ROHINI COLLEGE OF ENGINEERING AND TECHNOLOGY

(AUTONOMOUS)

(Anjugramam-Kanyakumari Main Road, Palkulam,Variyoor P.O.-629 401, K.K.Dist.)

Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai

Accredited with A+ Grade by NAAC

BE. Civil Engineering

Curriculum & Syllabus

(*2024-2025 Admitted Students Onwards*)

Vision Statement of RCET

To be an academic institute of continuous excellence towards education and research in rural regime and provide service to nation in terms of nurturing potentially higher social, ethical and engineering companion graduands.

Mission Statement of RCET

To foster and promote technically competent graduands by imparting the state of art Engineering education in rural regime.To enunciate research assisted scientific learning by dissemination of knowledge towards science, agriculture, industry and national security.

Vision of the Department

To develop professional knowledge and competent Civil Engineers to create ethically skilled students for better contribution to the society.

Mission of the Department

M1: To provide technically valuable education for the development of Civil Professionals

M2: To make a platform for the students to explore their potential and critical thinking in research field.

M3: To create awareness and spirit of ethical thoughts in societal concerns for professional development.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO1: Graduates will apply the knowledge of Civil Engineering concepts to solve real world Engineering problems.

PEO2: Graduates will have required qualities for a successful career in Civil Engineering and good interaction skills.

PEO3: Graduates will exhibit the professional skills with ethical values through societal concerns.

PROGRAMME OUTCOMES (PO)

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

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

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

PO4 Conduct investigations of complex problems: Draw well-founded conclusions applying the knowledge acquired from research and research methods including design of experiments, analysis and interpretation of data and synthesis of information and to arrive at significant conclusion.

PO5 Modern tool usage: Form, select and apply relevant techniques, resources and Engineering and IT tools for Engineering activities like electronic prototyping, modeling and control of systems and also being conscious of the limitations.

PO6 The engineer and society: Understand the role and responsibility of the Professional Civil Engineer and to assess societal, health, safety issues based on the reasoning received from the contextual knowledge.

PO7 Environment and sustainability: Be aware of the impact of professional Engineering solutions in societal and environmental contexts and exhibit the knowledge and the need for Sustainable Development.

PO8 Ethics: Apply the principles of Professional Ethics to adhere to the norms of the engineering practice and to discharge ethical responsibilities

PO9 Individual and team work: Function actively and efficiently as an individual or a member/leader of different teams and multidisciplinary projects.

PO10 Communication: Communicate efficiently the engineering facts with a wide range of engineering community and others, to understand and prepare reports and design documents; to make effective presentations and to frame and follow instructions.

PO11 Project management and finance: Demonstrate the acquisition of the body of engineering knowledge and insight and Management Principles and to apply them as member / leader in teams and multidisciplinary environments.

PO12 Life-long learning: Recognize the need for self and life-long learning, keeping pace with technological challenges in the broadest sense.

PROGRAMME SPECIFIC OUTCOMES (PSOS)

PSO1: Apply and develop basic concepts of civil engineering by inculcating the best practices for solving real time problem through feasible solution and to specialize in various academics

PSO2: Ability to provide interdisciplinary skill to meet the social needs through civil engineering and to develop successful professional career along with strong technical, communication and presentation skill.

PSO3: To apply experimental knowledge, analysis, interpretation of data and information to Civil Engineering problems.

CREDIT INFO		
Sl.No	**Category**	**Credits**
1	Humanities and Social Science (HSS)	13
2	Basic Science Courses (BSC)	25
3	Engineering Science Courses (ESC)	24
4	Professional Core Courses (PCC)	60.5
5	Professional Electives Courses (PEC)	18
6	Open Electives Courses (OEC)	12
7	Employability Enhancement Courses (EEC)	17
9	Mandatory Courses (MNC)	-
Total Credits		**169.5**

Humanities and Social Science (HSS)							
Sl.No	**Course Code**	**Course Title**	**Course Type**	**L**	**T**	**P**	**Credit**
1	24GE101	Heritage of Tamils	HSS	1	0	0	1
2	24EN101	English for Engineers	HSS	2	0	1	2.5
3	24GE201	Tamils and Technology	HSS	1	0	0	1
4	24EN231	Presentation and Communication Skills Laboratory	HSS	0	0	3	1.5
5	24MG602	Essentials of Entrepreneurship	HSS	2	0	0	2
6	24MG701	Economics for Engineers	HSS	3	0	0	3
7	24GE701	Professional Ethics And Human Values	HSS	2	0	0	2
Basic Science Courses (BSC)							
Sl.No	**Course Code**	**Course Title**	**Course Type**	**L**	**T**	**P**	**Credit**
1	24MA101	Matrices And Calculus	BSC	3	1	0	4
2	24PH101	Engineering Physics	BSC	3	0	2	4
3	24CY101	Engineering Chemistry	BSC	3	0	2	4
4	24MA201	Complex Variables And Transforms	BSC	3	1	0	4
5	24PH202	Applied Material Science	BSC	3	0	0	3

6	24CY401	Environment Science And Engineering	BSC	2	0	0	2
7	24MA302	Probability, Statistics And Numerical Methods	BSC	4	0	0	4

Engineering Science Courses (ESC)

Sl.No	Course Code	Course Title	Course Type	L	T	P	Credit
1	24ME301	Engineering Mechanics	ESC	3	1	0	4
2	24EE202	Fundamentals Of Electrical And Electronics Engineering	ESC	3	0	2	4
3	24ME201	Engineering Graphics And Design	ESC	1	0	4	3
4	24CS201	Programming For Problem Solving Using C	ESC	2	0	4	4
5	24GE231	Workshop Practices	ESC	0	0	3	1.5
6	24CE301	Engineering Geology	ESC	3	0	0	3
7	24CE331	Building Planning and Computer Aided Civil Engineering Drawing	ESC	0	0	4	2
8	24CS331	Programming For Problem Solving in Python	ESC	0	0	3	1.5
9	24CE632	Computer Aided Analysis and Design Laboratory	ESC	0	0	4	2

Professional Core Courses (PCC)

Sl.No	Course Code	Course Title	Course Type	L	T	P	Credit
1	24CE201	Strength of Materials -I	PCC	3	0	0	3
2	24CE302	Building Materials and Technology	PCC	2	0	2	3
3	24CE303	Fluid Mechanics	PCC	3	0	2	4
4	24CE304	Engineering Surveying	PCC	3	0	2	4
5	24CE401	Strength of Materials-II	PCC	3	1	0	3
6	24CE402	Construction Techniques And Management	PCC	3	0	0	3
7	24CE403	Geotechnical Engineering – I	PCC	3	0	2	4
8	24CE404	Transportation Engineering	PCC	3	0	2	4
9	24CE405	Hydraulics and Hydraulic Machinery	PCC	3	0	2	4
10	24CE406	Environmental Engineering	PCC	3	0	2	4
11	24CE501	Structural Analysis	PCC	3	0	0	3
12	24CE502	Design of Reinforced Concrete Elements	PCC	3	0	0	3

13	24CE503	Geotechnical Engineering - II	PCC	3	0	2	4
14	24CE504	Concrete Technology	PCC	2	0	2	3
15	24CE601	Design of Steel Structures	PCC	3	1	0	4
16	24CE631	Environmental and Irrigation Engineering Drawing	PCC	0	0	4	2
17	24CE701	Estimation, Costing and Valuation	PCC	3	1	0	4

Professional Electives Courses (PEC)

Sl.No	Course Code	Course Title	Course Type	L	T	P	Credit
Professional Elective-I- Structural Engineering							
1	24CE571	Fundamentals of Prestressed Concrete Design	PEC	3	0	0	3
2	24CE572	Prefabricated Structures	PEC	3	0	0	3
3	24CE573	Corrosion of RC Structures	PEC	3	0	0	3
4	24CE574	Advanced Design of RC Structures	PEC	3	0	0	3
5	24CE575	Repair and Rehabilitation of Structures	PEC	3	0	0	3
6	24CE576	Pre Engineered Buildings	PEC	3	0	0	3
Professional Elective-II- Environmental Engineering							
1	24CE581	Municipal Solid waste Management	PEC	3	0	0	3
2	24CE582	Industrial Waste Water Management	PEC	3	0	0	3
3	24CE583	Air And Noise Pollution Control	PEC	3	0	0	3
4	24CE584	Climate Change And Sustainable Management	PEC	3	0	0	3
5	24CE585	Solid And Hazardous Waste Management	PEC	3	0	0	3
6	24CE586	Environmental Impact Assessment	PEC	3	0	0	3
Professional Elective-III- Hydrology and Water Resources Engineering							
1	24CE671	Irrigation Engineering	PEC	3	0	0	3
2	24CE672	Ground Water Engineering	PEC	3	0	0	3
3	24CE673	Water Resources Systems Engineering	PEC	3	0	0	3
4	24CE674	Urban Water Infrastructure	PEC	3	0	0	3

5	24CE675	Hydrology And Water Resources Engineering	PEC	3	0	0	3
6	24CE676	Remote Sensing And GIS	PEC	3	0	0	3
Professional Elective-IV- Transportation Engineering and Management							
1	24CE681	Railways Airport Dock And Harbour Engineering	PEC	3	0	0	3
2	24CE682	Intelligent Transportation Systems	PEC	3	0	0	3
3	24CE683	Housing Planning And Management	PEC	3	0	0	3
4	24CE684	Bridge Engineering	PEC	3	0	0	3
5	24CE685	Traffic Engineering and Management	PEC	3	0	0	3
6	24CE686	Pavement Engineering	PEC	3	0	0	3
Professional Elective-V- Construction Techniques and Practices							
1	24CE771	Energy Efficient Buildings	PEC	3	0	0	3
2	24CE772	Building Services For Civil Engineers	PEC	3	0	0	3
3	24CE773	Smart Materials And Measuring Techniques	PEC	3	0	0	3
4	24CE774	Construction Equipment And Practices	PEC	3	0	0	3
5	24CE775	Advanced Construction Techniques	PEC	3	0	0	3
6	24CE776	Construction Safety Practices	PEC	3	0	0	3
Professional Elective-VI- Ocean Engineering							
1	24CE781	Port Harbor Engineering	PEC	3	0	0	3
2	24CE782	Off Shore Structures	PEC	3	0	0	3
3	24CE783	Coastal Engineering	PEC	3	0	0	3
4	24CE784	Coastal Zone Management And Remote Sensing	PEC	3	0	0	3
5	24CE785	Marine Geotechnical Engineering	PEC	3	0	0	3
6	24CE786	Ocean Wave Dynamics	PEC	3	0	0	3
Open Electives Courses (OEC)							
Sl.No	**Course Code**	**Course Title**	**Course Type**	**L**	**T**	**P**	**Credit**
Open Elective-I (Artificial Intelligence and Computer science and Engineering)							
1	24AI601	Artificial Intelligence and Machine Learning Fundamentals	OEC	3	0	0	3

2	24AI602	Business Intelligence and Its Applications	OEC	3	0	0	3
3	24AI603	Data Science Fundamentals	OEC	3	0	0	3
4	24CS601	Augmented Reality /Virtual Reality	OEC	3	0	0	3
5	24CS602	Full Stack Development	OEC	3	0	0	3
6	24CS603	Software Testing and Quality Assurance	OEC	3	0	0	3
7	24CS604	Cloud Computing	OEC	3	0	0	3
Open Elective-II (Electronics and Communication and Agricultural Engineering)							
1	24AG601	Principles of Crop Production	OEC	3	0	0	3
2	24AG602	Dairy and Food Engineering	OEC	3	0	0	3
3	24AG603	Post-Harvest Technology	OEC	3	0	0	3
4	24AG604	Agricultural Finance, Banking and Co-operation	OEC	3	0	0	3
5	24EC501	Nano Electronics	OEC	3	0	0	3
6	24EC502	Digital Signal Processing	OEC	3	0	0	3
7	24EC503	Fuzzy Logic Systems and ANN	OEC	3	0	0	3
8	24EC504	Fiber Optic Sensors	OEC	3	0	0	3
Open Elective-III (Bio Medical and Electrical Engineering)							
1	24BM701	Wearable Devices	OEC	3	0	0	3
2	24BM702	Telemedicine and Healthcare Delivery	OEC	3	0	0	3
3	24BM703	Medical Informatics	OEC	3	0	0	3
4	24BM704	Basics of Human Anatomy and Physiology	OEC	3	0	0	3
5	24EE701	Robot Process Automation	OEC	3	0	0	3
6	24EE702	Electric vehicle Technology	OEC	3	0	0	3
7	24EE703	Smart Grid	OEC	3	0	0	3
8	24EE704	Energy Conservation and Management	OEC	3	0	0	3
Open Elective-IV (Mechanical and Management)							
1	24ME701	Additive Manufacturing	OEC	3	0	0	3
2	24ME702	Rocket Propulsion	OEC	3	0	0	3
3	24ME703	Industrial Safety	OEC	3	0	0	3
4	24ME704	Marine Vehicles	OEC	3	0	0	3
5	24MG701	Digital Marketing	OEC	3	0	0	3

6	24MG702	Industrial Psychology	OEC	3	0	0	3
7	24MG703	Logistics and Supply chain Management	OEC	3	0	0	3
8	24MG704	Corporate Social Responsibility	OEC	3	0	0	3

Employability Enhancement Courses (EEC)

Sl.No	Course Code	Course Title	Course Type	L	T	P	Credit
1	24CE351	Mini Project – I (Introduction to Innovative Projects)	EEC	0	0	2	1
2	24CE451	Mini Project – II (Design and development of the product)	EEC	0	0	2	1
3	24EN451	Soft Skills Development	EEC	0	0	2	1
4	24CE551	Mini Project – III (Community based Project)	EEC	0	0	2	1
5	24EN631	Business and Managerial Communications	EEC	0	0	2	1
6	24GE531	Quantitative and Reasoning Skills-I	EEC	0	0	2	1
7	24CE651	Mini Project-IV (Micro Project)	EEC	0	0	2	1
8	24GE631	Quantitative And Reasoning Skills-II	EEC	0	0	2	1
9	24CE751	Project Work Phase I (Design and Analysis)	EEC	0	0	4	2
10	24CE752	Industrial Training / Internship	EEC	0	0	0	2
11	24CE851	Project Work Phase II	EEC	0	0	10	5

Mandatory Courses (MNC)

Sl.NO	Course Code	Course Title	Course Type	L	T	P	Credit
1	24MC101	Induction Programming	MNC				
2	24MC201	Sports And Yoga For Youth Empowerment - I	MNC	0	0	2	0
3	24MC202	NCC Credit Course Level - I	MNC	1	0	2	1#
4	24MC301	Sports and Yoga for Youth Empowerment - II	MNC	0	0	2	0
5	24MC401	NCC Credit Course Level – II	MNC	1	0	2	1#
6	24MC601	Disaster Management	MNC	1	0	0	1#
7	24MC701	Constitutions of India	MNC	1	0	0	1#

SEMESTER - I

S. No	Course Code	Course Title	Course Category	L	T	P	C
THEORY COURSES							
1	24GE101	*தமிழர் மரபு*/Heritage of Tamils	HSS	1	0	0	1
2	24MA101	Matrix and calculus	BSC	3	1	0	4
3	24ME301	Engineering Mechanics	ESC	3	1	0	4
INTEGRATED COURSES							
4	24EN101	English For Engineers	HSS	1	0	3	2.5
5	24PH101	Engineering Physics	BSC	3	0	2	4
6	24CY101	Engineering Chemistry	BSC	3	0	2	4
7	24EE202	Fundamentals of Electrical and Electronics Engineering	ESC	3	0	2	4
MANDATORY COURSES							
8	24MC101	Induction Programming	MNC	Three Weeks			
Total				17	2	9	23.5

SEMESTER - II

S. No	Course Code	Course Title	Course Category	L	T	P	C
THEORY COURSES							
1	24GE201	*தமிழரும் தொழில்நுட்பமும்*/ Tamil and Technology	HSS	1	0	0	1
2	24MA201	Complex Variables and Transforms	BSC	4	0	0	4
3	24PH202	Applied Material Science	BSC	3	0	0	3
4	24CY401	Environmental Science and Engineering	BSC	2	0	0	2
6	24CE201	Strength of Materials- I	PCC	3	0	0	3
INTEGRATED COURSES							
6	24ME201	Engineering Graphics and Design	ESC	1	0	4	3
7	24CS201	Programming for Problem Solving in C	ESC	2	0	4	4
LABORATORY COURSES							
8	24GE231	Workshop Practices	ESC	0	0	3	1.5
9	24EN231	Presentation and Language Skills Laboratory	HSS	0	0	3	1.5
MANDATORY COURSES							
10	24MC201	Sports And Yoga For Youth Empowerment - I	MNC	0	0	2	0
11	24MC202	NCC Credit Course Level - I	MNC	1	0	2	1#
Total				16	0	14	23

Proceedings of the 1ˢᵗ Academic Council [29.06.2024]

பாடநெறி குறியீடு	24GE101	பாடத்தின் தலைப்பு:	தமிழர் மரபு (Common to AI& DS, AE, BME, CE, CSE, CSE (AI& ML), EEE, ECE, MECH)
கிரெடிட்	1	L – T – P	1-0-1

பாடத்திட்ட நோக்கங்கள்:

1. தமிழின் மதச்சார்பற்ற தன்மை, இந்திய மொழிக் குடும்பத்தின் திராவிட மொழி, திருக்குறளின் கருத்துக்கள், சமயங்களின் தாக்கம், நவீன இலக்கிய வளர்ச்சி ஆகியவற்றை நினைவு கூர்தல்.

2. தமிழர்களின் சமூக மற்றும் பொருளாதார வாழ்வில் நடுகல், சிற்பங்கள், சிலைகள் மற்றும் அழகிய கைவினைப் பொருட்கள், இசைக்கருவிகள் ஆகியவற்றின் தொடர்புடைய அறிவைக் கோடிட்டுக் காட்டுதல்.

3. தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான் கூத்து, ஒயிலாட்டம், தோல்பாவைக் கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் விளையாட்டுகளை மனதில் பதிய வைத்தல்.

4. தமிழ்நாட்டின் தாவரங்கள் மற்றும் விலங்கினங்கள், சங்க நகரங்கள் மற்றும் துறைமுகங்கள், சங்க காலத்தின் ஏற்றுமதி மற்றும் இறக்குமதிகளை நினைவுபடுத்துதல், வெளிநாடுகளில் சோழர் படையெடுப்பைக் கண்டறிதல்.

இந்திய விடுதலைப் போரில் தமிழர்களின் பங்கைக் கண்டறிதல், இந்திய மருத்துவத்தில் சித்த மருத்துவத்தின் பங்குக்கு இணையாக இந்தியாவின் பிற பகுதிகளில் தமிழ்ப் பண்பாட்டின் தாக்கத்தை அடையாளம் காணுதல்.

அலகு I மொழி மற்றும் இலக்கியம்:	[3 hours]

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

அலகு II மரபு - பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை - சிற்பக்கலை:	[3 hours]

நடுகல் முதல் நவீன சிற்பங்கள் வரை - ஐம்பொன் சிலைகள் - பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினைப் பொருட்கள், பொம்மைகள் - தேர் செய்யும் கலை - சுடுமண் சிற்பங்கள் - நாட்டுப்புறத் தெய்வங்கள் - குமரிமுனையில் திருவள்ளுவர் சிலை - இசைக் கருவிகள் - மிருதங்கம், பறை, வீணை, யாழ், நாதஸ்வரம் - தமிழர்களின் சமூக பொருளாதார வாழ்வில் கோவில்களின் பங்கு.

அலகு III நாட்டுப்புறக் கலைகள் மற்றும் வீர விளையாட்டுகள்:	[3 hours]
தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான் கூத்து, ஓயிலாட்டம், தோல்பாவைக் கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் விளையாட்டுகள்.	

அலகு IV தமிழர்களின் திணைக் கோட்பாடுகள்:	[3 hours]
தமிழகத்தின் தாவரங்களும், விலங்குகளும் - தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக் கோட்பாடுகள் - தமிழர்கள் போற்றிய அறக்கோட்பாடு - சங்ககாலத்தில் தமிழகத்தில் எழுத்தறிவும், கல்வியும் - சங்ககால நகரங்களும் துறைமுகங்களும் - சங்ககாலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி - கடல் கடந்த நாடுகளில் சோழர்களின் வெற்றி.	

அலகு V இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு:	[3 hours]
இந்திய விடுதலைப்போரில் தமிழர்களின் பங்கு - இந்தியாவின் பிறப்பகுதிகளில் தமிழ்ப் பண்பாட்டின் தாக்கம் - சுயமரியாதை இயக்கம் - இந்திய மருத்துவத்தில், சித்த மருத்துவத்தின் பங்கு - கல்வெட்டுகள், கையெழுத்துப்படிகள் - தமிழ்ப் புத்தங்களின் அச்சு வரலாறு.	

Total : 15 Periods

பாடநெறி முடிவுகள் (பாமு):

பாடநெறியின் முடிவில், மாணவர் பின்வரும் திறன்களைப் பெறுவர்:

பாமு	பாடநெறி முடிவுகள்	மிக உயர்ந்த அறிவாற்றல் நிலை
அலகு I பாமு:	தமிழின் மதச்சார்பற்ற தன்மை, திராவிட மொழியின் பங்கு, திருக்குறளின் கருத்துக்கள், சமயங்களின் தாக்கம், நவீன இலக்கிய வளர்ச்சி ஆகியவற்றையும் தெரிந்துகொள்கிறார்கள்.	கே 1
அலகு II பாமு:	தமிழர்களின் சமூக மற்றும் பொருளாதார வாழ்வில் நடுகல், சிற்பங்கள், சிலைகள் மற்றும் அழகிய கைவினைப் பொருட்கள், இசைக்கருவிகள் ஆகியவற்றை விவரிக்கும் ஆற்றலை பெறுகிறார்கள்.	கே 2
அலகு III பாமு:	தமிழர்களின் பாரம்பரிய விளையாட்டுகளை தெரிந்து கொள்ளுவதால் விளையாட வேண்டும் என்ற ஆர்வத்தை பெறுகிறார்கள்.	கே 1
அலகு IV பாமு:	தமிழ்நாட்டின் தாவரங்கள் மற்றும் விலங்கினங்கள் பற்றிய அறிவையும், சங்க கால கட்டிடக்கலை, ஏற்றுமதி மற்றும் இறக்குமதி தொழில் நுட்ப அறிவை பெறுகிறார்கள்..	கே 1
அலகு V பாமு:	இந்திய விடுதலைப் போரில் தமிழர்களின் பங்கையும், இந்திய மருத்துவத்தில் சித்த மருத்துவத்தின் பங்கு இணையாக இருப்பதையும், தெரிந்து கொள்கிறார்கள்.	கே 1

பாடநெறி முடிவுகள் மற்றும் நிரல் முடிவுகள் ஒப்பிடுதல்

பாமுகள்	மிக உயர்ந்த அறிவாற்றல் நிலை	பாடநெறி முடிவுகள்											
		1	2	3	4	5	6	7	8	9	10	11	12
பாமு1	கே 1	2	-	-	-	-	-	-	-	-	-	-	-
பாமு2	கே 2	1	-	-	-	-	-	-	-	-	-	-	-
பாமு3	கே 1	1	-	-	-	-	-	-	-	-	-	-	-
பாமு4	கே 1	1	-	-	-	--	-	-	-	-	-	-	-
பாமு5	கே 1	1	-	-	-	-	-	-	-	-	-	-	-

நிலை 3- அதிக ஒத்துப்போதல், நிலை 2- மிதமாக ஒத்துப்போதல், நிலை 1- குறைவாக

ஒத்துப்போதல், நிலை 0- ஒத்துப்போகவில்லை

மதிப்பீட்டுத் திட்டம்:

கூறுகள்	மதிப்பீட்டின் வகை	அதிகபட்ச மதிப்பெண்கள்	குறைக்கப்பட்ட மதிப்பெண்கள்	இறுதி மதிப்பெண்கள்
தொடர்ச்சியான உள் தேர்வு	தொடர்ச்சியான உள் தேர்வு - I	100	40	40
	தொடர்ச்சியான உள் தேர்வு - II	100	40	
இறுதி பருவ தேர்வு	எழுத்து தேர்வு	100	60	60
மொத்தம்				100

மதிப்பீட்டு முறை

ப்ளூமின் வகை	தொடர்ச்சியான மதிப்பீட்டு சோதனைகள்		இறுதி தேர்வு
	1	**2**	
நினைவில் கொள்ளுதல்	60	50	60
புரிந்து கொள்ளுதல்	40	50	40
விண்ணப்பித்தல்	0	0	0
பகுப்பாய்வுதல்	0	0	0
மதிப்பிடுதல்	0	0	0
உருவாக்குதல்	0	0	0

இறுதி பருவ தேர்வு: (கேள்வி முறை)

- ஒவ்வொரு யூனிட்டும் இரண்டு 2 மதிப்பெண் வினாக்களையும் ஒரு 16 மதிப்பெண் வினாவையும் (இரண்டில் ஒன்று) கொண்டுள்ளது.
- பதினைந்து கேள்விகளுக்கும் பதிலளிக்க வேண்டும்

Course Code:	24GE101	Course Title:	HERITAGE OF TAMILS (Common to AI& DS, AE, BME, CE, CSE, CSE (AI& ML), EEE, ECE, MECH)
Credits:	1	L – T – P	1-0-0
Pre -requisite			Nil

COURSEOBJECTIVES:
- Recalling the secular nature of Tamil, the Dravidian language of the Indian language family, the ideas of Thirukkural, the influence of religions and the development of modern literature.
- To outline the relevant knowledge of Nadukal, sculptures, statues and beautiful handicrafts, musical instruments in the social and economic life of Tamils.
- Terukhoothu, Karakatam, Villuppattu, KanyanKoothu, Wailatam, DholpaVaikhuthoo, Silampattam,Valali,Puliyattam, Memorizing the games of Tamils
- Flora and fauna of TamilNadu, Sangam cities and ports, reminiscence of exports and imports of Sangam period, tracing Chola invasion abroad.
- Identify the role of Tamils in the Indian Liberation War and identify the influence of Tamil culture in other parts of India along with the role of Siddha medicine in Indian medicine.

UNIT I LANGUAGE AND LITERATURE	[3hours]

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

UNIT II HERITAGE-ROCK ART PAINTINGS TO MODERN ART SCULPTURE	[3hours]

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

UNIT III FOLK AND MARTIAL ARTS	[3hours]

Therukoothu, Karagattam, VilluPattu, Kaniyan Koothu, Oyillattam, Leatherpuppetry, Silambattam, Valari, Tigerdance - Sports and Games of Tamils.

UNIT IV THINAI CONCEPT OF TAMILS	[3hours]

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

UNIT V CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE	[3hours]
Contribution of Tamils to Indian Freedom Struggle - The Cultural Influence of Tamils over the other partsof India – Self-Respect Movement - Role of Siddha Medicine in Indigenous Systems of Medicine –Inscriptions & Manuscripts – Print History of Tamil Books.	

Course outcomes:

On completion of the course, the student will have the ability to:

COs	Course Outcomes	Highest cognitive level
CO1	Know the secular nature of Tamil, the role of Dravidian language, the ideas of Thirukkural, the influence of religions and the development of modern literature.	K1
CO2	Understand the social and economic life of the Tamils and to describe sculptures, statues and beautiful handicrafts, musical instruments.	K2
CO3	Get the interest in playing Terukoothu, Karakatam, Villuppattu, Kanyan Koothu, Wailatam, Dholbaik Koothu, Silampattam, Valali, Tiger Actam, and splashing	K1
CO4	Acquire knowledge of TamilNadu's flora and fauna, Sangam architecture, export and import techniques.	K1
CO5	Know the role of Tamils in the Indian Liberation War and the role of Siddha medicine in Indian medicine.	K1

Assessment Pattern

Bloom's Category	Continuous Assessment Tests		Terminal Examination
	1	2	
Remember	60	50	60
Understand	40	50	40
Apply	0	0	0
Analyze	0	0	0
Evaluate	0	0	0
Create	0	0	0

COsand POs Mapping

COs	Highest Cognitive Level	POs											
		1	2	3	4	5	6	7	8	9	10	11	12
CO1	K1	2	-	-	-	-	-	-	-	-	-	-	-
CO2	K2	1	-	-	-	-	-	-	-	-	-	-	-
CO3	K1	1	-	-	-	-	-	-	-	-	-	-	-
CO4	K1	1	-	-	-	-	--	-	-	-	-	-	-
CO5	K1	1	-	-	-	-	-	-	-	-	-	-	-

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Scheme of Evaluation:

Component	Type of assessment	Max Marks	Reduced Marks	Final marks
Continuous Internal Examination (CIE)	CIE– I	100	40	40
	CIE–II	100	40	
End Semester Examination (ESE)	Theory Exam	100	60	60
Total				100

End semester Examination:(QP PATTERN)

- Each unit consists of two 2 marks questions and one16marks question(either or).
- All the fifteen questions have to be answered.

TEXT BOOKS

1. .தமிழகவரலாறு - மக்களும்பண்பாடும் - கே. கே. பிள்ளை (வெளியீடு:

தமிழ்நாடுபாடநூல்மற்றும்கல்வியியல்பணிகள்கழகம்).

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

3. கீழடி - வைகைநதிக்கரையில்சங்ககாலநகரநாகரிகம் (தொல்லியல்துறைவெளியீடு)

4. பொருநை - ஆற்றங்கரைநாகரிகம். (தொல்லியல்துறைவெளியீடு)

5. SocialLifeofTamils(Dr.K.K.Pillay)AjointpublicationofTNTB&ESCandRMRL–(inprint)

6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by:
   International Institute of Tamil Studies.

REFERENCEBOOKS

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-'SangamCityCivilizationonthebanksofriverVaigai'(JointlyPublishedby:Department

Of Archaeology &Tamil Nadu Text Book and Educational Services Corporation, TamilNadu)

4.Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay)

(Published by: The Author)

5.Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil

Nadu Text Book and Educational Services Corporation, TamilNadu)

6.JourneyofCivilizationIndustoVaigai(R.Balakrishnan)(Publishedby:RMRL)–ReferenceBook

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Course Code:	24MA101	Course Title:	**MATRICES AND CALCULUS** (Common to AI& DS, AE, BME, CE, CSE, CSE (AI& ML), EEE, ECE, MECH)
Credits:	**4**	**L – T – P**	**3 – 1 – 0**
Pre -requisite			**Nil**

Course objectives:
- To provide the basic tools of calculus mainly for the purpose of modeling the engineering problems mathematically and obtaining solutions.
- To learn the concept of eigenvalues and eigenvectors and to reduce the quadratic form to canonical form.
- To learn the foundation course of Single Variable and multivariable calculus plays an important role in the understanding of science, engineering, economics and computer science, among other disciplines.

Teaching-Learning Process:

These are sample strategies which teachers can use to accelerate the attainment of the various course outcomes.

- Lecture method does not mean only traditional method, but different type of teaching methods may be adopted to develop the outcomes.
- Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop thinking skills such as the ability to evaluate, generalize, and analyze information rather than simply recall it.
- Topics will be introduced in a multiple representation and encourage the students to come up with their own creative ways to solve them.
- Discuss how every concept can be applied to the real world and when that's possible, it helps to improve the students' understanding.

UNIT I – MATRICES	**[12 hours]**

Eigenvalues and Eigenvectors and their properties – Diagonalization of a matrix (Symmetric matrix) – Cayley - Hamilton theorem (without proof) – Inverse and Power of a matrix by Cayley - Hamilton theorem – Quadratic forms and Nature of quadratic forms.
Application: Reduction of a quadratic form to canonical form by orthogonal transformation.

UNIT II – Differential Calculus	**[12 hours]**

Functions – Limit – Continuity – Derivatives – Differentiation rule – Product and quotient rules – Chain rules – Implicit differentiation – Logarithmic differentiation.
Application: Maxima and Minima of functions of one variable

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UNIT III – FUNCTIONS OF SEVERAL VARIABLES	[12 hours]
Partial differentiation – Total derivative – Change of variables – Jacobians – Partial differentiation of implicit functions – Taylor's series for functions of two variables. Application: Maxima and Minima of functions of two variables using MATLAB - Lagrange's method of undetermined multipliers.	

UNIT IV – Integral Calculus	[12 hours]
Definite and Indefinite integrals - Substitution rule - Techniques of Integration: Bernoulli's theorem (without proof) – Trigonometric integrals, Trigonometric substitutions, Integration of rational functions by partial fraction, Integration of irrational functions - Improper integrals. Application: Area between simple closed curves.	

UNIT V – Multiple Integrals	[12 hours]
Double integrals –Double integrals in cartesian and polar coordinates – Change of order of integration– Area enclosed by plane curves – Triple integrals – Change of variables in double and triple integrals. Application: Volume of solids, Mass of Lamina	

Course outcomes:

On completion of the course, the student will have the ability to:

CO1	Apply the matrix algebraic techniques for eigen value related applications
CO2	Understand the concepts of limit and continuity of functions
CO3	Compute the derivatives and the extreme points and solve engineering problems
CO4	Use the partial derivatives and the maxima and minima of multivariable functions
CO5	Use fundamental theorem of calculus to evaluate definite integrals
CO6	Apply the concepts of multiple integrals to find the areas and volumes of geometrical shapes

COs and POs Mapping:

COs	POs											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	3	2	1		2							2
CO2	2	1	1									1
CO3	3	2	1		2							
CO4	3	2	1									
CO5	3	2	1									
CO6	3	2	1		1							1

Level 3- Highly Mapped, Level 2- Moderately Mapped, Level 1- Low Mapped, Level 0- Not Mapped

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Scheme of Evaluation:

Component	Type of assessment	Max Marks	Reduced Marks	Total	Final marks
Continuous Internal Examination (CIE)	CIE – I	100	50	100	40
	CIE – II	100			
	MCQ	20	10		
	Skill Assessment - I	40	40		
	Skill Assessment - II	40			
End Semester Examination (ESE)	Theory Exam	100	60	60	60
				Total	100

End semester Examination: (QP PATTERN)

- Each unit consists of two 2 marks questions and one 16 marks question (either or).

- All the fifteen questions have to be answered.

Assessment Pattern

Bloom's Category	Continuous Internal Examination		End Semester Examination
	1	2	
Remember	20	20	20
Understand	40	40	20
Apply	40	60	60
Analyze	0	0	0
Evaluate	0	0	0
Create	0	0	0

Text Books:

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

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

3. James Stewart, "Calculus: Early Transcendentals", Cengage Learning, 8th

Edition, New Delhi, 2015. [For Units II & IV - Sections 1.1, 2.2, 2.3, 2.5, 2.7 (Tangents problems only), 2.8, 3.1 to 3.6, 3.11, 4.1, 4.3, 5.1 (Area problems only), 5.2, 5.3, 5.4 (excluding net change theorem), 5.5, 7.1 - 7.4 and 7.8]

Reference Books:

1. Muthusubramanian R and Salivahanan S, "Basic Electrical and Electronics Engineering," McGraw Anton. H, Bivens. I and Davis. S, " Calculus ", Wiley, 10th Edition, 2016

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

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

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

5. Ramana. B.V., "Higher Engineering Mathematics", McGraw Hill Education Pvt. Ltd, New Delhi, 2016.Hill, NewDelhi, 2009.

Equivalent NPTEL/SWAYAM Courses

S. No.	Course Title	Course Instructor	Host Institute
1	Matrix Analysis with Applications	Prof. S. K. Gupta Prof. Sanjeev Kumar	IIT Roorkee
2	Calculus of One Real Variable	Prof. Joydeep Dutta	IIT Kanpur

Web Links and Video Lectures (E-Resources):

1. System of Linear Equations, Eigenvalues and Eigenvectors:
   https://www.nptelvideos.com/lecture.php?id=13416

2. Concept of Domain, Limit, Continuity and Differentiability:
   https://www.nptelvideos.com/lecture.php?id=13422

3. Matrix Diagonalization: https://www.nptelvideos.com/lecture.php?id=13481

Course Code:	24ME301	Course Title:	ENGINEERING MECHANICS (Common for Agri ,Civil and Mechanical)
Credits:	4	L – T – P	3-1-0
Pre -requisite		Nil	

Course objectives:

 To impart knowledge on the
- To Learn the use scalar and vector analytical techniques for analysing forces in statically determinate structures
- To introduce the equilibrium of rigid bodies, vector methods and free body diagram
- To study and understand the properties of surfaces and solids.
- To learn the principles of friction, forces and apply the concepts of frictional forces at the contact surfaces of various engineering systems.
- To develop basic dynamics concepts – force, momentum, work and energy

Teaching-Learning Process:

 Suggested strategies that teachers may use to effectively achieve the course outcomes:
1. Chalk and Talk
2. Lab experiment videos
3. Blended Mode of Learning
4. Project based Learning
5. Experiential Learning
6. NPTEL and Other Videos
7. Smart Class Room
8. Flipped Class

UNIT I – STATICS OF PARTICLES	[9+3 hours]

Fundamental Concepts and Principles, Systems of Units, Method of Problem Solutions, Statics of Particles - Forces in a Plane, Resultant of Forces, Resolution of a Force into Components, Rectangular Components of a Force, Unit Vectors. Equilibrium of a Particle- Newton's First Law of Motion, Space and   Free-Body Diagrams.

UNIT II – EQUILIBRIUM OF RIGID BODIES	[9+3 hours]

Principle of Transmissibility, Equivalent Forces, Vector Product of Two Vectors, Moment of a Force about a Point, Varignon's Theorem, Rectangular Components of the Moment of a Force, Distributed Loads on Beams, Moment of a Force about an Axis, Couple - Moment of a Couple, Equivalent Couples, Addition of Couples, Resolution of a Given Force into a Force -Couple system, Further Reduction of a System of Forces, Equilibrium in Two Dimensions - Reactions at Supports.

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UNIT III – PROPERTIES OF SURFACES AND SOLIDS	[9+3 hours]

Centroids of lines and areas – symmetrical and unsymmetrical shapes, Determination of Centroids by Integration, Theorems of Pappus- Guldinus, Centre of Gravity of a Three-Dimensional Body, Moments of Inertia of Areas and Mass - Determination of the Moment of Inertia of an Area by Integration, Polar Moment of Inertia, Radius of Gyration of an Area, Parallel-Axis Theorem, Moments of Inertia of Composite Areas, Moments of Inertia of a Mass - Moments of Inertia of Thin Plates.

UNIT IV – FRICTION	[9+3 hours]

The Laws of Dry Friction, Coefficients of Friction, Angles of Friction, Wedge friction, Wheel Friction, Rolling Resistance, Ladder friction, Belt friction.

UNIT V – DYNAMICS OF PARTICLES	[9+3 hours]

Kinematics - Rectilinear Motion and Curvilinear Motion of Particles. Kinetics- Newton's Second Law of Motion-Equations of Motions, Dynamic Equilibrium, Energy and Momentum Methods - Work of a Force, Kinetic Energy of a Particle, Principle of Work and Energy, Principle of Impulse and Momentum, Impact of bodies.

Course outcomes:

On completion of the course, the student will have the ability to:

CO1	Illustrate the vector and scalar representation of forces and moments.
CO2	Analyse the rigid body in equilibrium.
CO3	Understand the properties of surfaces and solids.
CO4	Apply the friction and its effects by the laws of friction
CO5	Calculate dynamic forces exerted in rigid body.

COs and POs Mapping:

	POs											
COs	1	2	3	4	5	6	7	8	9	10	11	12
CO1	3	3	2	1	1	-	-	-	-	-	-	3
CO2	3	3	2	1	1	-	-	-	-	-	-	3
CO3	3	3	3	1	1	-	-	-	-	-	-	3
CO4	3	3	3	1	1	-	-	-	-	-	-	3
CO5	3	3	3	1	1	-	-	-	-	-	-	3

Level 3- Highly Mapped, Level 2- Moderately Mapped, Level 1- Low Mapped, Level 0- Not Mapped

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Scheme of Evaluation:

Component	Type of assessment	Max Marks	Reduced Marks	Total	Final marks
Continuous Internal Examination (CIE) - Theory	CIE – I	100	50	100	40
	CIE – II	100			
	MCQ	20	10		
	Skill Assessment - I	40	40		
	Skill Assessment - II	40			
End Semester Examination (ESE)	Theory Exam	100	60	60	60
				Total	100

Assessment Pattern

Bloom's Category	Continuous Assessment Tests		Terminal Examination
	1	**2**	
Remember	20	20	20
Understand	40	40	40
Apply	40	40	40
Analyze	0	0	0
Evaluate	0	0	0
Create	0	0	0

End semester Examination: (QP PATTERN)

- Each unit consists of two 2 marks questions and one 16 marks question (either or).
- All the fifteen questions have to be answered.

Text Books:

1. Beer Ferdinand P, Russel Johnston Jr., David F Mazurek, Philip J Cornwell, Sanjeev Sanghi, Vector Mechanics for Engineers: Statics and Dynamics, McGraw Higher Education., 12thEdition, 2019.

2. Vela Murali, "Engineering Mechanics-Statics and Dynamics", Oxford University Press, 2018.

3. Kottiswaran N "Engineering Mechanics-Statics and Dynamics", Pearson Education, 2018.

Reference Books:

1. Boresi P and Schmidt J, Engineering Mechanics: Statics and Dynamics, 1/e, Cengage learning, 2008.

2. Hibbeller, R.C., Engineering Mechanics: Statics, and Engineering Mechanics: Dynamics, 13th edition, Prentice Hall, 2013.

3. Irving H. Shames, Krishna Mohana Rao G, Engineering Mechanics – Statics and Dynamics, 4thEdition, Pearson Education Asia Pvt. Ltd., 2005.

4. Meriam J L and Kraige L G, Engineering Mechanics: Statics and Engineering Mechanics: Dynamics, 7th edition, Wiley student edition, 2013.

5. Timoshenko S, Young D H, Rao J V and SukumarPati, Engineering Mechanics, 5thEdition, McGraw Hill Higher Education, 2013.

6. Bansal R K., Engineering Mechanics-Statics and Dynamics, Revised 7th Edition, Laxmi Publications.

Web Links and Video Lectures (E-Resources):

1. NPTEL: Engineering Mechanics https://archive.nptel.ac.in/courses/112/106/112106286/

2. https://www.iitg.ac.in/rkbc/me101/Presentation/L16-18.pdf

Suggested Skill Activities:

1. Force analysis on any stationary object

2. Force analysis of structures and structural components

3. Determination of centre of gravity of composite surfaces

4. Building different types of slopes for frictional applications

5. Force analysis on any moving object

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Course Code:	24EN101	Course Title:	**ENGLISH FOR ENGINEERS [Common to AI&DS, AE,BME,CE,CSE,CSE(AI& ML),EEE, ECE,MECH]**
Credits:	**2.5**	**L – T – P**	**2-0-1**
Pre -requisite			**Nil**

Course Objectives:
1. To develop an understanding of Basic English Grammar.
2. To enhance listening skills and select appropriate responses.
3. To practise presentation and speaking techniques.
4. To develop a quest for reading.
5. To practise professional writing.

Teaching-Learning Process:
Suggested strategies that teachers may use to effectively achieve the course outcomes:

1. Chalk and Talk
2. Language learning softwares / Language Lab
3. Online Resources
4. Smart Class Room
5. Flipped classrooms
6. Project based Collaborative Experiential learning
7. Expert Lecture sessions

UNIT I - BASIC GRAMMAR- VOCABULARY AND EXPRESSIONS	**[8 hours]**

Grammar: Parts of speech - Types of sentences: Assertive - Imperative - Interrogative & Exclamatory - Affirmative - Negative - Gerunds & Infinitives - Tenses - Voices- Impersonal passives- Prepositions- Articles & Determiners- Cause and effect expressions - Vocabulary: Affixes- Synonyms & Antonyms - Homonyms - Homophones- Compound Nouns.

UNIT II - ACTIVE LISTENING - RESPONDING		**[15 hours]**
LIST OF EXERCISES		
LAB ACTIVITIES		
Sl. No.	**Topic**	**Hours**
1.	Listening to Audio (Podcasts- Audiobooks- Radio Program) and Practice Exercise-Answering Cloze Test Based on Listening	3
2.	Listening to native speaker's Telephone Conversations– Analyzing a Product	3
3.	Listening to Job Interviews - Sports Commentaries / Animated stories / Anecdotes / Event narration	3

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4.	Video Comprehension – Brainstorming and Note-Taking	3
CLASSROOM ACTIVITIES		
1.	Listening to Statistical Information and Follow-up Exercises. - Form Filling Exercises	1
2.	Debate and reviewing the performance of each participant - Panel Discussion	2

UNIT III: SPEAKING AND PRESENTATION SKILLS		**[15 hours]**
LIST OF EXERCISES		
LAB ACTIVITIES		
Sl. No.	**Topic**	**Hours**
1.	Speaking Development through English software S-net or Globarena and Online Content (Tenses- Voices- SV Agreement- Prepositions- Coherence Markers- Relative Clauses- Modals- Punctuation)	5
CLASSROOM ACTIVITIES		
1.	Self-Introduction - Sharing Childhood Experiences- Talking about Favorite Personalities	1
2.	Describing Recent Innovation in Technology	1
3.	Interviewing Celebrities and Entrepreneurs	1
4.	Situational Conversations (Meeting a friend in a cafe) - Narrating Personal Experience	1
5.	Group Communication- Discussing Social Issues- Current Affairs and Debate	1
6.	Role-Play- Picture/Movie Description	1
7.	Presentation – I (Book /Movie Review- Story Telling- General Presentations)	2
8.	Presentation – II (Technical Presentations)	2

UNIT IV: READING BETWEEN LINES		**[12 hours]**
LIST OF EXERCISES		
LAB ACTIVITIES		
Sl. No.	**Topic**	**Hours**
1.	Reading Comprehension - skimming - scanning (General / Technical passages	2
2.	Reading Longer Texts with Time Frame	2
3.	Reading Data using different types of Texts- Magazines and Internet Materials	2
4.	Reading Research Papers-- Editing/Proofreading	2
CLASSROOM ACTIVITIES		
1.	Job Advertisements – Manual for Product/Service – Telephone Phrases	1

| 2. | Reading Cause and Effect Essays-Technical Papers and Case Studies - Sorting out jumbled Sentences in a Paragraph | 2 |
| 3. | Short Stories - Critical Reading | 1 |

LIST OF EXERCISES		
LAB ACTIVITIES		
Sl. No.	**Topic**	**Hours**
1.	Mind Mapping and Brainstorming on any Social Event/Issue	1
2.	Creating a Blog/Vlog/YouTube Channel –Uploading MP3/MP4 – Practice (Movie/Book/ Gadget Review-General/Tech Talks- Interview with Celebrities)	1
3.	Creating a Product Review Blog.	1

UNIT V- WRITING FOR ENGINEERS	**[7+3 hours]**

Writing - Application Letters - Resume- Product Description - Essay related to Technical / Social / current topics - Interpretation of Charts - Short Articles on everyday life - letters – Enquiry- Quotation- Order- Claim - Adjustment - Response to complaints - Statement of Purpose (SoP) -Emails - Memos -Notices - Circulars - Minutes of Meetings - Internship - Accident Report - Feasibility Report- Recommendations.

Course outcomes:

On completion of the course, the student will have the ability to:

CO1	Identify various grammatical components- build vocabulary and apply expressions for error-free sentences	K3
CO2	Make use of appropriate words to respond by listening to general and technical online contents	K3
CO3	Experiment with the nuances of presentation and speaking skills	K3
CO4	Apply reading skills in various academic contexts	K3
CO5	Construct legible and flawless sentences proficiently with appropriate choice of words and structures for varied professional contexts	K3

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COs and POs Mapping:

COs	POs											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1										3		3
CO2										3		3
CO3										3		3
CO4										3		3
CO5										3		3

Level 3- Highly Mapped, Level 2- Moderately Mapped, Level 1- Low Mapped, Level 0- Not Mapped

Scheme of Evaluation:

Component	Type of assessment	Max. Marks	Reduced Marks	Total	Final marks
Continuous Internal Examination (CIE) - **Theory**	CIE – I	100	60	100	25
	CIE – II	100			
	Skill Assessment – I (2 Assignments + 1 seminar)	40	40		
	Skill Assessment – II (3Assignments)	40			
Continuous Internal Examination (CIE) - **Laboratory**	Continuous Assessment (Lab activities & exercises)	75	75	100	25
	Model Lab Exam	25	25		
End Semester Examination (ESE)	Theory Exam	100	35	50	50
	Lab Exam	100	15		
				Total	100

Assessment Pattern

Bloom's Category	Continuous Assessment Tests		Terminal Examination
	1	2	
Remember	10	10	10
Understand	30	30	30
Apply	60	60	60
Analyze	0	0	0
Evaluate	0	0	0
Create	0	0	0

Text Books:

1. Gangalakshmi- C- Rathika- B- Saranraj- L. Professional English for Engineers. New Delhi: Cengage- 2022.
2. Murphy- Raymond. English Grammar in Use Book with Answers: A Self-study Reference and Practice Book for Intermediate Learners of English. Fourth Edition: Cambridge University Press- 2012.

Reference Books:

1. Raman- Meenakshi and Sangeetha Sharma. Communication Skills. New Delhi: OUP- 2018
2. R. C. Sharma_Krishna Mohan - Business Correspondence and Report Writing _ a Practical Approach to Business _ Technical Communication-Mc Graw Hill India (2017)

Web Links and Video Lectures (E-Resources):

MANUALS / SOFTWARE: Open Sources / British Council / Cambridge Websites

Suggested Skill Activities:

1) Listening tests materials [Select podcasts / radio programmes / YouTube videos / audiobooks / materials from British Council] - Cloze tests where students fill in missing words from transcripts – Yes or No Question Answers – one-word answers based on recording – summary of recording

2) Self-introduction / Introduce Colleague

3) Just a Minute talks

4) Extempore

5) Mock GDs

6) Mock Interviews

7) Note Taking of Engineering Lectures

8) Create videos / blogs

9) Present Technical Papers

10) Reading Comprehension Exercises

11) Writing letters – Leave letter – Letter for academic purposes

12) Writing Essays

13) Composing Mails

14) Preparing Statement of Purpose

15) Preparing Covering letter and Resume

Course Code:	24PH101	Course Title:	ENGINEERING PHYSICS (Common to ALL Branches)
Credits:	4	L – T – P	3-0-2
Pre -requisite		Nil	

COURSE OBJECTIVES

- To make the students effectively to achieve an understanding of Mechanics
- To enable the students to gain knowledge of Elasticity.
- To enable the students to gain knowledge of Maxwell's Equation and Electromagnetic waves.
- To introduce the basics of optics and lasers.
- Equipping the students to be successfully understand the importance of quantum physics.

Teaching-Learning Process:

Suggested strategies that teachers may use to effectively achieve the course outcomes:

1. Chalk and Talk

2. Lab experiment videos

3. Blended Mode of Learning

4. Project based Learning

5. Experiential Learning

6. NPTEL and Other Videos

7. Smart Class Room

8. Flipped Class

UNIT- I MECHANICS	[9 hours]

Multiparticle dynamics: Center of mass (CM) – Rotation of rigid bodies: Rotational kinematics – Rotational kinetic energy and moment of inertia - Theorems of M .I –M.I of Uniform rod-M.I of a diatomic molecule - Torque– Rotational energy state of a rigid diatomic molecule - Gyroscope – Torsional stress and deformation-Torsional pendulum-Double pendulum.

Practical Topics:
1. Torsional pendulum – Determination of rigidity modulus of wire and moment ofinertia of disc.
2. Compound pendulum – Determination of rigidity modulus

UNIT- II ELASTICITY	[9 hours]

Elasticity – Factors affecting Elasticity –Different types of Modulus- Moduli of elasticity and its relation -Stress - strain diagram and its applications - Bending of beams - Bending moment – Cantilever - Young's modulus : Uniform & Non-uniform bending-theory and experiment-I Shaped Girders.

Practical Topics:
1. Determination of Young's modulus of a given material- Non uniform bending method
2. Uniform bending – Young's modulus determination.

UNIT- III MAXWELL'S EQUATIONS AND ELECTROMAGNETIC WAVES	[9 hours]

The Maxwell's equations - wave equation- Plane electromagnetic waves in vacuum - properties of electromagnetic waves - Producing electromagnetic waves - Energy and momentum in EM waves - Cell-phone reception. Reflection and transmission of electromagnetic waves from a non-conducting medium vacuum interface for normal incidence..

Practical Topics:
1. Spectrometer – Determination of wavelength of Hg spectrum using grating.
2. Spectrometer – Angle of the prism
3. Spectrometer – Dispersive power of the prism

UNIT- IV LASERS &FIBER OPTICS	[9 hours]

Lasers:-Einstein coefficients and their relations –-characteristics of laser - Types of Laser - Nd-YAG laser -semiconductor laser- Applications -Industrial, Medical, laser based military weapons
Fiber optics: principle and classification of optical fibers – propagation of light in optical fiber - Numerical aperture and Acceptance angle– Fiber optic communication system - Applications - Displacement and pressure sensors – Endoscopy

Practical Topics:
1. Determination the acceptance angle and numerical aperture of the given optical fiber.
2. Determination of the particle size of the given powder using laser
3. Determination of wavelength of a given laser source - Grating method

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UNIT-V QUANTUM MECHANICS	**[9 hours]**
Photons and light waves - Electrons and matter waves- Dual Nature of Light –-De Broglie Waves-Compton effect - The Schrodinger equation (Time dependent and time independent forms) - Physical Significance of wave function - Normalization –Free particle - particle in a infinite potential well: 1D,2D and 3D Boxes- Normalization-quantum computation.	
Practical Topics:	
1, Young's Double Slit Experiment to demonstrate the wave nature of particles	

Laboratory component: **(30 Hours)**

Any ten experiments have to be completed from the following list ofExperiments

Sl. No	Name of the experiment
1.	Apply parallel axis theorem to find the resultant of system of concurrent coplanar forces.
2.	Torsional pendulum – Determination of rigidity modulus of wire and moment of inertia of disc
3.	Compound pendulum- Determination of moment of inertia of a rigid rod.
4.	Apply the concept of bending of beams to find the Young's modulus of a given material- by Non uniform bending method
5.	Apply the concept of bending of beams to find the Young's modulus of a given material- by Uniform bending method.
6.	Determination of V-I characteristics of a solar cell.
7.	Using Ohm's law verify the laws of resistances .
8.	Using optical fiber find the acceptance angle and numerical aperture.
9.	Make use of the laser source find the particle size of the given powder.
10.	Determination of wavelength of a given laser source - Grating method
11.	Spectrometer – Determination of wavelength of Hg spectrum using grating
12.	Spectrometer – Dispersive power of the prism
13.	Determination of magnetic Induction due to long current carrying conductor.
14.	Make use of the Young's Double Slit Experiment, demonstrate the wave nature of particles.
15.	Spectrometer – Angle of the prism

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Course outcomes: On completion of the course, the student will have the ability to:

CO No	Corse Outcomes	Level
CO1	Apply the concepts of Mechanics in materials.	K3
CO2	Apply the concept of elasticity in beams.	K3
CO3	Apply the concept of electromagnetic waves in communication.	K3
CO4	Illustrate the applications of different lasers &Calculate the acceptance angle and numerical aperture of an optical fiber .	K2
CO5	Explain the quantum concepts and quantum computation.	K2

COs and POs Mapping

COs	POs											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1	3	2	2	-			-	-	-	-	-	1
CO2	3	2	2	-	1		-	-	-	-	-	1
CO3	3	2	2	-	1	1	-	-	-	-	-	1
CO 4	3	1	1	-	1	1	-	-	-	-	-	1
CO 5	3	1	1	-			-	-	-	-	-	1

Level 3- Highly Mapped, Level 2- Moderately Mapped, Level 1- Low Mapped

Scheme of Evaluation

Component	Type of assessment	Max Marks	Reduced Marks	Total	Final marks
Continuous Internal Examination (CIE) - Theory	CIE – I	100	60	100	25
	CIE – II	100			
	Skill Assessment - I	40	40		
	Skill Assessment - II	40			
Continuous Internal Examination (CIE) - Laboratory	Continuous Assessment	75	75	100	25
	Model Lab Exam	25	25		
End Semester Examination (ESE)	Theory Exam	100	35	50	50
	Lab Exam	100	15		
				Total	100

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End semester Examination: (QP PATTERN)

- Each unit consists of two 2 marks questions and one 16 marks question (either or).

- All the fifteen questions have to be answered.

Assessment Pattern

Bloom's Category	Continuous Assessment Tests		Terminal Examination
	1	**2**	
Remember	20	20	20
Understand	20	60	40
Apply	60	20	40
Analyze	0	0	0
Evaluate	0	0	0
Create	0	0	0

TEXT BOOKS:

1. D.Kleppner and R.Kolenkow. An Introduction to Mechanics. McGraw Hill Education (Indian Edition), 2017.
2. E.M.Purcell and D.J.Morin, Electricity and Magnetism, Cambridge Univ.Press, 2013.
3. Bhattacharya, D.K. & Poonam, T. "Engineering Physics". Oxford University Press, 2015

REFERENCES:

1. R.Wolfson. Essential University Physics. Volume 1 & 2. Pearson Education (Indian Edition),2009.
2. Paul A. Tipler, Physic – Volume 1 & 2, CBS, (Indian Edition), 2004.
3. K.Thyagarajan and A.Ghatak. Lasers: Fundamentals and Applications, LaxmiPublications,(Indian Edition), 2019.
4. D.Halliday, R.Resnick and J.Walker. Principles of Physics, Wiley (Indian Edition), 2015.

NPTEL COURSE:

Sl.No	Course Name	Course Instructor	Course Conducting Agency
1	Quantum Mechanics	Prof .P.Ramadevi	IIT -Bombay

Web links and Video Lectures (e-Resources):

ELASTICITY

https://youtu.be/eICv1p8WjgI?si=88hhiQw_fld7ZrBU

MAXWELL'S EQUATIONS AND ELECTROMAGNETIC WAVES

https://youtu.be/3IPVZYf7C-U?si=PnP1nupcfGfr1C76

LASERS &FIBER OPTICS

https://youtu.be/Ab1nxxkgjH8?si=KR2GS8iBUFayBwd

pQUANTUM MECHANICS

https://youtu.be/AEedn_NiWN0?si=Y27pAqawlwKmthNO

Skill Assessment:

1. Explain the concept behind the balance a water bottle on a edge.
2. The leaning Tower of Pisa is able to stand tilted without toppling, what is the reason behind it.
3. Apply the elasticity concept to find the fatigue change in plastic fiber and natural fiber
4. Radio antennas emit visible light, Why?
5. What does an opaque substance do when light rays fall on it.
6. Illustrate the things happen when light falls on a piece of black paper.
7. Explain the dual nature of matter.
8. Optical Fiber is used in hard to reach places in mechanical inspection explain it.
9. Is quantum communication faster than the speed of light?
10. Compare electron microscope & tunneling microscope.

Course Code	24CY101	Course Title:	**ENGINEERING CHEMISTRY** (Common to ALL Branches)
Credits:	4	**L – T – P**	**3-0-2**
Pre -requisite			Nil

Course objectives:

- ➤ To provide a comprehensive understanding of water quality parameters, water treatmenttechniques and wastewater systems.
- ➤ To use the fundamental science and engineering principles relevant to materials that includescharacterization, properties and processing of engineering materials.
- ➤ To familiarize with the principles, working and applications of electrochemistry and storagedevices for safe, effective and efficient operations.
- ➤ To study, measure, monitor, control and prevent corrosion processes, economically andsafely.
- ➤ To classify different types of fuel and fuel analysis techniques that assists to choose mostconvenient fuel for a process involving combustion.

Teaching-Learning Process:

Suggested strategies that teachers may use to effectively achieve the course outcomes:

1. Chalk and Talk
2. Blended Mode of Learning
3. Experiential Learning
4. NPTEL and Other Videos for theory topics
5. Flipped Class
6. Lab Experiment Videos

UNIT-1 WATER TREATMENT	**[9 hours]**

Water Sources- Water Quality parameters - Hardness of water – types-units and calcium carbonate equivalent. -Determination of hardness of water by EDTA method. Scale and sludge, caustic embrittlement, priming and foaming and boiler corrosion. Water softening methods – internal and external conditioning –zeolite process and ion exchange process. Desalination – reverse osmosis andelectro dialysis- Municipal water treatment and waste water treatment process.

Practical Topics:

1. Determination of total hardness by EDTA method.
2. Estimation of alkalinity by Indicator method.
3. Estimation of chlorine content in water sample by Argentometric method.
4. Determination of BOD in water samples.

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UNIT-2	CHEMISTRY OF ENGINEERING MATERIALS	[9 hours]

Adhesives: Introduction- requisites of a good adhesive-adhesive action-industrial applications of adhesives.

Insulating Materials: Introduction- requirements- Glass and ceramics - preparation, properties andapplications - fabrication of ceramic ware.

Lubricants-Classification of lubricants with examples-characteristics of a good lubricants - mechanism of lubrication (thick film, thin film and extreme pressure) - properties of lubricants: viscosity, cloud point, pour point, flash point and fire point**.**

Electronic materials: Introduction-types, properties and applications of semiconducting materials and transistors, materials used in IC's, fibers and cables- properties and applications, organic solar cells - types and applications.

Practical Topics:
1. Determination of viscosity of oils using Oswald viscometer.
2. Determination of cloud point and pour point of oils.

UNIT-3 ELECTROCHEMISTRY	[9 hours]

Introduction – Electrode potential – Nernst equation and problems - Electrochemical series - Conductometric titrations (acid - base & precipitation titration)

Electrodes: Construction, working and applications of Standard and reference electrode (Hydrogen & Calomel) – Ion selective (glass electrode) – determination of pH using glass electrode.

Batteries and Fuel Cells – Types of batteries —dry cell -Lead Storage battery–Nickel-Cadmium Battery – Lithium battery – Battery hazards - Biological Batteries. Fuel Cells – Hydrogen-Oxygen FuelCell.

Practical Topics:
1. Estimation of strength of hydrochloric acid by pHmetry.
2. Determination of strength of acids in a mixture of acids using conductivity meter.
3. Determination of charging and discharging rate of batteries.

UNIT-4 CORROSION AND ITS CONTROL	[9 hours]

Corrosion – causes, factors, types, Chemical and Electrochemical Corrosion (Galvanic, Differential aeration) –galvanic series-factors influencing rate of corrosion-measurement of corrosion. Determination of corrosion rate by weight loss method.

Control Methods-Electrochemical protection – Sacrificial Anodic method – Impressed Current Cathodic Protection – Corrosion Inhibitors – Bio corrosion Protective Coatings – Paints, Constituents, Functions- Surface coating - Surface preparation for metallic coatings, Electroplating and Electro-lessPlating- ceramic coatings, thermal vaporization coating, HVOF coating

Practical Topics:
1. Estimation of the Ferrous ions in mild steel by Spectrophotometry.
2. Determination of rate of corrosion of by weight loss method

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UNIT-5 FUELS AND COMBUSTION	[9 hours]

Fuels: Introduction: Classification of fuels; solid fuel -Coal and coke: Analysis of coal (proximate and ultimate), Carbonization, Manufacture of metallurgical coke (Otto Hoffmann method). Liquid fuels -Manufacture of synthetic petrol –hydrogenation of coal (Bergius process), Knocking – octane number, diesel oil – cetane number; Power alcohol and biodiesel. Combustion of fuels: Introduction: Calorific value – higher and lower calorific values, Theoretical calculation of calorific value by Dulong's formula - Ignition temperature: spontaneous ignition temperature, Explosive range; Flue gas analysis – ORSAT Method.

Practical Topics:
1. Determination of flash point and fire point of fuels.
2. Determination of charging and discharging rate of batteries.

Laboratory component: [30 hours]

Any ten experiments have to be completed from the following list of experiments

Sl.No.	Name of the experiment
1	Determine the total hardness of water sample by EDTA method.
2	Analyze the alkalinity of water sample by Indicator method.
3	Analyze the chlorine content in water sample by Argentometric method.
4	Determine the BOD of water samples.
5	Describe the procedure to determine the viscosity of oil using an Oswald viscometer.
6	Identify the cloud point and pour point of oils.
7	Make use of glass electrode to determine the strength of hydrochloric acid.
8	Make use of conductivity meter to determine the strength of acids in a mixture of acids.
9	Determine quantitatively the amount of Ferrous ions in mild steel by Spectrophotometry.
10	Determine the of rate of corrosion of by weight loss method.
11	Describe the procedure to determine the flash point and fire point of fuels.
12	Conduct a study to find out the charging and discharging rate of batteries.

Course outcomes: On completion of the course, the student will have the ability to:

CO No.	Course Outcomes	Highest cognitive level
CO1	Analyze the water quality parameters and choose appropriate water treatment methods for use in industries and daily life.	K4
CO2	Make use of the applications of the materials in different engineering disciplines.	K3
CO3	Utilize the principles of electrochemistry and find the materials for energyconversion and storage.	K4
CO4	Determine the corrosion rate to propose suitable protection methods for environmental considerations	K3
CO5	Choose suitable fuels for engineering processes and automobile applications.	K3

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COs and POs Mapping

COs	Highest Cognitive Level	POs											
		1	2	3	4	5	6	7	8	9	10	11	12
CO1	K4	2	2				1						
CO2	K3	2	1										
CO3	K4	2	1										
CO4	K3	2	2	1			2	2					
CO5	K3	2	1										

Level 3- Highly Mapped, Level 2- Moderately Mapped, Level 1- Low Mapped, Level 0- Not Mapped

Assessment Pattern

Bloom's Category	Continuous Assessment Tests		Terminal Examination
	1	**2**	
Remember	10	10	10
Understand	30	30	30
Apply	40	40	40
Analyze	20	20	20
Evaluate	0	0	0
Create	0	0	0

Scheme of Evaluation:

Component	Type of assessment	Max Marks	Reduced Marks	Total	Final marks
Continuous Internal Examination (CIE) - Theory	CIE – I	100	60	100	25
	CIE – II	100			
	Skill Assessment - I	40	40		
	Skill Assessment - II	40			
Continuous Internal Examination (CIE) - Laboratory	Continuous Assessment	75	75	100	25
	Model Lab Exam	25	25		
End Semester Examination (ESE)	Theory Exam	100	35	50	50
	Lab Exam	100	15		
				Total	**100**

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End semester Examination: (QP PATTERN)

- Each unit consists of two 2 marks questions and one 16 marks question (either or).
- All the fifteen questions have to be answered.

Text Books:

1. Jain P.C. and Jain M, Engineering Chemistry, Dhanpat Rai Publishing Company, New Delhi, 17th Edition, 2021.
2. Dara S S and Umare S.S, A Text Book of Engineering Chemistry, S.Chand & Company Limited, 20thEdition, 2018.

Reference Books:

1. Benjamin M. M, Water Chemistry, Waveland Press, 2nd Edition, 2019.
2. Cicek V, Corrosion Engineering, Springer Publishing, 1st Edition, 2021.
3. Shahinpoor. M, Fundamentals of Smart Materials, Publisher: Royal Society of Chemistry, 1st Edition, 2020.
4. Berg H, Bernhardsson S, and Johansson P, Electric Vehicle Batteries: Moving from Research towardsInnovation, Publisher: Springer, 1st Edition, 2019.
5. B.K.Sharma "Engineering chemistry" Krishna Prakasan Media (P) Ltd., Meerut (2014).

Web links and Video Lectures (e-Resources):

1. Water and wastewater treatment - https://onlinecourses.nptel.ac.in/noc2 3_ce12/preview
2. SemiconductorDevices and circuits. - https://nptel.ac.in/courses/108108112
3. Corrosion ProtectionMethods - https://onlinecourses.nptel.ac.in/noc2 3_mm01/preview
4. Elementary Electrochemistry - https://onlinecourses.nptel.ac.in/noc23_cy19/preview
5. Fuel and combustionTechnology - https://archive.nptel.ac.in/courses/10 3/105/103105110/

Suggested Skill Activities:

1. Measure the TDS, PH & electrical conductivity of a home water.
2. Removal of temporary hardness of any water sample by suitable method.

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3. Find the charging and discharging rate of mobile batteries when it is use or not.

4. The need of engineering material is essential in our day today life. - Justify the answer.

5. Measure the corrosion rate of iron bar when it is exposed in the environment.

6. List out the recent engineering materials used in emerging field.

7. Calculate the higher and lower calorific value of a fuel by using Dulong's formula.

8. List out the type of coatings applied on materials which are used in our daily life.

9. Improper disposal of batteries leads to environmental hazard. Suggest the suitable disposable method.

10. Pure Iron material undergo corrosion more fast than other materials. Give reasons.

Course Code:	24EE202	Course Title:	**FUNDAMENTALS OF ELECTRICAL AND ELECTRONICS ENGINEERING**
Credits:	**4**	**L – T – P**	**3-0-2**
Pre -requisite			**Nil**

Course objectives:
To impart knowledge on the
- Basics of DC electric circuits and its analysis
- Analysis of AC circuits and magnetic circuits
- Working principles and application of DC machines and transformers
- Digital devices and their characteristics
- Functional elements and working of sensors and actuators used for smart systems.

Teaching-Learning Process:
Suggested strategies that teachers may use to effectively achieve the course outcomes:
1. Chalk and Talk
2. Lab experiment videos
3. Blended Mode of Learning
4. Project based Learning
5. Experiential Learning
6. NPTEL and Other Videos
7. Smart Class Room
8. Flipped Class

UNIT I –DC CIRCUITS	[9 hours]

Introduction to DC Circuits – Circuit Components: Conductor, Resistor, Inductor, Capacitor – Ohm's Law - Kirchhoff's Laws –Nodal Analysis, Mesh analysis with independent sources only – Appliances.

Practical Topics:
1. Model an electrical circuit and simulate it to verify Ohms Law.
2. Model an electrical circuit and simulate it to verify Kirchhoff's Voltage Law.
3. Model an electrical circuit and simulate it to verify Kirchhoff's Current Law.

UNIT II – AC CIRCUITS AND MAGNETIC CIRCUITS	[9 hours]

Introduction to poly-phase circuits - Representation of sinusoidal waveform – peak and rms values, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations – Converters: rectifiers and inverters; Basics of magnetic circuits – Flux – Flux density – Magnetic resonance – Self-inductance – mutual-inductance – Coupling.

Practical Topics:
1. Demonstrate the measurement of power in an RLC circuit using wattmeter method.
2. Interpret the DC output of an RLC circuit using half wave rectifier.
3. Interpret the DC output of an RLC circuit using full wave rectifier.

UNIT III – DC MACHINES AND TRANSFORMERS	[9 hours]

Construction, principle of operation, characteristic and application – DC Motor and DC Generator, Types of DC motors and generators – Application: Electric Vehicle – Structure of electric power system – Introduction to single phase transformers – Construction, principle of operation, characteristics and application.

Practical Topics:
1. Conduct the load test on DC shunt motor to outline its characteristics.
2. Outline the study on the starting methods of DC series motor.
3. Conduct a study on transformer construction for real-time applications.

UNIT IV – DIGITAL ELECTRONICS	[9 hours]

Introduction to digital systems – Number system – Boolean Algebra – POS and SOP – Logic gates – K-map simplification – Flip Flops – Combinational logic circuits: adders – subtractors.

Practical Topics:
1. Experiment with the logic gates to verify its truth table.
2. Make use of the logic gates to verify the functioning of half and full adders.
3. Make use of the logic gates to verify the functioning of half and full subtractors.

UNIT V – SENSORS AND ITS APPLICATIONS	[9 hours]

Sensors in IoT – Mobile based sensors, Resistance Temperature sensor, Humidity sensor –Medical sensor – Neural sensor – Motion sensor – PIR sensor, Piezoelectric sensor, Air quality sensor – CO_2 Sensor, RFID sensor, Water leakage detection

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sensor, Light sensors - Introduction to actuators in automation – Applications: smart homes – smart cities – smart parking system.

Practical Topics:
1. Utilize Arduino and Bluetooth module for automating home appliances.
2. UtilizeESP8266 processorfor automating home appliances.
3. Construct an Arduino based solar tracker for solar irradiation measurement.

Laboratory Component: **[30 hours]**

Any 12experiments have to be completed from the following list of experiments.

S.No.	Name of the Experiment
1	Model an electrical circuit and simulate it to verify Ohms Law.
2	Model an electrical circuit and simulate it to verify Kirchhoff's Voltage Law.
3	Model an electrical circuit and simulate it to verify Kirchhoff's Current Law.
4	Demonstrate the measurement of power in an RLC circuit using wattmeter method.
5	Interpret the DC output of an RLC circuit using half wave rectifier.
6	Interpret the DC output of an RLC circuit using full wave rectifier.
7	Conduct the load test on DC shunt motor to outline its characteristics.
8	Outline the study on the starting methods of DC series motor.
9	Conduct a study on transformer construction for real-time applications.
10	Experiment with the logic gates to verify its truth table.
11	Make use of the logic gates to verify the functioning of half and full adders.
12	Make use of the logic gates to verify the functioning of half and full subtractors.
13	Utilize Arduino and Bluetooth module for automating home appliances.
14	UtilizeESP8266 processorfor automating home appliances.
15	Construct an Arduino based solar tracker for solar irradiation measurement.

Course outcomes:

On completion of the course, the student will have the ability to:

CO1	Apply the circuit laws and theorems to compute the electrical parameters of domestic and industrial appliances.
CO2	Compare the behavior of AC circuits & magnetic circuits for a given input.
CO3	Explain the construction, working, and application of electrical machine and transformer to infer its characteristics.
CO4	Apply the semiconductor principles using diodes, transistors, thyristors and displays for developing electronic switches and displays.
CO5	Identify the sensors for applications in Engineering.

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COs and POs Mapping:

COs	POs											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1	3	2	1	1	2	-	-	-	2	-	-	1
CO2	2	1	1	-	2	-	-	-	2	-	-	1
CO3	2	1	1	-	2	-	-	-	2	-	-	1
CO4	3	2	1	1	2	-	-	-	2	-	-	1
CO5	3	2	1	1	2	-	-	-	2	-	-	1

Level 3- Highly Mapped, Level 2- Moderately Mapped, Level 1- Low Mapped, Level 0- Not Mapped

Scheme of Evaluation:

Component	Type of assessment	Max. Marks	Reduced Marks	Total	Final marks
Continuous Internal Examination (CIE) - **Theory**	CIE – I	100	60	100	25
	CIE – II	100			
	Skill Assessment – I (2 Assignments + 1 seminar)	40	40		
	Skill Assessment – II (3Assignments)	40			
Continuous Internal Examination (CIE) - **Laboratory**	Continuous Assessment (Lab activities & exercises)	75	75	100	25
	Model Lab Exam	25	25		
End Semester Examination (ESE)	Theory Exam	100	35	50	50
	Lab Exam	100	15		
				Total	100

Assessment Pattern

Bloom's Category	Continuous Assessment Tests		Terminal Examination
	1	**2**	
Remember	20	20	20
Understand	60	40	40
Apply	20	40	40
Analyze	0	0	0
Evaluate	0	0	0
Create	0	0	0

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End semester Examination: (QP PATTERN)

- Each unit consists of two 2 marks questions and one 16 marks question (either or)
- All the fifteen questions have to be answered.

Text Books:

1. D P Kothari and I.J Nagarath, "Basic Electrical and Electronics Engineering," McGraw Hill Education (India)Private Limited, Second Edition, 2020

2. A.K.Sawhney and PuneetSawhney,"A Course in Electrical & Electronic Measurements & Instrumentation,"DhanpatRai and Co, 2015.

Reference Books:

1. John Bird, "Electrical Circuit theory and technology", Routledge; 2017.

2. Muthusubramanian R and Salivahanan S, "Basic Electrical and Electronics Engineering,"McGraw Hill, NewDelhi,2009.

3. Nagsarkar T K and Sukhija M S, "Basics of Electrical Engineering," Oxford University press, 2012.

4. V K Mehta, Rohitmehta "Principles of Electronics," S.Chand& Company Ltd, 2015.

5. Mahmood Nahvi and Joseph A.Edminister, "Electric Circuits," Schaum' Outline Series, McGraw Hill, 2009.

6. H.S. Kalsi, "Electronic Instrumentation," Tata McGraw-Hill, New Delhi, 2010.

7. Ian Sinclair, "Sensors and Transducers," Elsevier Science, 3rd Edition, 2000.

8. Perry Lea, "Internet of things for architects," Packt, 2018.

9. V N Mittle and Arvind Mittle "Basic Electrical Engineering," McGraw Hill, New Delhi, 2005.

10. R.S. Sedha, "A Textbook of Applied Electronics," S. Chand & Co., 2008.

11. Robert Barton, Patrick Grossetete, David Hanes, Jerome Henry and Gonzalo Salgueiro, "IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things", CISCO Press, 2017.

Web Links and Video Lectures (E-Resources):

1. A Basic Course on Electric and Magnetic Circuits

https://onlinecourses.nptel.ac.in/noc24_ee125/preview

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2. Basic Electrical Circuits: https://onlinecourses.nptel.ac.in/noc24_ee112/preview

3. Digital Circuits: https://onlinecourses.nptel.ac.in/noc24_ee147/preview

4. Electrical Machines – I: https://onlinecourses.nptel.ac.in/noc24_ee103/preview

5. Sensor Technologies: Physics, Fabrication and Circuits:

    https://onlinecourses.nptel.ac.in/noc24_ee83/preview

6. Semiconductor Devices and Circuits:

    https://onlinecourses.nptel.ac.in/noc24_ee143/preview

Suggested Skill Activities:

1. List the different electrical loads available in home, college and prepare their rating chart.

2. Design the residential house wiring using fuse, switch, indicator, lamp, circuit breaker, energy meter and apply Thevenin's theorem to find the current in particular branch.

3. Take a room in your home and replace the fluorescent lamp to LED lamp to calculate the monthly electrical charge and compare with the previous month.

4. Write the parts of the fan and electric mixer in home and draw the wiring diagram for fan and electric mixer.

5. Visit the nearby substation and list out the details of safety measures followed by electrical engineers.

6. List out the rating of electrical machines used in home appliances.

7. Identify the semiconductor devices in electronic appliances.

8. Develop IOT based solutions for engineering applications.

9. Draw the wiring diagram of EV and mentions its parts.

10. Visit nearby power plant and demonstrate the various components, working, power generation and distribution in power plant as a report.

பாடநெறி குறியீடு:	24GE201	பாடத்தின் தலைப்பு:	தமிழரும் தொழில்நுட்பமும்	
கிரெடிட்	1	L – T – P	1-0-1	
Pre -requisite			Nil	

பாடத்திட்டநோக்கங்கள்:

1. சங்ககாலத்து நெசவுத்தொழிலை விவரிப்பதற்கும் மட்பாண்டத்தொழில் நுட்பத்தைக் கண்டறிவதற்கும்.

2. சங்ககால கட்டுமானம், மேடை அமைப்பு, சிற்பங்கள், கோவில்கள், அம்மன்கோவில், திருமலைநாயக்கர் மஹால், செட்டிநாட்டு வீடுகள், இந்தோ - சாரோசெனிக் கட்டிடக்கலை ஆகியவற்றைக் கண்டறிந்து மேற்கோள் காட்ட.

3. கப்பல் கட்டுதல் மற்றும் இரும்புத் தொழிலைக் கண்டறிதல், சிலப்பதிகாரத்தில் நாணயங்கள், மணி தயாரிக்கும் தொழிற்சாலைகள், மணிகளின் வகைகள் ஆகியவற்றைப் படிக்க.

4. நீர்நிலைகளின் முக்கியத்துவத்தைகாட்ட, கால்நடை வளர்ப்பு மற்றும் கால்நடைகளுக்காக வடிவமைக்கப்பட்ட கிணறுகளை கண்காணிக்க, விவசாயம், மீன்பிடி, முத்து மற்றும் முத்துகலாச்சாரம் மற்றும் கடல் பற்றிய பண்டைய அறிவை அங்கீகரிக்க.

அறிவியல் தமிழின் வளர்ச்சி மற்றும் தமிழ்க்கணிப்பொறியின் வளர்ச்சியைக் கவனிக்க, இணையத்தில் தமிழ்மென்பொருள் மேம்பாடு, தமிழ் அகராதிகளை மேற்கோள் காட்ட.

அலகு I நெசவு மற்றும் பானைத்தொழில்நுட்பம்	[3 hours]
சங்ககாலத்தில் நெசவுத்தொழில் - பானைத் தொழில்நுட்பம் - கருப்பு சிவப்புபாண்டங்கள் - பண்டங்களில் கீறல் குறியீடுகள்	

அலகு II வடிவமைப்பு மற்றும் கட்டிடத்தொழில்நுட்பம்:	[3 hours]
சங்ககாலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் & சங்ககாலத்தில் வீட்டுப்பொருட்களில் வடிவமைப்பு - சங்ககாலத்தில் கட்டுமான பொருட்களும் நடுகல்லும் - சிலப்பதிகாரத்தில் மேடைஅமைப்பு பற்றியவிவரங்கள் - மாமல்லபுரச்சிற்பங்களும், கோவில்களும் - சோழர்காலத்துப் பெருங்கோவில்கள் மற்றும் வழிபாட்டுத்தலங்கள் - நாயக்கர்காலக்கோயில்கள் மாதிரி கட்டமைப்பு பற்றி அறிதல்,மதுரைமீனாட்சி அம்மன் ஆலயம் மற்றும் திருமலைநாயக்கர்மஹால் - செட்டி நாட்டு வீடுகள் - பிரிட்டிஷ் காலத்தில் சென்னையில் இந்தோ - சாரோசெனிக் கட்டிடக்கலை	

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அலகு III உற்பத்தித் தொழில்நுட்பம்	[3 hours]

கப்பல் கட்டும் கலை - உலோகவியல் - இரும்பு தொழிற்சாலை - இரும்பை உருக்குதல், எஃகு வரலாற்றுச்சான்றுகளாக செம்பு மற்றும் தங்கநாணயங்கள் - நாணயங்கள் அச்சடித்தல் - மணி உருவாக்கும் தொழிற்சாலைகள் - கல்மணிகள், கண்ணாடி மணிகள் - சங்கு மணிகள் - எலும்புத்துண்டுகள் - தொல்லியல் சான்றுகள் - சிலப்பதிகாரத்தில் மணிகளின் வகைகள்.

அலகு IV வேளாண்மை மற்றும் நீர்பாசனத்தொழில்நுட்பம்	[3 hours]

அணை, ஏரி, குளங்கள், மதகு - சோழர்காலக்கு குமுழித்தூம்பின் முக்கியத்துவம் - கால்நடை பராமரிப்பு - கால்நடைகளுக்காக வடிவமைக்கப்பட்ட கிணறுகள் - வேளாண்மை மற்றும் வேளாண்மைச்சார்ந்த செயல்பாடுகள் - கடல்சார் அறிவு - மீன் வளம் - முத்து மற்றும் முத்துக்குளித்தல் - பெருங்கடல் குறித்த பண்டைய அறிவு - அறிவுசார் சமூகம்

அலகு V அறிவியல் தமிழ் மற்றும் கணிதத்தமிழ்	[3 hours]

அறிவியல் தமிழின் வளர்ச்சி - கணித்தமிழ் வளர்ச்சி -தமிழ் நூல்களை மின்பதிப்பு செய்தல் - தமிழ்மென்பொருள் உருவாக்கம் - தமிழ் இணையக் கல்விக்கழகம் - தமிழ் மின் நூலகம் - இணையத்தில் தமிழ் அகராதிகள் - சொற்குவைத் திட்டம்.

பாடநெறி முடிவுகள் (பாமு):

பாடநெறியின் முடிவில், மாணவர் பின்வரும் திறன்களைப் பெறுவர்:

பாமு	பாடநெறி முடிவுகள்	மிக உயர்ந்த அறிவாற்றல் நிலை
அலகு I பாமு:	சங்க கால ஜவுளி தொழில் மற்றும் மட்பாண்ட தொழில்நுட்பம் பற்றி அறிவார்கள்.	கே 1
அலகு II பாமு:	சங்க கால கட்டுமானம், மேடை அமைப்பு, சிற்பங்கள், கோவில்கள், அம்மன் கோவில், திருமலை நாயக்கர் மஹால், செட்டிநாட்டு வீடுகள், இந்தோ-சராசனிக் கட்டிடக்கலை ஆகியவற்றை விவரிக்க இயலும்.	கே 2
அலகு III பாமு:	கப்பல் கட்டுதல், இரும்புத் தொழில், நாணயம் தயாரித்தல் மற்றும் மணி தயாரிக்கும் தொழில்கள் பற்றி அறிந்து கொள்கிறார்கள்.	கே 1
அலகு IV பாமு:	நீர்நிலைகளின் முக்கியத்துவம், கால்நடை வளர்ப்பு, கிணறு, விவசாயம், மீன்பிடி, முத்து மற்றும் முத்து கலாச்சாரம் மற்றும் கடல் பற்றிய போதுமான அறிவை பெற்றுகொள்கிறார்கள்.	கே 1
அலகு V பாமு:	அறிவியல் தமிழின் வளர்ச்சி, தமிழ்க் கணிப்பொறியின் வளர்ச்சி, இணையத்தில் தமிழ் மென்பொருள் மேம்பாடு, தமிழ் அகராதிகளை சந்தேகம் இன்றி முழுமையாக தெரிந்து கொள்கிறார்கள்.	கே 1

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பாடநெறி முடிவுகள் மற்றும் நிரல் முடிவுகள் ஒப்பிடுதல்

பாமுகள்	மிக உயர்ந்த அறிவாற்றல் நிலை	பாடநெறி முடிவுகள்											
		1	2	3	4	5	6	7	8	9	10	11	12
பாமு1	கே 1	2	-	-	-	-	-	-	-	-	-	-	-
பாமு2	கே 2	1	-	-	-	-	-	-	-	-	-	-	-
பாமு3	கே 1	1	-	-	-	-	-	-	-	-	-	-	-
பாமு4	கே 1	1	-	-	-	--	-	-	-	-	-	-	-
பாமு5	கே 1	1	-	-	-	-	-	-	-	-	-	-	-

நிலை 3- அதிக ஒத்துப்போதல், நிலை 2- மிதமாக ஒத்துப்போதல், நிலை 1- குறைவாக ஒத்துப்போதல், நிலை 0- ஒத்துப்போகவில்லை

மதிப்பீட்டுத் திட்டம்:

கூறுகள்	மதிப்பீட்டின் வகை	அதிகபட்ச மதிப்பெண்கள்	குறைக்கப்பட்ட மதிப்பெண்கள்	இறுதி மதிப்பெண்கள்
தொடர்ச்சியான உள் தேர்வு	தொடர்ச்சியான உள் தேர்வு - I	100	40	40
	தொடர்ச்சியான உள் தேர்வு - II	100	40	
இறுதி பருவ தேர்வு	எழுத்து தேர்வு	100	60	60
மொத்தம்				100

மதிப்பீட்டு முறை

ப்ளூமின் வகை	தொடர்ச்சியான மதிப்பீட்டு சோதனைகள்		இறுதி தேர்வு
	1	2	
நினைவில் கொள்ளுதல்	60	50	60
புரிந்து கொள்ளுதல்	40	50	40
விண்ணப்பித்தல்	0	0	0
பகுப்பாய்வுதல்	0	0	0
மதிப்பிடுதல்	0	0	0
உருவாக்குதல்	0	0	0

இறுதி பருவ தேர்வு: (கேள்வி முறை)

- ஒவ்வொரு யூனிட்டும் இரண்டு 2 மதிப்பெண் வினாக்களையும் ஒரு 16 மதிப்பெண் வினாவையும் (இரண்டில் ஒன்று) கொண்டுள்ளது.
- பதினைந்து கேள்விகளுக்கும் பதிலளிக்க வேண்டும்

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CourseCode:	24GE101	Course Title:	Heritage of Tamils
Credits:	1	L – T – P	1-0-0
Pre -requisite		Nil	

COURSE OBJECTIVES:
1. To describe the textile industry of the Sangam period and trace the pottery technique.
2. To identify and quote Construction in the Sangam period, platform structure, sculptures, temples, Amman temple, ThirumalaiNayakar Mahal, Chettinad houses, Indo-Saracenic architecture.
3. Finding Shipbuilding and iron industry, to read minting of coins, bell making factories, types of bells in Silapathikaram.
4. To show the Importance of water bodies, to observe Cattle rearing and Wells designed for cattle, to recognize Agriculture, Fisheries, Pearl and pearl culture and Ancient knowledge of the sea.
- To observe Development of Scientific Tamil and Development of Tamil computing, to quote Tamil Software Development, Tamil Dictionaries on the Internet.

UNIT I WEAVING AND CERAMIC TECHNOLOGY	[3hours]
Weaving Industry during Sangam Age – Ceramic technology – Black and Red Ware Potteries (BRW) – Graffiti on Potteries.	

UNIT II DESIGN AND CONSTRUCTION TECHNOLOGY	[3hours]
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)-ThirumalaiNayakar Mahal – Chetti Nadu Houses, Indo – Saracenic architecture at Madras during British Period.	

UNIT III MANUFACTURING TECHNOLOGY	[3hours]
Art of Ship Building – Metallurgical studies – Iron industry – Iron smelting, steel -Copper and gold - Coins as source of history – Minting of Coins – Beads making-industries Stone beads - Glass beads – Terracotta beads -Shell beads/ bone beats – Archeological evidences – Gem stone types described in Silappathikaram	

UNIT IV THINAI CONCEPT OF TAMILS	[3hours]
FloraandFaunaofTamils&AhamandPuramConceptfromTholkappiyamandSangamLiterature – Aram Concept of Tamils - Education and Literacy during Sangam Age - Ancient Cities and Ports ofSangam Age -ExportandImportduringSangam Age- Overseas Conquestof Cholas.	

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UNIT V SCIENTIFIC TAMIL & TAMIL COMPUTING	[3hours]
Development of Scientific Tamil – Tamil computing – Digitalization of Tamil Books – Development of Tamil Software – Tamil Virtual Academy – Tamil Digital Library – Online Tamil Dictionaries – Sorkuvai Project.	

Course outcomes:

On completion of the course, the student will have the ability to:

COs	Course Outcomes	Highest cognitive level
CO1	Know about Sangam period textile industry and pottery technology.	K1
CO2	Able to describe Sangam period construction, platform structure, sculptures, temples, Amman temple, Tirumala Nayakkar Mahal, Chettinad houses, Indo-Saracenic architecture.	K2
CO3	Learn about the shipbuilding, iron industry, coinage and bell making industries	K1
CO4	Acquire adequate knowledge about the importance of water bodies, animal husbandry, wells, agriculture, fishing, pearl and pearl culture and the sea	K1
CO5	Learn Scientific Tamil Development, Tamil Computer Development, Tamil Software Development on the Internet, Tamil Dictionaries without a doubt.	K1

Assessment Pattern

Bloom's Category	Continuous Assessment Tests		Terminal Examination
	1	2	
Remember	60	50	60
Understand	40	50	40
Apply	0	0	0
Analyze	0	0	0
Evaluate	0	0	0
Create	0	0	0

Cos and POs Mapping

COs	Highest Cognitive Level	POs											
		1	2	3	4	5	6	7	8	9	10	11	12
CO1	K1	2	-	-	-	-	-	-	-	-	-	-	-
CO2	K2	1	-	-	-	-	-	-	-	-	-	-	-
CO3	K1	1	-	-	-	-	-	-	-	-	-	-	-
CO4	K1	1	-	-	-	-	--	-	-	-	-	-	-
CO5	K1	1	-	-	-	-	-	-	-	-	-	-	-

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Scheme of Evaluation:

Component	Type of assessment	Max Marks	Reduced Marks	Final marks
Continuous Internal Examination (CIE)	CIE– I	100	40	40
	CIE–II	100	40	
End Semester Examination (ESE)	Theory Exam	100	60	60
Total				100

End semester Examination:(QPPATTERN)

- Each unit consists of two2 marks questions and one16marks question (either or).
- All the fifteen questions have to be answered.

TEXT BOOKS

1. .தமிழகவரலாறு - மக்களும்பண்பாடும் - கே. கே. பிள்ளை (வெளியீடு: தமிழ்நாடுபாடநூல்மற்றும்கல்வியியல்பணிகள்கழகம்).

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

3. கீழடி - வைகைநதிக்கரையில்சங்ககாலநகரநாகரிகம் (தொல்லியல்துறைவெளியீடு)

4. பொருநை - ஆற்றங்கரைநாகரிகம். (தொல்லியல்துறைவெளியீடு)

7. SocialLifeofTamils(Dr.K.K.Pillay)AjointpublicationofTNTB&ESCandRMRL–(inprint)

8. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute ofTamil Studies.

REFERENCEBOOKS

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 ofTamil Studies.)

3. Keeladi-'SangamCityCivilizationonthebanksofriverVaigai'(JointlyPublishedby:Department ofArchaeology&TamilNadu Text Bookand Educational Services Corporation,TamilNadu)

4. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Publishedby: TheAuthor)

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

6. Journey of Civilization IndustoVaigai(R.Balakrishnan) (Publishedby:RMRL)–Reference Book

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Course Code:	24MA201	Course Title:	**COMPLEX VARIABLES AND TRANSFORMS (COMMON TO ALL BRANCHES)**	
Credits:	4	**L – T – P**	3 – 1 – 0	
Pre -requisite			**Nil**	

Course objectives:
- To impart analytical ability in solving mathematical problems as applied to the respective branches of Engineering.
- To familiarize the students with complex integration techniques and contour integration techniques which can be used in real integrals.
- To introduce Fourier series analysis which is central to many applications in engineering apart from its use in solving boundary value problems.

Teaching-Learning Process:

These are sample strategies which teachers can use to accelerate the attainment of the various course outcomes.
- Lecture method does not mean only traditional method, but different type of teaching methods may be adopted to develop the outcomes.
- Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop thinking skills such as the ability to evaluate, generalize, and analyze information rather than simply recall it.
- Topics will be introduced in a multiple representation and encourage the students to come up with their own creative ways to solve them.
- Discuss how every concept can be applied to the real world and when that's possible, it helps to improve the students' understanding.

UNIT I – COMPLEX DIFFERENTIATION	**[12 hours]**

Function of a complex variable – Analytic functions – Necessary conditions and sufficient conditions (excluding proof) – Cauchy – Riemann equations — Properties of analytic function – Harmonic conjugate – Construction of Analytic functions - Conformal mapping: $w = z+a$, az, $1/z$, and bilinear transformation.

UNIT II – COMPLEX INTEGRATION	**[12 hours]**

Statement and application of Cauchy's integral theorem and integral formula – Taylor and Laurent expansions – Isolated singularities – Residues - Cauchy's residue theorem. Applications: Contour integration over unit circle and semicircular contours (excluding poles on axis).

UNIT III – LAPLACE TRANSFORMS	**[12 hours]**

Existence conditions – Transforms of elementary functions – Transform of unit step function and unit impulse function – Basic properties – Shifting theorems – Transforms of derivatives and integrals – Initial and Final Value Theorem – Inverse Laplace Transform – Convolution Theorem (Statement only) – Solution of linear second order Ordinary differential equations with constant coefficients using Laplace transforms.

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UNIT IV – FOURIER SERIES AND FOURIER TRANSFORMS	[12 hours]
Dirichlet's conditions – General Fourier series – Odd and even functions – Half range series – Harmonic analysis - Statement of Fourier integral theorem – Fourier transform pair – Parseval's identity.	

UNIT V – PARTIAL DIFFERENTIAL EQUATION	[12 hours]
Formation of partial differential equations - Classification of partial differential equations - Solutions of one dimensional wave equation, One dimensional heat equation (excluding insulated ends) – Steady state solution of two dimensional equation of heat conduction (excluding insulated edges).	

Course outcomes:

On completion of the course, the student will have the ability to:

CO1	Construct analytic functions and use their conformal mapping property in Engineering problems.
CO2	Solve real and complex integrals using the Cauchy's integral formula and residue theorem.
CO3	Apply Laplace transforms techniques in system modelling, digital signal processing, process control, solving boundary value problems
CO4	Apply Fourier series to solve the steady state two-dimensional heat equation in cartesian coordinates.
CO5	Apply the effective mathematical tools for solutions of partial differential equations that model physical phenomena and engineering problems.

COs and POs Mapping:

COs	POs											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	3	2										
CO2	3	2										
CO3	3	2										
CO4	3	2	1									1
CO5	3	2	1									
CO6	3	2	1									1

Level 3- Highly Mapped, Level 2- Moderately Mapped, Level 1- Low Mapped, Level 0- Not Mapped

Scheme of Evaluation:

Component	Type of assessment	Max Marks	Reduced Marks	Total	Final marks
Continuous Internal Examination (CIE)	CIE – I	100	50	100	40
	CIE – II	100			
	MCQ	20	10		
	Skill Assessment - I	40	40		
	Skill Assessment - II	40			
End Semester Examination (ESE)	Theory Exam	100	60	60	60
				Total	100

Assessment Pattern

Bloom's Category	Continuous Internal Examination		End Semester Examination
	1	2	
Remember	20	20	20
Understand	20	20	20
Apply	60	60	60
Analyze	0	0	0
Evaluate	0	0	0
Create	0	0	0

End semester Examination: (QP PATTERN)
- Each unit consists of two 2 marks questions and one 16 marks question (either or).
- All the fifteen questions have to be answered.

Text Books:
1. Kreyszig.E, "Advanced Engineering Mathematics", John Wiley and Sons, 10th Edition, New Delhi, 2016.
2. Grewal.B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 44th Edition, 2018.
3. Veerarajan. T., "Transforms and Partial Differential Equations", Tata McGraw Hill Education Pvt. Ltd., New Delhi, Second reprint, 2012
4. Kandasamy. P., Thilagavathy. K, and Gunavathy. K, Engineering Mathematics Volume I & II, S. Chand & Co, New Delhi, 2005.Reference Books:

Equivalent NPTEL/SWAYAM Courses

S. No.	Course Title	Course Instructor	Host Institute
1	Partial Differential Equations	Prof. Sivaji Ganesh	IIT Bombay
2	Introduction to Fourier Analysis	Prof. Parasar Mohanty	IIT Kanpur
3	Complex Analysis	Prof. Pranav Haridas	IIT Madras

Web Links and Video Lectures (E-Resources):

1. Analytic Functions, C-R Equations:

   https://www.nptelvideos.com/lecture.php?id=13416

2. Laplace Transform and its Existence:

   https://www.nptelvideos.com/lecture.php?id=13433

3. Taylor's, Laurent Series of f(z) and Singularities:

   https://www.nptelvideos.com/lecture.php?id=13431

4. Applications of Fourier Transform to PDEs:

   https://www.nptelvideos.com/lecture.php?id=13442

Course Code	24PH202	Course Title:	APPLIED MATERIAL SCIENCE (Common to Mech, Civil & Agri)
Credits:	3	L – T – P	3-0-0

Course objectives:
- To study the electrical properties of materials including electron theory of metals.
- To familiarize with the properties of semiconductors, determination of charge carriers and device applications.
- Equipping the students to understand the applications of magnetic materials and dielectric materials.
- To impart knowledge on the processing and applications of new engineering materials
- To motivate the students towards the different material testing methods

Teaching-Learning Process:

Suggested strategies that teachers may use to effectively achieve the course outcomes:
1. Chalk and Talk
2. Lab experiment videos
3. Blended Mode of Learning
4. Project based Learning
5. Experiential Learning
6. NPTEL and Other Videos
7. Smart Class Room
8. Flipped Class

UNIT I CONDUCTING MATERIALS	[9 hours]

Classical free electron theory - Expression for electrical conductivity - Thermal conductivity, Wiede- Mann Franz law, Merits & Demerits of classical free Electron Theory - Quantum free electron theory - Electron in a metal – degenerate and non-degenerate states – Fermi-Dirac statistics– Density of energy states – Energy bands in solids – Electron effective mass.

UNIT II SEMICONDUCTING MATERIALS	[9 hours]

Direct and indirect band gap semiconductors – Intrinsic Semiconductors - Carrier concentration in intrinsic semiconductors - Variation of Fermi level with temperature – extrinsic semiconductors - Carrier concentration in N-type & P-type semiconductors – Variation of Fermi level with temperature – Hall effect and devices- Ohmic contacts– Schottky diode.

UNIT III MAGNETIC AND DIELECTRIC MATERIALS	[9 hours]

Magnetic materials – Classification (Dia , Para & Ferro) – Hysteresis – Ferrites - $BaTiO_3$ – Application of Nd-FeB magnets. Electric polarization – Different types of polarization – Temperature and frequency dependence –Dielectric loss and dielectric breakdown – dielectric materials applications - capacitors and transformers

UNIT IV SMART MATERIALS	[9 hours]

Metallic glasses - Shape memory alloys - Composites - Definition and Classification - Fiber reinforced plastics (FRP) and fiber reinforced metals (FRM) - Ceramics - Classification - Crystalline - Non Crystalline - Bonded - ceramics, Manufacturing methods - Slip casting - Isostatic pressing - Gas pressure bonding - Properties - thermal, mechanical, electrical and chemical ceramic fiber- Applications of ceramics in electronics.

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UNIT V	MATERIALS TESTING	**[9 hours]**

Microscope-Magnification Power-Resolving Power-Optical & Electron Microscope-Difference between optical & Electron Microscope-Tunneling - Scanning Electron Microscope-Transmission Electron Microscope- Scanning Tunneling Microscope-hardness - Rockwell and Brinell hardness - Knoop and Vickers Micro hardness- spot test techniques

Course outcomes: On completion of the course, the student will have the ability to:

CO No	Corse Outcomes	Blooms Level
CO1	Explain the electrical properties of materials.	K2
CO2	Apply the properties of semiconducting materials in electronics.	K3
CO3	Infer the properties of magnetic and dielectric materials for relevant electrical and electronics engineering applications.	K2
CO4	Utilize the smart materials in the field of Engineering..	K3
CO5	Make use of different testing methods for analyzing the properties of materials.	K3

COs and POs Mapping

COs	POs											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1	2	1	1	-	-	-	-	-	-	-	-	1
CO2	3	2	1	-	-	-	-	-	-	-	-	1
CO3	2	1	1	-	-	-	-	-	-	-	-	1
CO4	3	2	1	-	-	-	-	-	-	-	-	1
CO5	3	2	1	-	-	-	-	-	-	-	-	1

Level 3- Highly Mapped, Level 2- Moderately Mapped, Level 1- Low Mapped, Level 0- NotMapped

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Scheme of Evaluation:

Component	Type of assessment	Max Marks	Reduced Marks	Total	Final marks
Continuous Internal Examination (CIE) - Theory	CIE – I	100	50	100	40
	CIE – II	100			
	MCQ	20	10		
	Skill Assessment - I	40	40		
	Skill Assessment - II	40			
End Semester Examination (ESE)	Theory Exam	100	60	60	60
				Total	100

Assessment Pattern

Bloom's Category	Continuous Internal Examination		End semester Examination
	1	**2**	
Remember	20	20	20
Understand	60	40	40
Apply	20	40	40
Analyze	0	0	0
Evaluate	0	0	0
Create	0	0	0

End semester Examination: (QP PATTERN)
- Each unit consists of two 2 marks questions and one 16 marks question (either or).
- All the fifteen questions have to be answered

TEXT BOOKS:

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

2. R.F.Pierret. Semiconductor Device Fundamentals. Pearson (Indian Edition), 2006.

3. O.P.Khanna. "Materials Science and metallurgy: Dhanpat Rai Publications,2011

REFERENCE BOOKS:

1. Jasprit Singh, Semiconductor Optoelectronics: Physics and Technology, McGraw- HillEducation (Indian Edition), 2019.

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

3. Arthur Beiser, Shobhit Mahajan, S. Rai Choudhury, Concepts of Modern Physics, McGrawHill (Indian Edition), 2017.

NPTEL COURSE:

Sl.No	Course Name	Course Instructor	Course Conducting Agency
1	Solid state Physics	Prof. Amal Kumar Das	IIT Kharagpur

WEB LINKS AND VIDEO LECTURES (E-RESOURCES):

1. Electrical Conductivity: https://www.youtube.com/watch?v=QvPSVwzU-8A

2. Band Theory of solids:

https://www.youtube.com/watch?v=qcE2Wcpm05k&ab_channel=nptelhrd

3. Intrinsic semiconductor: https://www.youtube.com/watch?v=JZN3DAaeOB8

4. Brinell Hardness Test: https://www.youtube.com/watch?v=TM487F4p-YM

5. FRP:

https://www.youtube.com/watch?v=tyKtUoQo9VM&list=PLbMVogVj5nJTnVBY4n3K HSPJsPDy38QS

Suggested Skill Activities:

1. As you look at materials and objects around your house Which do you think are conductors and insulators?
2. Identify the change when you connect a light bulb to battery using conductive materials?
3. What will happen if you connect a light bulb to battery using insulating materials?
4. List the usage of alphanumerical displays in day to life.
5. Compute the size variation and efficiency of the nano materials.
6. Illustrate the role of semiconductors in renewable energy technologies.
7. Explain the reason for using smart materials like SMA in retractable roofs.
8. List out 10 uses of magnetic materials in house.
9. Explain the testing methodology used in aerospace technology.
10. Discuss about the role of semiconductor in temperature sensors which is air conditioner.

Course Code:	24CY401	Course Title:	ENVIRONMENTAL SCIENCE AND ENGINEERING
Credits:	2	L – T – P	2-0-0
Pre -requisite			Nil

Course objectives:

To impart knowledge on the

- To gain in-depth knowledge on natural processes and resources that sustain life and govern economy.
- To know the importance of water resources which are important socially, economicallyviable and environmentally sustainable.
- To impart the Knowledge of pollution and its control methods.
- To mitigate the environmental and health risks associated with indiscriminate waste and find the suitable methodologies for waste management.
- To balance ecological, economic and social goals, such as reducing carbon emissions,promoting renewable energy and ensuring equitable resource access.

Teaching-Learning Process:

Suggested strategies that teachers may use to effectively achieve the course outcomes:

1. Chalk and Talk
2. NPTEL and Other Videos
3. Smart Class Room
4. Field visit
5. Project based learning
6. Industrial Visit

UNIT I - ECOLOGY AND BIODIVERSITY	[6 hours]

Definition, scope and importance of environment – need for public awareness – conceptof an ecosystem - Biodiversity and its values- Biodiversity at global, national and local level- India as a mega-diversity nation – hotspots of biodiversity – threats to biodiversity – endangered and endemic speciesof India – conservation of biodiversity: In-situ and ex-situ conservation of biodiversity.

UNIT II - WATER RESOURCES AND ENVIRONMENT MICROBIOLOGY	[6 hours]

Water resources: Use and over- utilization of surface and groundwater – dams benefits and problems, conflicts over water –Water availability at global level, surface level, ground level- Sources-Hydro phonics -Classification of microorganism –Role of microorganism in waste water treatment-Bacterial nutrition and growth.

UNIT III -AIR AND NOISE POLLUTION	[6 hours]
Sources and classification of air pollutants and their effect on human health-Ambient airquality and emission standards-Air pollutants-Particulate matters-Control equipments- Gravity separator-Centrifugal separator-fabric filter-Electrostatic separator, Catalytic convertors– Noise pollution-causes – Consequences-Control measures- modern tools used in pollution mitigation measures-sustainable activity of pollution control- recent case studies - Environmental Protection Act.	

UNIT IV- SOLID WASTE AND HAZARDOUS WASTE MANAGEMENT	[6 hours]
Soil contaminants–sources and management methods of -Solid Waste Hazardous waste – Plastic waste- -Biomedical waste- Hazardous waste& E-waste management -Case studies on Occupational Health and Safety Management system (OHASMS).	

UNIT V-ENVIRONMENTAL MANAGEMENT AND SUSTAINABLE DEVELOPMENT	[6 hours]
Renewable and non-renewable energy Sources- Energy Polices- Development, GDP, Sustainability- concept, needs and challenges-economic, social and aspects of sustainability-Zero waste and R concept, Circular economy, ISO 14000 Series, Material Life cycle assessment, Environmental Impact Assessment-Sustainable goals -Sustainable habitat- Green buildings, Green materials, Energy efficiency, Sustainable transports. Carbon emission-Carbon footprint-Carbon Sequestration.	

Course outcomes:
On completion of the course, the student will have the ability to:

CO1	Illustrate the important features of environment and its conservation.	K2
CO2	Explain the need of water resources and its application to meet the modern requirements and the necessity of its conservation.	K2
CO3	Identify the causes, effects of environmental pollution and explain the control techniques for particulate, gaseous emissions and contribute to the preventive measures in the society.	K3
CO4	Identify the different management methods of solid and hazardous waste.	K3
CO5	Explain the sustainability practices and identify green materials for sustainable development.	K2

COs and POs Mapping:

COs	POs											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1	2					1	1					
CO2	1	1				1	1					
CO3	2					1	2	1				
CO4	1					2	2	1				
CO5	1					1	2	1				

Level 3- Highly Mapped, Level 2- Moderately Mapped, Level 1- Low Mapped, Level 0- Not Mapped

Scheme of Evaluation:

Component	Type of assessment	Max Marks	Reduced Marks	Total	Final marks
Continuous Internal Examination (CIE)	CIE – I	100	60	100	40
	CIE – II	100			
	Skill Assessment – I	40	40		
	Skill Assessment - II	40			
End Semester Examination (ESE)	Theory Exam	100	60	60	60
				Total	100

Assessment Pattern

Bloom's Category	Continuous Assessment Tests		End Semester Examination
	1	**2**	
Remember	20	20	30
Understand	60	40	30
Apply	20	40	40
Analyze	0	0	0
Evaluate	0	0	0
Create	0	0	0

End semester Examination: (QP PATTERN)

- Each unit consists of two 2 marks questions and one 16 marks question (either or)
- All the fifteen questions have to be answered.

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Text Books:

1. Benny Joseph,Environmental Science and Engineering ', Tata McGraw-Hill, New Delhi, (2014).

2. Miguel Fischer,"Environmental Management: Ecosystems, Competitiveness and Waste Management" Nova Science Publishers, (2021)

Reference Books:

1. Dharmendra S.Sengar, 'Environmental law ', Prentice hall of India Pvt Ltd, New Delhi, (2007).

2. Erach Bharucha, "Textbook of Environmental Studies", Universities Press Pvt, Ltd, Hydrabad, (2015).

3. G.TylerMiller,Scott E.Spoolman,"Environmental Science",Cengag Learning India Pvt.Ltd,Delhi, (2014).

4. Mahuabasu, Xavier saverimuthu, "Fundamentals of Environmental Studies", Cambridge university press,(2017)

5. Anubha Kaushik , C.P. Kaushik, "Perspectives in Environmental Studies", New Age International Pvt. Ltd, New Delhi, (2004). 6. Frank R. Spellman, "Handbook of Environmental Engineering", CRC Press, (2015).

Web Links and Video Lectures (E-Resources):

1. Ecology and Society**:** https://onlinecourses.nptel.ac.in/noc24_hs149/preview
2. Sustainable Power Generation Systems**:** https://onlinecourses.nptel.ac.in/noc24_ge54/preview
3. Environment and Development**:** https://onlinecourses.nptel.ac.in/noc24_hs150/preview

Suggested Skill Activities:

1. Why is it beneficial to follow a student centered and participatory process for environmental education?

2. Identify the endemic species of flora and fauna found nearest to your locality.

3. List the major arguments cited against the construction of dams.

4. Discuss how the symbiotic relationship between algae and bacteria is useful in the treatment of sewage in an oxidation pond.

5. List the various ways in which an individual can contribute towards pollution prevention in the society.

6. Mention any four hazardous wastes originating from households and explain their management strategies.

7. Conduct a survey and find out how chemicals and various material are distributed /cycled in your campus.

8. List the common organic materials that are suitable and unsuitable for composting.

9. List the advantages of recycling of MSW with examples.

10. What are the major obstacles in the implementation of incineration technology in developing countries

Course Code:	24CE201	Course Title:	STRENGTH OF MATERIALS – I
Credits:	3	L – T – P	3-0-2
Pre -requisite			24ME301-ENGINEERING MECHANICS

Course objectives:

To impart knowledge on
- The state of stresses and strains in structural components as a result of different loading conditions.
- Shear force and bending moment for all statically determinate beams by recognizing the beam type and loading.
- The concepts of internal stresses in beams of various cross sections.
- The analysis of the elements under complex state of stress by means of analytical and graphical methods.
- The behaviour of members subjected to pure torsion.

Teaching-Learning Process:

Suggested strategies that teachers may use to effectively achieve the course outcomes:
1. Chalk and Talk
2. Lab experiment videos
3. Blended Mode of Learning
4. Project based Learning
5. Experiential Learning
6. NPTEL and Other Videos
7. Smart Class Room
8. Flipped Class

UNIT I – STRESS AND STRAIN	[9 hours]

Stress and strain at a point – Tension, Compression, Shear Stress – Hooke''s Law – Relationship among elastic constants – Stress Strain Diagram for Mild Steel, TOR steel,

Concrete – Ultimate Stress – Yield Stress – Factor of Safety – Thermal Stresses – Thin Cylinders and Shells – Strain Energy due to Axial Force – Resilience – Stresses due to impact and Suddenly Applied Load – Compound Bars.

Practical Topics:

1. Determine the tension test on mild steel bar.

2. Determine the double shear test..

3. Determine the compression test on wood.

UNIT II – SHEAR FORCE AND BENDING MOMENT	[9 hours]

Beams and Bending- Types of loads, supports – Shear Force and Bending Moment Diagrams for statically determinate beam with concentrated load, UDL, uniformly varying load. Theory of Simple Bending – Analysis of Beams for Stresses – Stress Distribution at a cross Section due to bending moment and shear force for Cantilever, simply supported and overhanging beams with different loading conditions

Practical Topics:
1. Determine the Rockwell Hardness test.
2. Determine the Brinell Hardness test.
3. Determine the deflection test on metal beam..

UNIT III – BENDING OF BEAMS	[9 hours]

Beams – types and transverse loading on beams – shear force and bending moment in beams – Cantilever beams – Simply supported beams and over-hanging beams - Theory of simple bending – bending stress distribution – Load carrying capacity – Proportioning of sections – Leaf springs – Flitched beams – Shear stress distribution.

Practical Topics:
1. Determine the compression test on brick.
2. Determine the compression test on concrete.
3. Determine the compression test on tiles.

UNIT IV – COMPLEX STRESSES AND PLANE TRUSSES	[9 hours]

2 D State of Stress – 2 D Normal and Shear Stresses on any plane – Principal Stresses and Principal Planes – Mohr's circle - Plane trusses: Analysis of plane trusses - method of joints - method of sections.

Practical Topics:
1. Determine the compression test on spring.
2. Determine the izod impact test.
3. Determine the charpy test.

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UNIT V – TORSION OF SHAFTS AND SPRING	**[9 hours]**

Torsion of Circular and Hollow Shafts – Elastic Theory of Torsion – Stresses and Deflection in Circular Solid and Hollow Shafts – combined bending moment and torsion of shafts - strain energy due to torsion - Modulus of Rupture – Power transmitted to shaft – Shaft in series and parallel – Closed and Open Coiled helical springs – Leaf Springs – Springs in series and parallel – Design of buffer springs.

Practical Topics:
1. Determine the torsion test
2. Determine the compression test on spring.
3. Determine the tension test on spring..

Laboratory Component: **[30 hours]**

Any 12 experiments have to be completed from the following list of experiments.

S.No.	Name of the Experiment
1	Determine the tension test on mild steel bar.
2	Determine the double shear test.
3	Determine the torsion test.
4	Determine the compression test on wood.
5	Determine the compression test on brick.
6	Determine the compression test on concrete.
7	Determine the compression test on tiles
8	Determine the izod impact test.
9	Determine the charpy test.
10	Determine the Rockwell Hardness test.
11	Determine the Brinell Hardness test.
12	Determine the deflection test on metal beam.
13	Determine the compression test on spring
14	Determine the tension test on spring
15	Determine the test on cement

Course outcomes:

On completion of the course, the student will have the ability to:

CO1	Apply the load on various structural elements and assess the nature of stresses induced in material under different loads
CO2	Identify the variation of shear force and bending moments over the statically determinate beams under different types of loads and plot the bending moment and shear force diagram
CO3	Analyze the bending of various types of beams under static loading conditions and compute the shear stress distribution for different cross sections of beams.
CO4	Identify the principal stresses due to the combination of two dimensional stresses on an element and failure mechanisms in materials.
CO5	Examine the behavior of torsional shear stress in shafts and deformations of springs.

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COs and POs Mapping:

COs	POs											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1	3	2	1	1	2	-	-	-	2	-	-	1
CO2	2	1	1	1	2	-	-	-	2	-	-	1
CO3	2	1	1	1	2	-	-	-	2	-	-	1
CO4	2	1	1	1	2	-	-	-	2	-	-	1
CO5	3	2	1	1	2	-	-	-	2	-	-	1

Level 3- Highly Mapped, Level 2- Moderately Mapped, Level 1- Low Mapped, Level 0- Not Mapped

Scheme of Evaluation:

Component	Type of assessment	Max Marks	Reduced Marks	Total	Final marks
Continuous Internal Examination (CIE) - Theory	CIE – I	100	50	100	25
	CIE – II	100			
	MCQ	20	10		
	Skill Assessment - I	40	40		
	Skill Assessment - II	40			
Continuous Internal Examination (CIE) - Laboratory	Continuous Assessment	75	75	100	25
	Model Lab Exam	25	25		
End Semester Examination (ESE)	Theory Exam	100	35	50	50
	Lab Exam	100	15		
				Total	100

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End semester Examination: (QP PATTERN)

- Each unit consists of two 2 marks questions and one 16 marks question (either or)
- All the fifteen questions have to be answered.

Assessment Pattern:

Bloom's Category	Continuous Assessment Tests		Terminal Examination
	1	2	
Remember	20	20	20
Understand	30	30	30
Apply	30	30	30
Analyse	20	20	20
Evaluate	0	0	0
Create	0	0	0

Text Books:

1. Rajput.R.K. "Strength of Materials (Mechanics of Solids)", S.Chand and Co, New Delhi, 2015.

2. Bansal R.K. "Strength of materials", Laxmi Publications, New Delhi, 2018.

Reference Books:

1. Subramanian R. "Strength of materials", Oxford University Press, New Delhi, 2016.

2. Ramamrutham, S.,"Strength of Materials", DhanpatRai & Sons, 2011.

3. Bhavikatti. S., "Solid Mechanics", Vikas publishing house Pvt. Ltd, New Delhi, 2010.

4. William A. Nash, "Theory and Problems of Strength of Materials", Schaum's Outline Series, Tata McGraw-Hill publishing co., New Delhi, 2014.

5. Srinath L.S," Advanced Mechanics of Solids", Tata McGraw-Hill Publishing Co., New Delhi, 2017.

6. Gambhir. M.L., "Fundamentals of Solid Mechanics", PHI Learning Private Limited., New Delhi, 2009.

Web Links and Video Lectures (E-Resources):

1. Strength of materials for anomaterials;https://nptel.ac.in/courses/113/107/113107081/

2. Matrix method for Strength of aterials;https://nptel.ac.in/courses/105/105/105105180/

3. Strength of materials for frame structures;https://nptel.ac.in/courses/114/106/114106045/

4. Strength of materials;https://nptel.ac.in/courses/105/105/105105166/

5. Advanced topics in Strength of materials;https://nptel.ac.in/courses/105/106/105106050/

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6. Strength of materials;https://nptel.ac.in/courses/105/101/105101085/

7. Strength of materials; https://nptel.ac.in/courses/105/101/105101086/

Suggested Skill Activities:

1. Before delving into complex topics, make sure you have a solid understanding of the basic concepts such as stress, strain, types of loads, deformation, and material properties. These fundamentals form the foundation of Strength of Materials.

2. Understand the different types of stress (like tensile, compressive, shear) and strain (like normal strain, shear strain). Learn how to calculate stress and strain in various situations.

3. Learn about mechanical properties like modulus of elasticity, yield strength, ultimate strength, and factors affecting the mechanical behavior of materials.

4. Beams are fundamental components in Strength of Materials. Learn about different types of beams, beam loading conditions, and how to analyze beams under different loading scenarios.

5. Familiarize yourself with the properties of materials like elasticity, plasticity, ductility, and brittleness. Understanding how materials behave under different conditions is crucial in Strength of Materials.

6. Learn about deflection and buckling of structural elements. Understand how to calculate deflections and how to prevent buckling in various structural members

7. Strength of Materials is a subject that requires practice. Solve a variety of problems to reinforce your understanding of concepts and improve problem-solving skills.

8. Use textbooks, online resources, video lectures, and study materials to enhance your learning. There are many resources available that can provide a different perspective and help clarify difficult concepts.

9. Try to relate theoretical concepts to real-world applications. Understanding how Strength of Materials principles apply to practical engineering problems can deepen your understanding of the subject.

10. Don't hesitate to ask for help from professors, tutors, or online communities if you encounter difficulties. Strength of Materials can be complex, and getting clarification on challenging topics is important for your learning progress.

Course Code:	24ME201	Course Title:	**ENGINEERING GRAPHICS AND DESIGN**
Credits:	3	**L – T – P**	1-0-4
Pre -requisite			**Nil**

Course objectives:

 To impart knowledge on the

- To enable students to understand the standards and conventions of engineering drawing.
- To enhance the visualization skills to understand objects in the respective positions withrespect to principal planes.
- To comprehend general projection theory, with emphasis on orthographic projection torepresent three-dimensional objects in two-dimensional views.
- To emphasize freehand sketching and pictorial view to aid in the visualization process and toefficiently communicate ideas graphically.
- To Introduce CAD software for the creation of 3D models and 2D engineering drawings.

Teaching-Learning Process:

 Suggested strategies that teachers may use to effectively achieve the course outcomes:
  1. Chalk and Talk
  2. NPTEL and Other Videos
  3. Smart Class Room
  4. Field visit
  5. Project based learning
  6. Industrial Visit

UNIT I - DRAWING FUNDAMENTALS, GEOMETRIC CONSTRUCTION, PROJECTION OF POINTS, STRAIGHT LINES AND PLANES	**[15 hours]**

Drawing BIS standards – Orthographic projections – First angle projection - Drawing instruments – Sheet layout – Conventions – Lines, Lettering, Numbering and Dimensioning

Geometric construction – Construction of regular polygons – Conic sections – Ellipse, Parabola andHyperbola by eccentricity method.

Projection of points – Points situated in all four quadrants. Projection of straight lines – Straight lines inclined to both principal planes – Finding true length of the line and true inclinations with respect to principal planes – Rotating line method.

Projection of planes – Introduction – Polygonal lamina and Circular lamina - Orientation of planes - Plane parallel to both principal planes, Planes perpendicular to both principal planes and Planes inclined to both principal planes – Rotating object method.

Orthographic projection of simple engineering components.

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UNIT II - PROJECTION OF SOLIDS	[15 hours]

Projection of solids – Introduction – Types of solids – Polyhedra and solids of revolution - Projectionwith axes inclined to one of the principal planes and parallel to other – Change of Position method.

2D drafting - Basic commands – Coordinate systems, Object section methods. Line, Circle, Polyline,Rectangle, Hatch, Fillet, Chamfer, Trim, Extend, Offset, Dim style – Annotation and Layering – Object snaps - 3D modelling – Basic commands – Extraction of multiple views – Part modelling of

simple components - Utensils, Hand tools & Furniture etc. - Drawing views using 3D environment.

UNIT III - DEVELOPMENT OF SURFACES AND PICTORIAL PROJECTION	[15 hours]

Development of lateral surfaces of truncated Prisms, Pyramids, Cylinders and Cones–

Parallel line methodand Radial line method.

Pictorial Projection – Isometric projection – Introduction – Isometric scale – Isometric view of two right regular composite solids – Isometric projection of truncated frustum of solids – Box method. Problems onapplications of Isometric projections of simple objects / engineering components.

UNIT IV- BASIC COMPUTER AIDED DRAWING APPLICATIONS	[15 hours]

Free hand Sketching - Sketching of geometry - multiple view projection from single pictorial view ofobjects – Illustrative examples - True free hand, Guided Free hand, Roads, Buildings, Utensils, Handtools & Furniture's etc.

Drawing Simple Mechanisms - Bicycles, Tricycles, Gear trains, Ratchets, two-wheeler cart &Four-wheeler carts to dimensions etc.

UNIT V- MULTIDISCIPLINARY APPLICATIONS AND PRACTICE	[15 hours]

Electric Wiring and lighting diagrams - Like, Automatic fire alarm, Call bell system, UPS system, Basicpower distribution system using suitable software.

Basic Building Drawing - Draw various types of lines, graphical symbols for materials, doors and windows, symbols for sanitary, water supply and electrical installations and write abbreviations as per IS 962. Like, Architectural floor plan, basic foundation drawing, steel structures- Frames, bridges, trusses using Auto CAD or suitable software,

Electronics Engineering Drawings - Like, Simple Electronics Circuit Drawings, practice on layers concept.

Graphs & Charts - Like, Column chart, Pie chart, Line charts, Gantt charts, etc. using Microsoft Excel or any suitable software.

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Course outcomes:

On completion of the course, the student will have the ability to:

CO1	Apply principles of first angle projection in drafting plan and elevation of points, lines, planes, and solids.
CO2	Apply change of position method in the projection of solids and determine the true shape of the section.
CO3	Apply principles of orthographic projection to extract 2D views from 3D drawing using freehand sketching.
CO4	Apply parallel line and radial line methods to develop lateral surfaces of solids so that students can understand applications in sheet metal design.
CO5	Apply box method to develop the isometric view of simple, truncated, and composite solids.
CO6	Develop simple part model in 3D and plan, elevation, and section of building using a designated CAD software.

COs and POs Mapping:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	1	-	-	-	-	-	-	-	2	-	-	1	2	-
CO2	3	1	-	-	-	-	-	-	-	2	-	-	1	2	-
CO3	3	1	-	-	-	-	-	-	-	-	-	-	1	2	-
CO4	3	1	-	-	-	-	-	-	-	2	-	-	1	-	-
CO5	3	1	-	-	-	-	-	-	-	2	-	-	1	2	-

Level 3- Highly Mapped, Level 2- Moderately Mapped, Level 1- Low Mapped, Level 0- Not Mapped

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Scheme of Evaluation:

Component	Type of assessment	Max Marks	Reduced Marks	Total	Final marks
Continuous Internal Examination (CIE) - Theory	CIE – I	100	50	100	25
	CIE – II	100			
	MCQ	20	10		
	Skill Assessment - I	40	40		
	Skill Assessment - II	40			
Continuous Internal Examination (CIE) - Laboratory	Continuous Assessment	75	75	100	25
	Model Lab Exam	25	25		
End Semester Examination (ESE)	Lab Exam	100	50	50	50
				Total	100

Assessment Pattern

Bloom's Category	Continuous Assessment Tests		Terminal Examination
	1	2	
Remember	0	0	0
Understand	20	20	20
Apply	40	40	40
Analyze	0	0	0
Evaluate	0	0	0
Create	40	40	40

End semester Examination: (QP PATTERN)

- Each unit consists of two 2 marks questions and one 16 marks question (either or).

- All the fifteen questions have to be answered.

Text Books:

1. N.D.Bhatt,"Engineering Graphics", Charotor Publishing House, 53RD Edition 2019

2. Natrajan K.V., "A textbook of Engineering Graphics", Dhanalakshmi Publishers, Chennai(2015)

Reference Books:

1. Venugopal K. and Prabhu Raja V., "Engineering drawing + AutoCAD", New Age International (P) Limited (2022)

2. Lakhwinder pal singh, Harwinder Singh, "Engineering Drawing Principles and Applications", Cambridge University Press, 2021.

3. Cecil Johnson, Jay D Helsel and Dennis R Short, "Engineering Drawing and Design",Seventh Edition, McGraw Hill, 2007.

4. Patil, Rajashekar, "Computer Aided Engineering Graphics", New Age International Ltd,2018.

5. Chris Schroder, "Printed Circuit Board Design using AutoCAD", Newnes,1997.

6. K S Sai Ram, "Design of steel structures", Third Edition by Pearson.

7. A S Pabla, "Electrical power distribution", 6th edition, Tata Mcgrawhill.

8. K. R. Gopalakrishna, & Sudhir Gopalakrishna, "Textbook of Computer Aided EngineeringDrawing", 39th Edition, Subash Stores, Bangalore, 2017

Web Links and Video Lectures (E-Resources):

1. http://nptel.ac.in/courses/112103019
2. https://archive.nptel.ac.in/courses/112/105/112105294/

Publication of Bureau of Indian Standards:
1. IS 10711 – 2001: Technical products Documentation – Size and lay out of drawing sheets.
2. IS 9609 (Parts 0 and 1) – 2001: Technical products Documentation – Lettering.
3. IS 10714 (Part 20) – 2001 and SP 46 – 2003: Lines for technical drawings.
4. IS 11669 – 1986 and SP 46 – 2003: Dimensioning of Technical Drawings.
5. IS 15021 (Parts 1 to 4) – 2001: Technical drawings – Projection Methods.

LABORATORY REQUIREMENTS

SYSTEM REQUIREMENTS (For a batch of 30 Students)

Hardware:
1. Intel i3 core due processor with 4GB ram with 500GB hard disk – 30 Nos.
2. Laser Printer – 1 No.

Software:
Drafting package – AutoCAD – Adequate license (Open source)

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Suggested Skill Activities:

1. 2D drafting of plan and elevation of computer CPU.

2. 2D drafting of plan and elevation of a thermos flask.

3. 2D drafting of a plan and elevation of piston and cylinder.

4. Sketching the projections of a bicycle in freehand.

5. Sketching the projections of a stapler.

6. Cut and develop the lateral surface of a funnel.

7. Cut one edges vertically and develop the lateral surface of CPU cabin.

8. Cut and develop the lateral surfaces of elbow of a pipe.

9. Draw the isometric view of a simple bread toaster.

10. Draw the isometric view of the computer table.

11. Sketch the assembled view of the screw jack using the orthographic projections of its components.

12. Draft the plan, elevation and section of your home using CAD.

13. Draft the plan, elevation and section of 2 storey office building using CAD.

14. Develop the 3D model of the (a) and (b).

Course Code:	24CS201	Course Title:	PROGRAMMING FOR PROBLEM SOLVING USING C
Credits:	4	L – T – P	2-0-4
Pre -requisite		Nil	

Course objectives:

To impart knowledge on the

- To gain knowledge on problem solving techniques

- To learn how to write simple and modular C programs

- To develop C programs using arrays and strings

- To learn the usage of pointers in accessing and manipulating memory

- To develop applications in C using structures & files

Teaching-Learning Process:

Suggested strategies that teachers may use to effectively achieve the course outcomes:
1. Chalk and Talk
2. Lab experiment videos
3. Blended Mode of Learning
4. Project based Learning
5. Experiential Learning
6. NPTEL and Other Videos
7. Smart Classroom
8. Flipped Class

UNIT1 - BASICS OF C PROGRAMMING	[6 hours]

Problem Solving Techniques: Introduction to Algorithm, Pseudo code, Flow Chart, Structure of 'C' program. C Tokens: Keywords, Data Types, Constants, Variables - Declaration - Qualifiers – typedef

Practical Topics:
1. Steps in Problem Solving Drawing flowchart using yEd tool/Raptor Tool programs using simple statements.
2. Programs to illustrate the use of user-defined data types

UNIT II – BASIC CONSTRUCTS IN C	[6 hours]

Managing simple Input and Output operations - Operators and Expressions - Decision Making: Branching statements, looping statements - Function: Declaration, Definition - Passing arguments by value - Recursion - Storage classes

Practical Topics:
1. Programs using decision making statements
2. Programs using looping statements
3. Programs using user defined functions and recursive functions

UNIT III – ARRAYS AND STRINGS IN C	[6 hours]

Arrays: Initialization - One dimensional, Two dimensional, and Multi-dimensional arrays - String: Basics, declaring and initializing strings, string handling functions: standard and user defined functions

Practical Topics:
1. Build programs using arrays and array-based operations.
2. Programs using one dimensional and two dimensional arrays.
3. Implementations involving array usage for string operations.

UNIT IV – POINTERS IN C	[6 hours]

Pointers - Passing arguments by address - Dynamic Memory Allocation - Pointer arithmetic - Pointers and one dimensional array - Pointers and Multi-Dimensional Array: Array of Pointers, Pointer to Pointer, Pointer to an array - void Pointer - Pointer to function

Practical Topics:
1. Implementations involving pointers for dynamic memory allocation
2. Implementations involving pointers for string manipulation.

UNIT V – STRUCTURES, UNIONS AND FILE HANDLING IN C	[6 hours]

Structure: Declaration, Definition-Array of Structures - Pointer to Structure –
Nested Structures- Union: Defining union, Accessing union members. Files: File Management functions, Random access in file- Working with Text Files and Binary Files

Practical Topics:
1. Programs to implement structures
2. Programs to implement union
3. Programs to implement various file operations.

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Laboratory Component: **[45 hours]**

Any 12 experiments have to be completed from the following list of experiments.

S.No.	Name of the Experiment
1	Steps in Problem Solving Drawing flowchart using yEd tool/Raptor Tool programs using simple statements
2	Programs to illustrate the use of user-defined data types
3	Programs using decision making statements
4	Programs using looping statements
5	Programs using user defined functions and recursive functions
6	Build programs using arrays and array-based operations.
7	Programs using one dimensional and two dimensional arrays.
8	Implementations involving array usage for string operations.
9	Implementations involving pointers for dynamic memory allocation
10	Implementations involving pointers for string manipulation.
11	Programs to implement structures
12	Programs to implement union
13	Programs to implement various file operations

Course outcomes:

On completion of the course, the student will have the ability to:

CO1	Make use of problem solving techniques to solve real world problems & outline the structure of C program
CO2	Identify the appropriate looping and control statements in C and develop applications using these statements
CO3	Make use of arrays & strings in development of simple applications
CO4	Apply the concepts of pointers and develop C programs using pointer
CO5	Develop programs for storing, retrieving and processing data using structures and files.

COs and POs Mapping

COs	POs											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	3	2	2	-	1	-	-	-		-	-	1
CO2	3	2	2	-	1	-	-	-		-	-	1
CO3	3	3	2	1	1	-	-	-		-	-	1
CO4	3	2	2	1	1	-	-	-		-	-	1
CO5	3	3	3	1	1	-	-	-		-	-	1

Level 3- Highly Mapped, Level 2- Moderately Mapped, Level 1- Low Mapped,

Level 0- Not Mapped

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Scheme of Evaluation:

Component	Type of assessment	Max Marks	Reduced Marks	Total	Final marks
Continuous Internal Examination (CIE) - Theory	CIE – I	100	50	100	25
	CIE – II	100			
	MCQ	20	10		
	Skill Assessment - I	40	40		
	Skill Assessment - II	40			
Continuous Internal Examination (CIE) - Laboratory	Continuous Assessment	75	75	100	25
	Model Lab Exam	25	25		
End Semester Examination (ESE)	Theory Exam	100	15	50	50
	Lab Exam	100	35		
				Total	100

Assessment Pattern

Bloom's Category	Continuous Internal Examination		End Semester Examination
	1	2	
Remember	20	20	20
Understand	20	20	20
Apply	60	60	60
Analyze	0	0	0
Evaluate	0	0	0
Create	0	0	0

End semester Examination: (QP PATTERN)

- Each unit consists of two 2 marks questions and one 16 marks question (either or).

- All the fifteen questions have to be answered.

Text Books:

1. Kernighan, B.W and Ritchie,D.M, "The C Programming language", Second Edition, Pearson Education, 2015.
2. Pradip Dey, Manas Ghosh, "Programming in C", AICTE Edition, Oxford University Press, 2018

Reference Books:

1. Yashavant P. Kanetkar, "Let Us C : Authentic guide to C programming

language", Eighteenth Edition, BPB Publications, 2021

2. Ashok N Kamthane, Programming in C, Pearson, Third Edition, 2020

3. Reema Thareja, "Programming in C", Oxford University Press, Second Edition, 2016.

4. Paul Deitel and Harvey Deitel, "C How to Program with an Introduction to C++", Eighth edition, Pearson Education, 2018.

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

6. E.Balagurusamy, "Programming in ANSI C", seventh edition, Mc Graw Hill Education,2017

Web Links and Video Lectures (E-Resources):

- Introduction To Programming In C By Prof. Satyadev Nandakumar IIT Kanpur

- http://www.cprogramming.com/tutorial/c-tutorial.html

- http://www.tutorialspoint.com/cprogramming/index.htm

- https://www.geeksforgeeks.org/c-programming-language/

- http://www.w3schools.in/c

Suggested Skill Activities:

1. Steps in Problem Solving Drawing flowchart using yEd tool/Raptor Tool
2. Write a Program to calculate and display the volume of a CUBE having its height (h=10cm), width (w=12cm) and depth (8cm).

3. Ramya has bought 50 kg of onion for Rs 40 per kg and 60 kg of potato for Rs 20 per kg. Then she sold out all the stock with the selling price of Rs 60 per kg and Rs 30 per kg for onion and potato respectively. Write a C program which computes the profit gained by her.

4. A Food delivery boy needs to walk down every street in his area in order to deliver the food. Assume that the distances between the streets along the roads are given. The food delivery boy starts at the hotel and returns back to the hotel after delivering all the foods. Implement an algorithm to help the food delivery boy to walk minimum distance for the purpose.

5. Write a program to input name, marks of 5 subjects of a student and display the name of the student, the total marks scored, percentage scored and the class of result.

6. A location in a map is represented by a pair of points as x co-ordinate and y co-ordinate. Person X wants to move towards person Y which is residing in the location L1 and L2 respectively. Write C Program to find the distance between these two person .

7. If a four-digit number is input through the keyboard, write a program to obtain the sum of the first and last digit of this number.

8. Write a program to find GCD (greatest common divisor or HCF) and LCM (least common multiple) of two numbers

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9. Write a Program to multiply two 3 X 3 Matrices

10. Write a program to create a structure named company which has name, address, phone and no Of Employee as member variables. Read name of company, its address, phone and no Of Employee. Finally display these members" value.

11. Write a program to create array of books. Collect various details of books such as topic, author, department. Collect details for N books and display the details of books based on department name or author

12. A class has strength of N students. The class has two mentors, one person for the odd roll numbers and the other for the rest. Write a C program which reads the roll numbers of all the students and gives two lists of roll numbers corresponding to each advisor

13. Write a C program to maintain the inventory details of items sold in a super market such as item id, name, no of items available, price per item. Perform efficient data storage based on user"s demand at runtime

14. Write a C program to use binary files for maintaining a telephone directory which includes telephone no, Owner name and address. Here address includes details such as door no, street name, locality, city and pincode. Update the door no of all people belonging to a particular street as follows: Increment the old door no by 10 to get the new door no. (Eg: If the old door no is 13, update it as 23)

Course Code:	24GE231	Course Title:	WORKSHOP PRACTICE (Common to All Branches)
Credits:	1.5	L – T – P	0-0-3
Pre -requisite		Nil	

Course objectives:
   To provide hands on training to the students in:
● Applying basic techniques to measure a field, infer masonry work and install plumbing design.
● Fabricating carpentry, foundry, sheet metal and welding works to practice on workshop tradesand making end products.
● Utilizing machining processes like turning, drilling, tapping in parts and 3D printing forperforming the jobs.
● Designing electrical wiring layout with MCBs and RCCBs, developing staircase wiring andillumination design circuits for buildings.
● Assembling simple electronic components on PCB by soldering and desoldering and testingwith IoT based interfaces.
● Developing blogs and website design for the complete access over the network.

Teaching-Learning Process:
 Suggested strategies that teachers may use to effectively achieve the course outcomes:
   1. Project based learning
   2. Industrial Visit

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GROUP – A (Civil and Mechanical)

PART I - CIVIL ENGINEERING PRACTICES	**[5 hours]**

1. FIELD MEASUREMENT, MASONRY WORK AND PLUMBING

a. Calculate the area of a built-up space and a small parcel of land-use standard measuring tape anddigital distance measuring devices.

b. Visit a nearby site where construction is at initial stage and observe for following (if necessary,visit two/three times with a gap of a week). If drawings are available relate/match activities with the drawings.

i. Digging and filling.

ii. Foundation preparations.

iii. Brick/stone masonry.

iv. Concrete laying and curing.

v. Laying of sewerage/sanitary lines.

vi. Bar bending and bar laying for columns, beams and ceiling.

vii. Onsite testing for quality.

viii. Onsite preparation for construction work.

ix. Erection and removal of form work, scaffolding, centering/shuttering.

Prepare a brief report on the construction activities, methods, tools, equipment and materials being used.

c. Installation of water lines for wash basin and showers faucet.

PART II MECHANICAL ENGINEERING PRACTICES	**[5 hours]**

2. CARPENTRY, FOUNDRY, WELDING AND SHEET METAL
   a. Carpentry: Prepare T/L/Lap Joint from given wooden work piece and make a Box/Tray out ofplywood using modern power tools.
   b. Welding: Make a Butt/Lap of MS plate using Arc welding process.
   c. Casting: Demonstration of Pattern making by sand moulding.
   d. Sheet Metal: Fabrication of Sheet Metal Tray and Funnels.
3. LATHE, DRILLING MACHINE AND 3D PRINTER
   a. Designing a driller component using radial machine.
   b. Perform a job using facing and turning in lathe.
   c. Printing simple 3D geometric shapes using SLA printer.

GROUP – B (ELECTRICAL, ELECTRONICS AND IT)

PART III ELECTRICAL ENGINEERING PRACTICES	**[3 hours]**

4. ELECTRICAL WIRING
   a. Design a wiring circuit integrating energy meter, MCBs and RCCBs.
   b. Develop fluorescent lamp wiring, staircase wiring and electric fan wiring circuits.

PART IV	ELECTRONICS ENGINEERING PRACTICES	**[4 hours]**

5. IOT BASED SOLUTIONS AND PCB
   a. Design a single layer PCB layout structure.
   b. Fabricate single layer PCB printing.
   c. Assembling, soldering and desoldering practice on single layer PCB.
   d. GPIO programming in ESP8266, sensor and actuator interfacing with internet enabledmicrocontroller device.
   e. Integration of microcontroller-based system with Cloud platform.

PART V	COMPUTER SCIENCE AND ENGINEERING PRACTICES	**[3 hours]**

6. INTERACTIVE DYNAMIC WEBSITE
   a. Design a website for an application using HTML and CSS.
   b. Convert the designed website into responsive website using Bootstrap.
   c. Add dynamism to the website by using JavaScript and embed the social media components to thewebsite.
   d. Incorporate the database interaction with the website.
   e. Deploy the developed website in the server.

Course outcomes:

On completion of the course, the student will have the ability to:

CO1	Apply basic techniques for field measurements, masonry work and plumbing.
CO2	Make use of workshop trades like carpentry, foundry, sheet metal and welding for practicing on manufacturing of components.
CO3	Develop simple components using Lathe, Drilling Machine and 3D Printer.
CO4	Construct the electrical wiring circuits for buildings based on their requirement.
CO5	Develop IoT based solutions and PCB for real world use cases.
CO6	Build and host an interactive dynamic website.

COs and POs Mapping:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	2	1	1	2	-	-	-	1	1	-	1	3	2	1
CO2	3	2	1	1	2	-	-	-	1	1	-	1			
CO3	3	2	1	1	2	-	-	-	1	1	-	1			
CO4	3	2	1	1	2	-	-	-	1	1	-	1	1	-	-
CO5	3	2	1	1	2	-	-	-	1	1	-	1			
CO6	3	2	1	1	2	-	-	-	1	1	-	1	-	1	3

Level 3- Highly Mapped, Level 2- Moderately Mapped, Level 1- Low Mapped, Level 0- Not Mapped

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Scheme of Evaluation:

The weightage of Continuous Internal Evaluation (CIE) is 60% and for End Semester Examination (ESE) is 40%

S.No	Component	Type of Assessment	Max Marks	Reduced Marks	Total	Final Marks
1.	**Continuous Internal Examination(CIE) - Laboratory**	Continuous Assessment	75	75	100	60
2.		Model Lab Exam	25	25		
3.	**End Semester Examination (ESE)**	Lab Exam	100	40	40	40
					Total	100

Assessment Pattern

Bloom's Category	Terminal Examination
Remember	0
Understand	0
Apply	100
Analyze	0
Evaluate	0
Create	0

Reference Books:

1. AICTE's Prescribed Textbook: Workshop / Manufacturing Practices (with Lab Manual)   ISBN: 978-93-91505-332

2. Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K., "Elements of Workshop Technology", Vol. I 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai.

3. Kalpakjian S. And Steven S. Schmid, "Manufacturing Engineering and Technology", 4 th edition,Pearson Education India Edition, 2002.

4. Gowri P. Hariharan and A. Suresh Babu," Manufacturing Technology – I" Pearson Education, 2008.

5. Roy A. Lindberg, "Processes and Materials of Manufacture", 4 th edition, Prentice Hall India, 1998.

6. Rao P.N., "Manufacturing Technology", Vol. I and Vol. II, Tata McGraw Hill House, 2017.

Course Code:	24EN231	Course Title:	**PRESENTATION AND COMMUNICATION SKILLS LABORATORY (Common to AI& DS, AE,BME,CE,CSE,CSE(AI& ML),EEE, ECE,MECH)**
Credits:	**1.5**	**L – T – P**	**0-0-3**
Pre -requisite			**24EN101 ENGLISH FOR ENGINEERS**

Course objectives:
- To apply critical listening skills.
- To make use of critical thinking skills.
- To apply stress as well as tonal variation.
- Make use of language skills to produce error free sentences
- To experiment with presentation skills.

Teaching-Learning Process:

Suggested strategies that teachers may use to effectively achieve the course outcomes:

1. Lab experiment videos
2. Blended Mode of Learning
3. Project based Learning
4. Smart Classroom
5. Flipped Class

UNIT I	[12 hours]
LIST OF EXERCISES	

LAB ACTIVITIES

Sl. No.	Topic	Hours
1.	Listening to Audio (Podcasts, Audiobooks, Radio Program) and Practice Exercises, making a critical appreciation of Audio content	3
2.	Listening to BBC news	2
3.	Listening to British council/ Cambridge English (Selected topics)	2

CLASSROOM ACTIVITIES

1.	Speaking Current issues (Selected topics)	2

2.	Making Conversation at work place, Public speaking based on a festival, Celebrations	3

UNIT II	[12 hours]

LIST OF EXERCISES

LAB ACTIVITIES

Sl.No.	Topic	Hours
1	English Movie clips and software in the Lab C (Globe Rena)	3
2	Vocabulary Development through movies/ short films/ Documentaries	2

CLASSROOM ACTIVITIES

1	Speaking- Just a minute talk and expressions for plans and decisions	2
2	Marketing of a Product	2
3	Describing a process in industry	2
4	Writing- Writing a Complaint Letter about a manufacturing defect of a product	1

UNIT III	[12 hours]

LIST OF EXERCISES

LAB ACTIVITIES

Sl. No.	Topic	Hours
1.	Listening to TED talks, scientific lectures.	3
2.	Reading Comprehension strategies	2
3.	Reading- Editorials	2

CLASSROOM ACTIVITIES

1.	Speaking- Introduction to Phonetics- Speech sounds- Vowels and Consonants- Stress- Rising/ Falling Tone	2
2.	Writing- A day in my life	2
3.	Writing- Situational Dialogues	1

UNIT IV	[12 hours]

LIST OF EXERCISES

LAB ACTIVITIES

Sl. No.	Topic	Hours

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1.	Reading Popular Blogs	3
2.	Creating a Blog	2
CLASSROOM ACTIVITIES		
1.	Errors in Pronunciation. Error detection	3
2.	Writing- Terminology for Engineers. Writing- Preparing day today scripts.	2 2

UNIT V	[12 hours]
LIST OF EXERCISES	
LAB ACTIVITIES	

Sl. No.	Topic	Hours
1.	Prepare power Point presentation for topics, selected by the students	3
2.	Reading newspaper articles	2
CLASSROOM ACTIVITIES		
1.	Present the selected topic.	3
2.	Making a short speech- Extempore	2
3.	Writing- Expanding a Proverb Writing Instructions	2

Course outcomes:

On completion of the course, the student will have the ability to:

CO1	Build communicative competence through critical listening skills.
CO2	Make use of critical thinking skills to express plans and opinions.
CO3	Apply stress as well as tonal variations for effective communication.
CO4	Make use of language skills to produce error free sentences.
CO5	Experiment with presentation skills to address confidently.

COs and POs Mapping:

COs	POs											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1						-	-	-	-	3	-	3
CO2						-	-	-	-	3	-	3
CO3						-	-	-	-	-	-	3
CO4						-	-	-	-	-	-	3
CO5						-	-	-	-	3	-	3

Level 3- Highly Mapped, Level 2- Moderately Mapped, Level 1- Low Mapped,
Level 0- Not Mapped

Name of the Test	Marks	Total	Reduced to
Continuous Assessment (Experiments 1-10)	50	100	50
Model Examination	50		
End Semester Lab Exam	100	100	50
		TOTAL	**100 MARKS**

Textbooks:

1. Raman, Meenakshi and Sangeetha Sharma. Professional Communication. Oxford University Press, Oxford, 2014.

2. Dr. Chellammal. V. Learning to Communicate. Allied Publishers, New Delhi, 2003.

3. Mohan, Krishna. And Meera Bannerjee. Developing Communication Skills. Macmillan India   Ltd. 1990.

Reference Books:

1. Murphy – Raymond. English Grammar in Use BOOK with Answers: A Self-Study. Reference and Practice Book for Intermediate Learners of English. Fourth edition: Cambridge University   Press – 2012.

MANUALS/ SOFTWARE: Open Sources / Websites