quantum confinement in nanomaterials (wells, wires, and dots)and explain the working principles of single-electron and tunneling devices.
5	Describe the concept of a qubit using the Bloch sphere and demonstrate how quantum gates manipulate information differently than classical bits.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
1	3	2	1	2	-	-	-	-	-	-	-	2	2	-
2	3	3	2	2	1	-	-	-	-	-	-	2	3	1
3	3	3	3	1	2	-	-	-	-	-	-	1	1	3
4	3	2	2	3	2	-	1	-	-	-	-	3	3	-
5	3	3	2	2	3	-	-	-	-	-	-	3	-	2
Avg	3.0	2.6	2.0	2.0	2.0	-	1.0	-	-	-	-	2.2	2.25	2.0

"3" - High, "2" - Medium, "1"- Low, "-" No Correlation

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26UHM201	CLASSICAL TAMIL HERITAGE - II	T	L	T	P	J
			1	0	0	0

Course Objectives:

1	To understand the sophisticated weaving mechanisms, ceramic technologies, and socio-cultural expressions through material graffiti during the Sangam Age.
2	To analyze structural design frameworks, theatrical staging, and architectural evolution across the Sangam, Pallava, Chola, Nayaka, and British colonial periods.
3	To explore ancient manufacturing, metallurgical systems, numismatics, and precision bead-making technologies validated by archaeological evidence.
4	To evaluate irrigation infrastructure, agro-processing methods, and the deep oceanographic and maritime insights possessed by ancient Tamil societies.
5	To investigate the development of Scientific Tamil, digital localization tools, language repositories, and computational frameworks driving modern Tamil computing.

Syllabus:

WEAVING AND CERAMIC TECHNOLOGY	**3 Hours**
Weaving and Ceramic Technology: Weaving Industry during Sangam Age, Ceramic technology, Black and Red Ware Potteries (BRW), Graffiti on Potteries.	
DESIGN AND CONSTRUCTION TECHNOLOGY	**3 Hours**
Design and Construction Technology: Designing and Structural construction House & Designs in household materials during Sangam Age, Building materials and Hero stones of Sangam age, Details of Stage Constructions in Silappathikaram, Sculptures and Temples of Mamallapuram, Great Temples of Cholas and other worship places - Temples of Nayaka Period -Type study (Madurai Meenakshi Temple), Thirumalai Nayakar Mahal -Chetti Nadu Houses, Indo-Saracenic architecture at Madras during British Period	
MANUFACTURING TECHNOLOGY	**3 Hours**
Manufacturing Technology: Art of Ship Building - Metallurgical studies, Iron industry, Iron smelting, steel -Copper and gold- Coins as source of history - Minting of Coins, Beads making-industries Stonebeads, Glass beads, Terracotta beads -Shell beads/ bone beats, Archeological evidences - Gem stone types described in Silappathikaram.	
AGRICULTURE AND IRRIGATION TECHNOLOGY:	**3 Hours**
Agriculture and Irrigation Technology: Dam, Tank, ponds, Sluice, Significance of Kumizhi Thoompuof Chola Period, Animal Husbandry - Wells designed for cattle use - Agriculture and Agro Processing - Knowledge of Sea, Fisheries, Pearl, Conche diving - Ancient Knwledge of Ocean -Knowledge Specific Society.	
SCIENTIFIC TAMIL & TAMIL COMPUTING	**3 Hours**
Scientific Tamil & Tamil Computing: Development of Scientific Tamil, Tamil computing, Digitalization of Tamil Books, Development of Tamil Software, Tamil Virtual Academy, Tamil Digital Library, Online Tamil Dictionaries, Sorkuvai Project.	
Total Lecture Periods: 15 Hours	

Text Books:

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

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2	Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
References:	
1	Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies
2	The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
3	Keeladi - 'Sangam City civilization on the banks of river Vaigai' (Jointly Published by: Department ofArchaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
4	Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Publishedby: The Author)
5	Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Bookand Educational Services Corporation, Tamil Nadu)
E-Resources:	
1	www.tnarch.gov.in
2	www.sahapedia.org
3	www.tamilheritage.org
4	www.tamilvu.org
5	www.sorkuvai.tn.gov.in

Course Outcomes: Upon successful completion of the course, students will be able to	
CO	**Course Outcome**
1	Analyze material artifacts, ceramic types, and decorative practices of the Sangam Age to reconstruct ancient production workflows.
2	Deconstruct the structural design principles, spatial layout, and theatrical engineering parameters of architectural monuments and traditional dwellings.
3	Evaluate ancient metallurgical methods, coin minting techniques, and fine bead-making processes through scientific and archaeological viewpoints.
4	Appraise hydro-engineering configurations, marine navigation insights, and resource extraction methodologies optimized by historical Tamil communities.
5	Apply computer science paradigms to localized software design, linguistic parsing, and structural data archiving within digital Tamil infrastructure.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
1	-	1	-	-	-	2	-	-	-	-	-	-	-	-
2	-	-	2	-	-	2	-	-	-	-	-	-	-	-
3	-	-	-	2	-	1	-	-	-	-	-	-	-	-
4	-	-	2	-	-	3	1	-	-	-	-	-	-	-
5	-	-	-	-	3	-	-	-	-	-	2	3	3	-
Avg	-	1.0	2.0	2.0	3.0	2.0	1.0	-	-	-	2.0	3.0	3.0	-

"3"- High, "2"- Medium, "1"- Low,"-" No Correlation

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26UME201	ENGINEERING MECHANICS	LIT	L	T	P	J	C
			3	1	0	0	4

Course Objectives:

1	To learn analysis of static objects, force, moment and equilibrium concepts.
2	To learn equilibrium of rigid bodies such as frames, trusses and beams.
3	To identify properties of surfaces and solids using various theorems.
4	To learn concepts of dynamics of particles.
5	To acquire concepts of frictional forces and rigid body dynamics.

Syllabus:

BASICS AND STATICS OF PARTICLES	**12 Hours**
Introduction, units and dimensions, laws of mechanics, transmissibility, Lame's theorem, parallelogram and triangular law of forces, vectors, vector operations, coplanar forces, equilibrium of particles, forces in space, equivalent systems of forces.	
EQUILIBRIUM OF RIGID BODIES	**12 Hours**
Free body diagrams, supports and reactions, stable equilibrium, static determinacy, moments and couples, Varignon's theorem, equilibrium of rigid bodies in two dimensions.	
PROPERTIES OF SURFACES AND SOLIDS	**12 Hours**
Areas and volumes, centroid, moment of inertia, parallel and perpendicular axis theorems, polar moment of inertia, mass moment of inertia.	
DYNAMICS OF PARTICLES	**12 Hours**
Displacements, Velocity and acceleration, their relationship – Relative motion – Curvilinear motion –Newton's law – Work Energy Equation of particles – Impulse and Momentum – Impact of elastic bodies.	
FRICTION AND ELEMENTS OF RIGID BODY DYNAMICS	**12 Hours**
Frictional force – Laws of Coloumb friction – simple contact friction – Rolling resistance – Belt friction. Translation and Rotation of Rigid Bodies – Velocity and acceleration – General Plane motion.	
Total Periods: 60 Hours	

Text Books:

1	Rajasekaran, S. & Sankarasubramanian, G., Fundamentals of Engineering Mechanics, Vikas Publishing House, 2017.
2	Beer, F.P. & Johnson, E.R., "Vector Mechanics for Engineers", McGraw-Hill, 11th Edition, 2016.

References:

1	Jayakumar, V. and Kumar, M., Engineering Mechanics, PHI Learning, 2012.
2	Hibbeler, R.C., Engineering Mechanics – Statics and Dynamics, Pearson.
3	Bansal, R.K., Engineering Mechanics, Laxmi Publications, 2011.
4	Hibbeller, R.C., Engineering Mechanics: Statics, and Engineering Mechanics: Dynamics, 13th edition, Prentice Hall, 2013.

E- resources:

1	Moment of Inertia Calculator – https://skyciv.com/free-moment-of-inertiacalculator/

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2	OpenStax – University Physics Volume 1 – https://openstax.org/books/university-physics-volume-1/pages/10-4-moment-ofinertia-and-rotational-kinetic-energy
3	Engineering Mechanics, Dr. Dwarakish. G. S. –

	https://onlinecourses.swayam2.ac.in/ntr24_ed75/preview
4	https://www.slideshare.net/slideshow/dynamics-of-particles/70833166
5	https://www.scribd.com/document/370324561/Friction-Force

Course Outcomes: Upon successful completion of the course, students will be able to	
CO No.	**Course Outcomes**
1	Use scalar and vector analytical techniques for analyzing forces in statically determinate structures.
2	Apply scientific concepts to solve real-world problems.
3	Calculate properties of surfaces and solids using various theorems.
4	Determine and analyse effects of dynamics of particles
5	Analyse effects of frictional forces and rigid body dynamics

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
1	3	3	3	1	-	-	-	-	-	-	-	2	1	-
2	3	3	3	1	-	-	-	-	-	-	-	2	1	-
3	3	3	3	1	1	-	-	-	-	-	-	2	1	-
4	3	3	3	1	1	-	-	-	-	-	-	2	1	-
5	3	3	2	1	-	-	-	-	-	-	-	2	1	-
Avg	3	3	2.8	1	0.4	-	-	-	-	-	-	2	1	-

"3" -High, "2" -Medium, "1" – Low, "-" – No Correlation

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26UMA201	STATISTICS AND NUMERICAL METHODS	LIT	L	T	P	J	C
			3	0	2	0	4

Course Objectives:

1	This course aims at providing the necessary basic concepts of a few statistical and numerical methods and give procedures for solving numerically different kinds of problems occurring in engineering and technology.
2	To acquaint the knowledge of testing of hypothesis for small and large samples this plays an important role in real life problems.
3	To introduce the basic concepts of solving algebraic and transcendental equations.
4	To introduce the numerical techniques of interpolation in various intervals and numerical techniques of differentiation and integration this plays an important role in engineering and technology disciplines.
5	To acquaint the knowledge of various techniques and methods of solving ordinary differential equations.

Syllabus:

TESTING OF HYPOTHESIS — **15 Hours**

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

Activities: Assignment: Applications of Hypothesis Testing Using Real-World Data. Quiz: Objective -Type test.

Practicals:

1. Application of Student – t test
2. Application of Chi-square test

DESIGN OF EXPERIMENTS — **15 Hours**

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

Activities: Assignment: Design and Analysis of Experiments Using ANOVA. Quiz: Objective -Type test.

Practicals:

1. ANOVA – one way classification
2. ANOVA – two way classification

SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS — **15 Hours**

Solution of algebraic and transcendental equations – Newton Raphson method- Solution of linear system of equations - Gauss elimination method - Gauss Jordan method –Iterative methods of Gauss Jacobi and Gauss Seidel.

Activities: Assignment: Direct and Iterative Methods for Solving Linear Systems, Numerical Techniques for Solving Equations. Quiz: Objective -Type test.

Practicals:

1. Root Extraction of Transcendental and Algebraic Functions by Newton Raphson's method.
2. Solution of a System of Linear Equations using Gauss–Seidel Iterative Method.

INTERPOLATION, NUMERICAL DIFFERENTIATION AN NUMERICAL INTEGRATION — **15 Hours**

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

Activities: Assignment: Numerical Interpolation and Integration of Experimental Data. Quiz: Objective -Type test.

Practicals:

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1. Polynomial Interpolation using Lagrange's Methods. 2. Numerical Evaluation of Double Integrals using Trapezoidal and Simpson's Rules.	
NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS	**15 Hours**
Single step methods: Euler's method - Modified Euler's method - Fourth order Runge-Kutta method for solving first order differentia equations- Multi step methods: Milne's and Adams - Bash forth predictor corrector methods for solving first order differential equations. **Activities:** Assignment: Single-Step and Multi-Step Methods for Ordinary Differential Equations, Numerical Techniques for Initial Value Problems. Quiz: Objective -Type test. **Practicals:** 1. Numerical Solution of First-Order Ordinary Differential Equations using Euler's and Modified Euler's Methods. 2. Numerical Solution of First-Order ODEs using Fourth-Order Runge-Kutta Method.	
Total Lecture Periods: 45 Hours **Total Practical Periods: 30 Hours**	

Text Books:	
1	Grewal, B. S., & Grewal, J. S., *Numerical Methods in Engineering and Science*, 11th Edition, Khanna Publishers, New Delhi, 2013.
2	Johnson, R. A., Miller, I., Freund, J. E., & Miller, M., *Miller and Freund's Probability and Statistics for Engineers*, 9th Edition, Pearson, 2018.
References:	
1	Burden, R. L., & Faires, J. D., *Numerical Analysis*, 10th Edition, Cengage Learning, 2016.
2	Devore, J. L., *Probability and Statistics for Engineering and the Sciences*, 10th Edition, Cengage Learning, 2021.
3	Gerald. C.F. and Wheatley. P.O., *Applied Numerical Analysis*, Pearson Education, Asia, New Delhi, 7th Edition, 2007.
4	Gupta, S. C., & Kapoor, V. K., *Fundamentals of Mathematical Statistics*, 12th Edition, Sultan \ Chand & Sons, New Delhi, 2020.
5	Spiegel, M. R., Schiller, J., & Srinivasan, R. A., *Schaum's Outline of Probability and Statistics*, 5th Edition, McGraw Hill Education, 2021.
E-Resources:	
1	https://nptel.ac.in/courses/111105041
2	https://online.stat.psu.edu/stat503/
3	https://math.libretexts.org/Special:Search?qid=&fpid=230&fpth=&query=STATIS
4	https://nptel.ac.in/courses/111107105
5	https://www.r-project.org/

Course Outcomes: Upon successful completion of the course, students will be able to	
CO	**Course Outcome**
1	Apply the concept of testing of hypothesis for small and large samples in real life problems.
2	Apply the basic concepts of classifications of design of experiments in the field of agriculture.
3	Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.
4	Understand the knowledge of various techniques and methods for solving first and

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	second order ordinary differential equations.

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

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
1	3	3	1	1	1	-	-	-	2	-	2	2	2	-
2	3	3	1	1	1	-	-	-	2	-	2	2	2	-
3	3	3	1	1	1	-	-	-	2	-	2	2	2	-
4	3	3	1	1	1	-	-	-	2	-	2	2	2	-
5	3	3	1	1	1	-	-	-	2	-	2	2	2	-
Avg	3	3	1	1	1	-	-	-	2	-	2	2	2	-

"3" – High, "2" – Medium, "1" – Low, "-" No Correlation.

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26UME202	MANUFACTURING PROCESSES	LIT	L	T	P	J	C
			2	0	2	0	3

Course Objectives:

1	To acquire theoretical and practical knowledge in material casting processes.
2	To expose the students to the principles of the various metal joining methods.
3	To study the various metal forming process.
4	To study the manufacturing sheet metal processes.
5	To impart the knowledge on the Smart manufacturing.

Syllabus:

METAL CASTING PROCESSES — **12Hours**

Sand Casting: Sand Mould, Types of Patterns, Pattern Materials, Pattern Allowances, Moulding Sand Properties and Testing, Cores, Moulding Machines, Blast and Cupola Furnaces, Shell Casting, Investment Casting, Ceramic Mould, Pressure Die Casting, Centrifugal Casting, CO2 Process, Stir Casting and Defects in Sand Casting.

Practicals:

1. Preparing green sand moulds with cast patterns.

BASIC MACHINING PROCESSES — **12Hours**

Centre lathe, constructional features, cutting tool geometry, various operations, taper turning methods, thread cutting methods, special attachments, machining time and power estimation. Capstan and turret lathes, Construction and operation of special machines – milling machine, shaper, slotting machine, drilling machine, surface and cylindrical grinding machines.

Practicals:

1. **Lathe Machining Exercise**
   Perform basic lathe operations such as facing, plain turning, step turning, taper turning, drilling, knurling, and external thread cutting on a mild steel work piece while observing safety practices.
2. **Machining on Conventional Machine Tools**
   Perform basic machining operations on milling, drilling, shaper, slotting, and grinding machines.

METAL JOINING PROCESSES — **12Hours**

Fusion Welding Processes, Gas Welding, Manual Metal Arc Welding, GTAW, GMAW, Submerged Arc Welding, Electro Slag Welding, Resistance Welding, Plasma Arc Welding, Thermit Welding, Electron Beam Welding, Friction Welding, Friction Stir Welding, Brazing, Soldering and Weld Defects.

Practicals:

1. **Gas Tungsten Arc Welding (TIG/GTAW) Exercise**
   Perform bead-on-plate and butt joint welding on mild steel plates using the TIG welding process, and evaluate the weld bead quality and common weld defects.
2. **Gas Metal Arc Welding (MIG/GMAW) Exercise**
   Perform lap joint and fillet joint welding on mild steel plates using the MIG welding process, followed by visual inspection and identification of weld defects.

METAL FORMING PROCESSES — **12Hours**

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Hot and Cold Working, Forging Processes, Open and Closed Die Forging, Rolling Processes, Rolling Defects, Rod and Wire Drawing, Tube Drawing and Extrusion Processes.

Practicals:

1. Study of Forging and Rolling Processes
2. Study the working principles and applications of forging and rolling processes.
3. Study of Drawing and Extrusion Processes
4. Study the working principles and applications of wire drawing, tube drawing, and extrusion processes

SHEET METAL PROCESSES	**12Hours**

Sheet Metal Characteristics, Shearing, Bending, Drawing, Stretch Forming, Formability Tests, Hydro Forming, Rubber Pad Forming, Metal Spinning, Explosive Forming, Magnetic Pulse Forming, Peen Forming, Super Plastic Forming and Micro Forming.

Practicals:

1. Study of Basic Sheet Metal Operations
2. Study the principles and applications of shearing, bending, drawing, and stretch forming processes.
3. Study of Advanced Sheet Metal Forming Processes
4. Study the working principles and applications of hydro forming, metal spinning, and other advanced forming processes.

Total Periods: 60 Hours

	Text Books:
1	Kaushish, J.P., Manufacturing Processes, PHI Learning Ltd, New Delhi, 2021.
2	Rajput, R.K., A Textbook of Manufacturing Technology, Laxmi Publications, 2020.
	References:
1	Jain R.K., Production Technology, Khanna Publishers, 2021.
2	Rao P.N., Manufacturing Technology, Tata McGraw Hill, 2021.
3	Serope Kalpakjian and Stephen Schmid, Manufacturing, Engineering and Technology, Pearson,2022.
4	Masoud Soroush et al., Smart Manufacturing: Concepts and Methods, Elsevier, 2020.
	E- resources:
1	https://nptel.ac.in/courses/112107219
2	https://www.iitg.ac.in/engfac/ganu/public_html/Metal%20forming%20processes_full.pdf
3	chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://osme.co.in/wp-content/uploads/2020/04/Metal-Joining-6th.pdf
4	Chrome Extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.iitg.ac.in/engfac/ganu/public_html/Metal%20forming%20processes_full.pdf
5	https://nptel.ac.in/courses/112107219

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Course Outcomes: Upon successful completion of the course, students will be able to	
CO No.	**Course Outcomes**
1	Explain the fundamentals of metal casting processes, moulding techniques and casting defects.
2	Explain various machining processes using lathes and other special machines
3	Analyse various metal joining processes and their applications in manufacturing industries.
4	Apply hot working and cold working principles in different metal forming operations.
5	Evaluate various sheet metal forming processes for suitable manufacturing applications.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
1	3	3	3	1	1	2	1	2	1	-	-	3	3	-
2	3	3	2	1	2	2	1	1	1	-	-	3	3	-
3	3	2	3	1	1	2	1	2	1	-	-	3	3	-
4	3	2	3	1	1	2	1	2	1	-	-	2	3	-
5	3	2	2	1	2	2	1	2	1	-	-	3	3	-
Avg	3	2.4	2.6	1	1.4	2	1	1.8	1	-	-	2.2	3	-

"3" -High, "2" -Medium, "1" – Low, "-" – No Correlation

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26UHM202	FUNCTIONAL ENGLISH II	LIT	L	T	P	J	C
			1	0	2	0	2

Course Objectives:

1	To advance grammatical agility for constructing sophisticated, persuasive, and nuanced arguments in high-stakes corporate and engineering documentation.
2	To master technical nomenclature, idiomatic industry vernacular, and stylistic syntax required for international business operations and research environments.
3	To develop the technical writing capabilities, including formal investigative reports, grant proposals, and system-level white papers.
4	To cultivate professional verbal-linguistic strategies for leading cross-functional meetings, executing crisis communication, and defending technical projects.
5	To refine multi-dimensional data synthesis skills, enabling the translation of multi-variate data matrices, trend vectors, and system architectures into executive summaries.

Syllabus:

FOUNDATIONS OF ORAL COMMUNICATION — **9 Hours**

Verbal vs. Nonverbal Communication (body language, kinesics, proxemics, and paralanguage); telephonic etiquette and active listening; parts of speech overview, correct usage of nouns and pronouns, subject-verb agreement, and basic tense structures for clear verbal delivery.

Activities: Delivering 3-to-5-minute short presentations; listening and responding to short podcasts to practice targeted oral feedback and identifying spoken grammatical errors.

Practicals:

1. Deliver short conversations with correct verbal and nonverbal cues.
2. Identify and apply parts of speech in spoken communication.

EXPRESSING CAUSAL RELATIONS IN WRITING — **9 Hours**

Reading - Reading longer technical texts– Cause and Effect Essays, and Letters / emails of complaint, Writing – Writing responses to complaints. Grammar - Active Passive Voice transformations, Infinitive and Gerunds, if conditional sentences.

Activities: Delivering 3-to-5-minute short presentations; listening and responding to short podcasts topractice targeted oral feedback and identifying spoken grammatical errors.

Practicals:

1. Integrate grammar structures into professional writing tasks.
2. Practice kinesics, proxemics, and paralanguage through role plays

BUSINESS CORRESPONDENCE & MEETING DOCUMENTATION — **9 Hours**

Digital correspondence mechanics and professional email etiquette; formal letter writing formats for business complaints, requests, and permissions; business meeting architecture.

Activities: Writing and drafting formal emails and letters based on situational prompts.

Practicals:

1. Demonstrate collaborative communication in business meetings.
2. Formal Business Letter Writing and Business Meeting Architecture

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ACADEMIC WRITING & TECHNICAL DOCUMENTATION	9 Hours

Resume Writing, Bio-data, CV Writing, planning protocols; punctuation mechanics (commas, semicolons, apostrophes), common spelling errors, sentence fragments.

Activities: Business meeting to practice drafting an agenda and capturing the minutes of the meeting.

Practicals:

1. Proofread resumes and CVs for grammatical accuracy.
2. Prepare employment documents using professional standards.

TEAMWORK, LEADERSHIP & COLLABORATIVE PROBLEM SOLVING	9 Hours

Leadership dynamics and the distinct roles of a team leader and team player; strategic negotiation techniques, interest-based bargaining, and conflict resolution; collaborative problem-solving frameworks.

Activities: Conducting a personal or case-study SWOT analysis; participating in collaborative brainstorming sessions and structured recruitment-style group discussions.

Practicals:

1. Develop leadership competencies through team exercises.
2. Conduct structured brainstorming sessions.

Total Lecture Periods: 15 Hours
Total Practical Periods: 30 Hours

Text Books:	
1	English for Engineers & Technologists (2020 edition) Orient Blackswan Private Ltd. Department of English, Anna University
2	English for Science & Technology Cambridge University Press 2021.
References:	
1	Raman. Meenakshi, Sharma. Sangeeta (2019). Professional English. Oxford university press. New Delhi.
2	Improve Your Writing ed. V.N. Arora and Laxmi Chandra, Oxford Univ. Press, 2001, NewDelhi.
3	Lesikar, R. V., Flatley, M. E., & Rentz, K. (2018). *Business Communication: Connecting in a Digital World* (13th ed.). McGraw Hill Education.
4	Anderson, P. V. (2019). *Technical Communication: A Reader-Centered Approach* (9th ed.). Cengage Learning.
5	Sethi, A., & Dhamija, P. V. (2017). *A Course in Phonetics and Spoken English* (2nd ed.). PHI Learning
E – Resources:	
1	https://youtu.be/2R_LGnt9Y6U?si=c8p1P0rwXhm3uRbE
2	https://youtu.be/wzeARCKDr70
3	https://youtu.be/Ow2k2J13Cts?si=OIxRRqt2tutesR-j
4	https://youtu.be/QgjkjsqAzvo?si=zJSlhDKebd76V2Z0

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5	https://youtu.be/EzGH3hZuJVk?si=bNuet2B-E7Y7KQee

Course Outcomes: Upon successful completion of the course, students will be able to	
CO No.	**Course Outcome**
1	Apply listening strategies to comprehend spoken English in various contexts.
2	Understand the importance of communication and drafting skills in engineering and technology.
3	Create written reports coherently for various purposes.
4	Adapt communication styles to global, multicultural environments.
5	Participate actively in group discussions by analysing critically from different views.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
1	1	-	-	-	-	-	-	2	3	-	2	-	1	-
2	2	-	-	-	-	-	-	2	3	-	2	-	1	-
3	2	-	-	-	-	-	-	2	3	-	2	-	1	-
4	2	-	-	-	-	-	-	2	3	-	2	-	1	-
5	2	-	-	-	-	-	-	2	3	-	2	-	1	-
Avg	1.8	-	-	-	-	-	-	2	3	-	2	-	1	-

"3" -High, "2" -Medium, "1" – Low "-" – No Correlation.

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26UME211	INTEGRATED ENGINEERING DESIGN LABORATORY	LIT	L	T	P	J	C
			0	0	4	0	2

Course Objectives:

1	To understand the fundamentals of product development and reverse engineering concepts.
2	To develop skills in disassembly, measurement and sketching of simple engineering products.
3	To gain knowledge in CAD modelling and virtual assembly of product components.
4	To acquire basic skills in embedded systems, sensor interfacing and automation applications.
5	To develop innovative thinking through prototyping, 3D printing and product redesign.

Syllabus:

INTRODUCTION TO PRODUCT DEVELOPMENT & REVERSE ENGINEERING	**12 Hours**
1. Study of product lifecycle and product development stages 2. Identification of components in a simple product 3. Basic reverse engineering of a household product (observation only)	
PRODUCT DISASSEMBLY, MEASUREMENT & SKETCHING	**12 Hours**
1. Disassembly of a simple product (pen, toy, mouse, etc.) 2. Identification and documentation of individual parts 3. Measurement of components using basic measuring instruments (Vernier, Micrometer, Scale, etc.) 4. Freehand sketching of disassembled parts	
CAD MODELLING & VIRTUAL ASSEMBLY	**12 Hours**
1. 2D CAD modelling of individual components 2. 3D CAD modelling of simple parts 3. Virtual assembly of disassembled product using CAD tools	
EMBEDDED SYSTEMS & SENSOR INTERFACING	**12 Hours**
1. Introduction to embedded development platform (Arduino/ESP32 etc.) 2. Sensor interfacing (temperature, proximity, light, etc.) 3. Data reading and display on serial monitor/LCD 4. Simple automation project (home/agriculture/healthcare based)	
PROTOTYPING, 3D PRINTING & PRODUCT DEVELOPMENT	**12 Hours**
1. Brainstorming and concept design for improved product 2. Sketching and redesign of existing product 3. 3D modelling of redesigned prototype 4. Fabrication of prototype using 3D printing or workshop tools 5 . Final assembly and testing of prototype product	
	Total Periods: 60 Hours

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References:	
1	Wang, W. (2010). Reverse engineering: Mechanisms, structures, systems & materials. CRC Press.oks,2014.
2	Margolis, M. (2020). Arduino cookbook: Recipes to begin, expand, and enhance your projects (3rd ed.). O'Reilly Media.
3	H. Lipson, Fabricated - The New World of 3D Printing, Wiley, 1st edition, 2013.
E- resources:	
1	GrabCAD – https://grabcad.com/14.
2	GitHub – https://github.com/,

Course Outcomes: Upon successful completion of the course, students will be able to	
CO No.	**Course Outcomes**
1	Explain the basics of product development lifecycle and reverse engineering concepts.
2	Apply skills in disassembly, measurement and sketching of simple products.
3	Create CAD models and perform virtual assembly of mechanical components.
4	Apply embedded system programming and sensor interfacing for simple automation tasks.
5	Design and develop a prototype using reverse engineering, CAD, and 3D printing techniques

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
1	3	1	1	2	1	-	-	-	-	-	3	3	1	-
2	2	2	3	2	1	-	-	-	-	-	2	3	1	-
3	2	2	3	2	3	-	-	-	-	-	3	2	3	-
4	2	2	3	2	3	-	-	-	-	-	3	2	3	-
5	2	3	3	3	3	-	-	-	-	-	3	3	3	-
Avg	2.2	2	2.6	2.2	2.2	-	-	-	-	-	2.8	2.6	2.2	-

"3" -High, "2" -Medium, "1" – Low, "-" – No Correlation

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26UHM204	KOREAN	T	L	T	P	J	C
			1	0	0	0	1

Course Objective:

1	To impart fundamentals of the Korean language, including reading, writing systems,pronunciation, and speaking.

Syllabus:

FUNDAMENTALS OF KOREAN	**5 Hours**

Introduction to Hangul: consonants and vowels, Basic pronunciation and syllable formation, Common greetings and self-introductions, Numbers (Sino-Korean and Native Korean basics), Basic sentence structure (Subject-Object-Verb), Simple expressions (e.g., 감사합니다, 안녕하세요).

Activities: Writing and reading Hangul practice sheets, Pronunciation drills and audio repetition, Dialogue practice for greetings and self-introduction, Counting and number exercises.

ESSENTIAL GRAMMAR AND VOCABULARY	**5 Hours**

Particles (은/는, 이/가, 을/를) and usage, Basic verbs and present tense conjugation, Sentence patterns: affirmative, negative, interrogative, Common adjectives and descriptive sentences, Expressing possession and location, Asking simple questions (어디, 뭐, 누구).

Activities: Verb conjugation and sentence formation drills, Role-play conversations for shopping and daily routines, Descriptive writing and speaking exercises, Question and answer practice.

EVERYDAY KOREAN COMMUNICATION	**5 Hours**

Polite speech levels and honorifics introduction, Talking about time, dates, and schedules, Ordering food, shopping phrases, counting objects, Simple directions and transportation vocabulary, Listening practice with short dialogues, Cultural notes on etiquette and communication.

Activities: Role-play ordering at a restaurant or buying items, Listening comprehension exercises, Giving and asking for directions practice, Group conversations and presentations.

Total Lecture Periods: 15 Hours

Text Books:

1	King, R., Yeon, J., & Brown, A. (2015). Elementary Korean (2nd ed.). Tuttle Publishing.
2	Cho, Y., Lee, H., Schulz, C., Sohn, H.-M., & Sohn, S.-O. (2001). Integrated Korean: Beginning 1. University of Hawai‘i Press.

References:

1	Ross, C., & Maeng, J. (2019). *Korean Made Easy for Beginners*. Darakwon
2	Talk To Me In Korean. (2020). *Talk To Me In Korean Level 1*. Talk To Me In Korean.
3	The National Institute of the Korean Language. (2015). *Korean Grammar in Use: Beginning*. Darakwon.

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E-Resources:	
1	Foreign Language | Introduction to HANGUL (KOREAN) | CMSCET
2	[1 hour] Learn to Read Korean | Full Hangeul Course
3	https://youtu.be/yoUtQr606vI?si=sGjPZoKZsK0xTLzH&t=72

Course Outcomes: Upon successful completion of the course, students will be able to	
CO No.	**Course Outcome**
1	Understand simple spoken Korean in everyday contexts.
2	Communicate with widely used Korean words effectively
3	Develop the skills necessary for self-directed learning and continuous improvement in Korean language

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
1	1	1	-	-	-	-	-	-	3	-	2	1	-	-
2	2	2	2	2	-	-	-	-	3	-	2	-	2	-
3	2	2	2	2	-	-	-	-	3	-	2	-	2	-
Avg	1.8	1.8	2	2	-	-	-	-	3	-	2	1	2	-

"3" - High, "2" - Medium,"1" – Low, "-" No Correlation

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26UHM205	JAPANESE	T	L	T	P	J	C
			1	0	0	0	1

Course Objective:

1	To impart fundamentals of the Japanese language, including reading, writing systems, pronunciation, and speaking.

Syllabus:

WRITING SYSTEMS & BASIC COMMUNICATION	**5 Hours**

Introduction to Hiragana: vowels, basic characters, reading & writing, Introduction to Katakana: basic characters and usage, Basic greetings and farewells (こんにちは, おはようございます, さようなら), Introducing yourself (名前、出身、年齢), Basic sentence structure: Subject–Object– Verb, Numbers 1–100, days of the week, classroom expressions.
Activities: Flashcard games and writing drills, Self-introduction, Numbers & datematching, Greeting expressions, Listening to audio.

GRAMMAR & EVERYDAY VOCABULARY	**5 Hours**

Particles: は (wa), を (wo), の (no), へ (e), に (ni), Present tense verbs: です, ます-form conjugation (たべます、のみます), Negative forms: ではありません, ません, Describing people and objects using adjectives (い and な), Question formation: なに、どこ、だれ、いつ, Vocabulary for family, food, colors, and basic actions.
Activities: Verb conjugation drills, Guessing game, Picture description, "Shopping" with food vocab and counters

CONVERSATION & CULTURAL ETIQUETTE	**5 Hours**

Polite speech levels and honorifics introduction, Talking about time, dates, and schedules, Ordering food, shopping phrases, counting objects, Simple directions and transportation vocabulary, Listening practice with short dialogues, Cultural notes on etiquette and communication.
Activities: Role-play ordering at a restaurant or buying items, Listening comprehension exercises, Giving and asking for directions practice, Group conversations and presentations.
Practice worksheets and flashcards for hiragana, Writing drills and reading simple katakana words,

Total Lecture Periods: 15 Hours

Text Books:

1	Banno, E., Ikeda, Y., Ohno, Y., Shinagawa, C., & Tokashiki, K. (2011). Genki I: An integrated course in elementary Japanese. The Japan Times
2	The Japan Foundation. (2017). Marugoto Japanese language and culture starter (A1) course book for communicative language activities. Goyal Publishers

References:

1	Banno, E., Ohno, Y., Sakane, Y., & Shinagawa, C. (2020). *Genki II: An Integrated Course in Elementary Japanese* (3rd ed.). The Japan Times Publishing.
2	Tae, K. (2014). *A Guide to Japanese Grammar: A Japanese Approach to Learning Japanese Grammar*. CreateSpace Independent Publishing Platform.

3	Makino, S., & Tsutsui, M. (2012). *A Dictionary of Basic Japanese Grammar*. The Japan Times Publishing.
E-Resources:	
1	Learn Japanese – Tae Kim's Guide to Learning Japanese
2	Japanese from scratch: the game-changing course in organic Japanese - YouTube
3	Erin's Challenge! I Can Speak Japanese. Contents Library | The Japan Foundation

Course Outcomes: Upon successful completion of the course, students will be able to	
CO No.	**Course Outcome**
1	Understand simple spoken Japanese in everyday contexts.
2	Communicate with widely used Japanese words effectively
3	Develop the skills necessary for self-directed learning and continuous improvement in Japanese language.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
1	1	1	-	-	-	-	-	-	3	-	2	1	-	-
2	2	2	2	2	-	-	-	-	3	-	2	-	2	-
3	2	2	2	2	-	-	-	-	3	-	2	-	2	-
Avg	1.8	1.8	2	2	-	-	-	-	3	-	2	1	2	-

"3" - High, "2" - Medium,"1" – Low, "-" No Correlation

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26UHM206	DEUTSCH	T	L	T	P	J	C
			1	0	0	0	1

Course Objective:

1	To impart fundamentals of the Deutsch language, including reading, writing systems, pronunciation, and speaking.

Syllabus:

BASICS & INTRODUCTION	**5 Hours**

German alphabet and pronunciation, Basic greetings and farewells, Introducing yourself and others (Ich heiße…, Wer bist du?), Numbers 1–100 and days of the week, Personal pronouns (ich, du, er, sie…), Sentence structure (SVO word order).
Activities: Alphabet spelling game, short skits, Use color-coded cards for SVO sentences.

GRAMMAR ESSENTIALS & EVERYDAY VOCABULARY	**5 Hours**

Present tense of regular verbs (spielen, arbeiten, machen…), Common irregular verbs: sein (to be), haben (to have), gehen, kommen, Articles and gender (der, die, das; ein, eine), Simple questions and negation (nicht, kein), Describing people and things: adjectives and colors, Family, school, food, and common objects vocabulary.
Activities: Conjugate regular and irregular verbs, "Question Chain" game, Create a simple family tree.

EVERYDAY COMMUNICATION IN GERMAN	**5 Hours**

Asking for and giving directions, telling the time and talking about schedules, ordering food and drinks at a café or restaurant, talking about hobbies, weather, and daily routines, listening to short conversations and responding appropriately, introduction to german culture and formal/informal language use (du vs sie).
Activities: ordering food and drinks, give directions, formal / informal greetings, do's and don'ts.

Total Lecture Periods: 15 Hours

Text Books:

1	Funk, H., Kuhn, C., & Demme, S. (2015). Menschen A1: Deutsch als Fremdsprache Kursbuch.Hueber Verlag.

References:

1	Dengler, S., Mayr-Sieber, T., Schuster, T., & Sieber, T. (2016). *Sicher! A1+: Deutschals Fremdsprache Kursbuch*. Hueber Verlag.
2	Perlmann-Balme, M., Schwalb, S., & Weers, D. (2018). *Netzwerk Neu A1: Kurs- und Übungsbuch*. Ernst Klett Sprachen.
3	Albrecht, U., Dengler, S., Paul, R., & Sieber, T. (2016). *Ideen A1: Deutsch als Fremdsprache Kursbuch*. Hueber Verlag.

E-Resources:

1	Learn German A1 from Scratch | Complete Beginner Course | Lesson 1
2	https://youtube.com/@yourgermanteacher?si=mL3zshsV3T79zh48
3	https://learngerman.dw.com/en/beginners/s-62078399

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Course Outcomes: Upon successful completion of the course, students will be able to	
CO No.	**Course Outcome**
1	Understand simple spoken Deutsch in everyday contexts.
2	Communicate with widely used Deutsch words effectively.
3	Develop the skills necessary for self-directed learning and continuous improvement in Deutsch language.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
1	1	1	-	-	-	-	-	-	3	-	2	1	-	-
2	2	2	2	2	-	-	-	-	3	-	2	-	2	-
3	2	2	2	2	-	-	-	-	3	-	2	-	2	-
Avg	1.8	1.8	2	2	-	-	-	-	3	-	2	1	2	-

"3" - High, "2" - Medium,"1" – Low, "-" No Correlation

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26UHM203	PHYSICAL EDUCATION - II	L	T	P	J	C
		0	0	2	0	1

Course Objective:

1	To impart knowledge on gymnastic exercises and pressing needs for up skilling in a particular game.

Syllabus:

BASIC GYMNASTICS EXERCISES	**15 Hours**
Warming up, Suitable exercise, Lead up games, Safety education, Movement education, Balanced Walk, execution, floor exercise, tumbling/acrobatics, grip, release, swinging, parallel bar exercise, horizontal bar exercise, flic-flac-walk and pyramids.	
UPSKILLING IN ANY ONE OF THE ATHLETICS	**15 Hours**
Broad Jump, High Jump, Triple Jump, Relay Sprints, Javelin Throw, Discuss Throw, Shot Put, Short and Long-distance Running.	

Total Periods: 30 Hours

References:

1	Singh, A. (2008). Essentials of physical education. Kalyani Publishers.
2	Kamlesh, M. L. (2006). Psychology in physical education and sport (3rd ed.). Metropolitan Book Co.

E-Resources:

1	https://www.who.int/health-topics/physical-activity
2	https://www.gymnastics.sport
3	https://nptel.ac.in

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

CO No.	Course Outcome
1	Understand the importance of physical activity for mental and physical health.
2	Apply safety principles and methods during sports activities.
3	Develop teamwork, discipline, and leadership through sports and group activities and collaborate effectively.
4	Demonstrate the advanced technical skills and strategic understanding in the game of their interest.

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1	1	-	-	-	-	-	-	-	-	-	-	-	-	-
2	3	-	-	-	-	-	-	-	-	-	-	-	-	1
3	-	-	-	-	-	-	-	3	-	-	-	-	-	2
4	-	-	-	-	-	-	-	-	-	-	1	-	-	2
Avg	2	-	-	-	-	-	-	3	-	-	1	-	-	1.6

“3”- High, “2”- Medium, “1”- Low,“-” No Correlation

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