PSG INSTITUTE OF TECHNOLOGY AND APPLIED RESEARCH

COIMBATORE – 641 062

(Autonomous college affiliated to Anna University)

R2025

Courses of Study, Scheme of Assessment and Syllabi for First, Second, Third and Fourth Semesters

for

B.E. Electrical and Electronics Engineering

B.E. ELECTRICAL AND ELECTRONICS ENGINEERING
(Minimum No. of credits to be earned: 168)

S. No.	Course Code	Course Title	Hours / Week			Credits	Maximum Marks			CAT
			Lecture	Tutorial	Practical		CA	ESE	Total	
SEMESTER I										
THEORY										
1	25MA101	Calculus and its Applications	3	1	0	4	40	60	100	BS
2	25PH103	Physics for Electrical Engineering	3	0	0	3	40	60	100	BS
3	25CY103	Chemistry for Electrical Engineering	3	0	0	3	40	60	100	BS
4	25ME101	Basics of Mechanical Engineering	2	2	0	4	40	60	100	ES
5	25HS101	English Language Proficiency	3	1	0	4	40	60	100	HS
6	25HS102	*தமிழர் மரபு* / Heritage of Tamils	1	0	0	1	40	60	100	HS
PRACTICALS										
7	25BS112	Basic Sciences Laboratory	0	0	4	2	60	40	100	BS
8	25GE111	Design Thinking for Innovation	0	0	2	1	100	0	100	ES
9	25GE112	Engineering Graphics	0	0	4	2	60	40	100	ES
10	25EE111	Problem Solving and Python Programming Laboratory	0	0	2	1	60	40	100	ES
MANDATORY COURSES										
11	25GEM01	Induction Programme**	-	-	-	Grade	-	-	-	MC
Total 31 periods			**15**	**4**	**12**	**25**	**520**	**480**	**1000**	

S. No.	Course Code	Course Title	Hours / Week			Credits	Maximum Marks			CAT
			Lecture	Tutorial	Practical		CA	ESE	Total	
SEMESTER II										
THEORY										
1	25MA201	Complex Variables and Transforms	3	1	0	4	40	60	100	BS
2	25EE201	Electric Circuits and Networks	3	1	0	4	40	60	100	ES
3	25EE202	Electromagnetic Fields	3	1	0	4	40	60	100	ES
4	25PH203	Semiconductor Devices	3	0	0	3	40	60	100	BS
5	25EE203	Programming in C Language	3	0	0	3	40	60	100	ES
6	25HS201	*தமிழரும் தொழில்நுட்பமும்* / Tamils and Technology	1	0	0	1	40	60	100	HS
PRACTICALS										
7	25HS21_	Language Elective	0	0	4	2	60	40	100	HS
8	25EE211	Circuits and Devices Laboratory	0	0	2	1	60	40	100	ES
9	25EE212	Programming in C Laboratory	0	0	2	1	60	40	100	ES
10	25EEC01	Workplace Communication Skills	0	0	2	Grade	100	0	100	EEC
MANDATORY COURSES										
11	25GEM02	Activity Point Programme I*	-	-	-	Grade	-	-	-	MC
Total 29 periods			**16**	**3**	**10**	**23**	**520**	**480**	**1000**	

**** As per AICTE norms;**
*** As per AICTE norms; Total 60 hrs.; Grade: Non-Credit Course**
CAT - Category; BS - Basic Science; HS - Humanities and Social Sciences; ES - Engineering Sciences; PC - Professional Core; PE - Professional Elective; OE - Open Elective; EEC - Employability Enhancement Course; MC – Mandatory Course

S. No.	Course Code	Course Title	Hours / Week			Credits	Maximum Marks			CAT
			Lecture	Tutorial	Practical		CA	ESE	Total	
SEMESTER III										
THEORY										
1	25MA304	Matrix Theory and Numerical Methods	3	1	0	4	40	60	100	BS
2	25EE301	Electronic Circuits	3	1	0	4	40	60	100	ES
3	25EE302	Measurements and Instrumentation	3	0	0	3	40	60	100	ES
4	25EE303	DC Machines and Transformers	3	0	0	3	40	60	100	PC
5	25HS301	Project and Finance Management	3	0	0	3	40	60	100	HS
PRACTICALS										
6	25EE311	DC Machines and Transformers Laboratory	0	0	4	2	60	40	100	PC
7	25EE312	Electronic Circuits Laboratory	0	0	2	1	60	40	100	ES
8	25EEC02	Foundations of Problem Solving	0	0	2	1	100	0	100	EEC
MANDATORY COURSES										
9	25MC0__	Mandatory Course I	2	0	0	Grade	100	0	100	MC
10	25GEM03	Activity Point Programme II*	-	-	-	Grade	-	-	-	MC
Total 27 periods			**17**	**2**	**8**	**21**	**520**	**380**	**900**	

S. No.	Course Code	Course Title	Hours / Week			Credits	Maximum Marks			CAT
			Lecture	Tutorial	Practical		CA	ESE	Total	
SEMESTER IV										
THEORY										
1	25MA403	Stochastic Processes and Statistical Analysis	3	1	0	4	40	60	100	BS
2	25EE401	Generation, Transmission and Distribution	3	0	0	3	40	60	100	PC
3	25EE402	Digital Electronics	3	1	0	4	40	60	100	PC
4	25EE403	Linear Integrated Circuits	3	0	0	3	40	60	100	PC
5	25EE404	AC Machines	3	1	0	4	40	60	100	PC
PRACTICALS										
6	25EE411	AC Machines Laboratory	0	0	4	2	60	40	100	PC
7	25EE412	Digital Electronics and LIC Laboratory	0	0	4	2	60	40	100	PC
8	25EEE01	Mini-Project I	0	0	2	1	100	0	100	EEC
9	25EEC03	Problem Solving	0	0	2	1	100	0	100	EEC
MANDATORY COURSES										
10	25MC0__	Mandatory Course II	2	0	0	Grade	100	0	100	MC
11	25GEM04	Activity Point Programme III*	-	-	-	Grade	-	-	-	MC
Total 32 periods			**17**	**3**	**12**	**24**	**620**	**380**	**1000**	

*** As per AICTE norms; Total 60 hrs.; Grade: Non-Credit Course**
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S. No.	Course Code	Course Title	Hours / Week			Credits	Maximum Marks			CAT
			Lecture	Tutorial	Practical		CA	ESE	Total	
SEMESTER V										
THEORY										
1	25EE501	Control Systems	3	1	0	4	40	60	100	PC
2	25EE502	Power Electronics	3	1	0	4	40	60	100	PC
3	25EE503	Microprocessor and Microcontrollers	3	0	0	3	40	60	100	PC
4	25EE504	Digital Signal Processing	3	1	0	4	40	60	100	PC
5	25EEP__	Professional Elective I	3	0	0	3	40	60	100	PE
PRACTICALS										
6	25EE511	Power Electronics Laboratory	0	0	2	1	60	40	100	PC
7	25EE512	Microprocessor and Microcontrollers Laboratory	0	0	4	2	60	40	100	PC
8	25EE513	Instrumentation and Control Laboratory	0	0	2	1	60	40	100	PC
9	25EEE02/ 25EEE03	Internship – I / Community Project	0	0	0	1	100	0	100	EEC
10	25EEC04	Aptitude Skills	0	0	2	1	100	0	100	EEC
MANDATORY COURSES										
11	25GEM05	Activity Point Programme IV*	-	-	-	Grade	-	-	-	MC
Total 28 periods			**15**	**3**	**10**	**24**	**580**	**420**	**1000**	

S. No.	Course Code	Course Title	Hours / Week			Credits	Maximum Marks			CAT
			Lecture	Tutorial	Practical		CA	ESE	Total	
SEMESTER VI										
THEORY										
1	25EE601	Power System Analysis	3	1	0	4	40	60	100	PC
2	25EE602	Electric Drives and Control	3	0	0	3	40	60	100	PC
3	25EE603	Data Structures using C++	2	2	0	4	40	60	100	ES
4	25__O__	Open Elective I	3	0	0	3	40	60	100	OE
5	25EEP__	Professional Elective II	3	0	0	3	40	60	100	PE
PRACTICALS										
6	25EE611	Electric Drives and Control Laboratory	0	0	2	1	60	40	100	PC
7	25EEE04	Mini-project II	0	0	2	1	100	0	100	EEC
8	25EEC05	Enhancing Problem Solving Ability with Code	0	0	2	1	100	0	100	EEC
MANDATORY COURSES										
9	25GEM06	Activity Point Programme V*	-	-	-	Grade	-	-	-	MC
Total 23 periods			**14**	**3**	**6**	**20**	**460**	**340**	**800**	

*** As per AICTE norms; Total 60 hrs.; Grade: Non-Credit Course**

CAT - Category; BS - Basic Science; HS - Humanities and Social Sciences; ES - Engineering Sciences; PC - Professional Core; PE - Professional Elective; OE - Open Elective; EEC - Employability Enhancement Course; MC – Mandatory Course

S. No.	Course Code	Course Title	Hours / Week			Credits	Maximum Marks			CAT
			Lecture	Tutorial	Practical		CA	ESE	Total	
SEMESTER VII										
THEORY										
1	25EE701	Power System Protection and Switchgear	3	1	0	4	40	60	100	PC
2	25EE702	Electrical Machine Design	3	1	0	4	40	60	100	PC
3	25EEP__	Professional Elective III	3	0	0	3	40	60	100	PE
4	25EEP__	Professional Elective IV	3	0	0	3	40	60	100	PE
5	25__O__	Open Elective II	3	0	0	3	40	60	100	OE
PRACTICALS										
6	25EE711	Power System Laboratory	0	0	2	1	60	40	100	PC
7	25EEE05	Project Work I	0	0	4	2	100	0	100	EEC
8	25EEE06	Internship II	0	0	0	1	100	0	100	EEC
Total 23 periods			**15**	**2**	**6**	**21**	**460**	**340**	**800**	

S. No.	Course Code	Course Title	Hours / Week			Credits	Maximum Marks			CAT
			Lecture	Tutorial	Practical		CA	ESE	Total	
SEMESTER VIII										
THEORY										
1	25EEP__	Professional Elective V	3	0	0	3	40	60	100	PE
2	25EEP__	Professional Elective VI	3	0	0	3	40	60	100	PE
PRACTICALS										
3	25EEE07	Project Work II	0	0	8	4	60	40	100	EEC
Total 14 periods			**6**	**0**	**8**	**10**	**140**	**160**	**300**	

CAT - Category; BS - Basic Science; HS - Humanities and Social Sciences; ES - Engineering Sciences; PC - Professional Core; PE - Professional Elective; OE - Open Elective; EEC - Employability Enhancement Course; MC – Mandatory Course

Summary of Credit Distribution

BE ELECTRICAL AND ELECTRONICS ENGINEERING										
S. No.	Course Category	Credits Per Semester								Total Credits
		I	II	III	IV	V	VI	VII	VIII	
1	HS	5	3	3	0	0	0	0	0	**11**
2	BS	12	7	4	4	0	0	0	0	**27**
3	ES	8	13	8	0	0	4	0	0	**33**
4	PC	0	0	5	18	19	8	9	0	**59**
5	PE	0	0	0	0	3	3	6	6	**18**
6	OE	0	0	0	0	0	3	3	0	**6**
7	EEC	0	0	1	2	2	2	3	4	**14**
8	MC	0	0	0	0	0	0	0	0	0
TOTAL		**25**	**23**	**21**	**24**	**24**	**20**	**21**	**10**	**168**

CAT - Category; BS - Basic Science; HS - Humanities and Social Sciences; ES - Engineering Sciences; PC - Professional Core; PE - Professional Elective; OE - Open Elective; EEC - Employability Enhancement Course; MC – Mandatory Course.

LIST OF PROFESSIONAL ELECTIVE COURSES: VERTICALS

S. No.	Vertical 1 Embedded Systems	Vertical 2 Power Electronics and Drives	Vertical 3 Electric Vehicle Technology	Vertical 4 Power System	Vertical 5 Diversified Courses
1	25EEP01 Embedded System Design	25EEP09 Modelling and simulation of power converters	25EEP17 Electric Vehicle Architecture	25EEP25 Power System Operation and Control	25EEP33 Artificial Intelligence and Machine Learning Fundamentals
2	25EEP02 Embedded C Programming	25EEP10 Switched Mode Power Conversion	25EEP18 Design of motors and Converters for Electric Vehicle	25EEP26 Renewable Energy Systems	25EEP34 Data Analytics
3	25EEP03 Internet of Things (IoT) and its applications	25EEP11 Control of Power Electronic Circuits	25EEP19 Intelligent Control of Electric vehicle	25EEP27 Smart Grid	25EEP35 VLSI Design Techniques
4	25EEP04 Operating Systems	25EEP12 Special Electrical Machine	25EEP20 Battery Management System	25EEP28 Energy Management and Auditing	25EEP36 Cyber Security
5	25EEP05 Computer Architecture	25EEP13 Power electronics for Renewable Energy Systems	25EEP21 Design of Electric vehicle Charging System	25EEP29 Utilization and Conservation of Electrical Energy	25ICP12 Virtual Instrumentation
6	25EEP06 System Design using FPGA	25EEP14 Multilevel Power Converters	25EEP22 Testing of Electric vehicles	25EEP30 HVDC and FACTS	25EEP37 PLC and SCADA
7	25EEP07 Digital Image Processing	25EEP15 Dynamic Modelling, Analysis and Design of Drives	25EEP23 Grid Integration of Electric Vehicles	25EEP31 Power quality and Management	25EEP38 Electrical system estimation and costing
8	25EEP08 Automotive Electronics	25EEP16 Embedded Control of Electric Drives	25EEP24 Artificial Intelligence for Autonomous vehicles	25EEP32 High Voltage Engineering	25EEP39 Model Based Systems

LIST OF PROFESSIONAL ELECTIVE COURSES FOR MINOR DEGREE PROGRAMME

S. No.	Course Code	Course Title
1	25EEM01	Basics of Electric Vehicle
2	25EEM02	Hybrid Electric Vehicles
3	25EEM03	Embedded System for Automotive Applications
4	25EEM04	Energy Storage Systems
5	25EEM05	Electric Machines for EVs
6	25EEM06	EV Data Analytics and Cyber Security
7	25EEM07	Design Modelling and Simulation of Electric Vehicle
8	25EEM08	Unmanned Aerial Vehicles

25MA101 CALCULUS AND ITS APPLICATIONS
(Common to CIVIL, CSE, EEE, ECE, ICE, MECH, AI&DS and EE-VLSI)

3 1 0 4

DIFFERENTIAL CALCULUS: Functions of two variables, limits and continuity, partial derivatives, chain rule, extreme values and saddle points, Lagrange multipliers, Taylor's formula for two variables. **(9+3)**

INTEGRAL CALCULUS: Double and iterated integrals over rectangles, double integrals over general regions, Fubini's theorem, area and volume by double integration, reversing the order of integration, double integrals in polar form. **(9+3)**

FIRST ORDER ORDINARY DIFFERENTIAL EQUATIONS: Basic concepts, separable differential equations, exact differential equations, integrating factors, linear differential equations, modeling - mixing problems, Newton's law of cooling, decay and growth problems. **(9+3)**

SECOND ORDER LINEAR DIFFERENTIAL EQUATIONS: Homogeneous linear equations of second order, homogeneous linear ODEs with constant coefficients, Euler–Cauchy equations, solution by variation of parameters, free oscillations mass spring systems, electric circuits. **(9+3)**

VECTOR CALCULUS: Gradient and directional derivative of a scalar field, divergence and curl of a vector field. Integration in vector field – line integrals, path independence of line integrals, Green's theorem in the plane, divergence theorem of Gauss and Stokes' theorem. **(9+3)**

Total L: 45 + T: 15 = 60 periods

TEXT BOOKS

1. J. Hass, C. Heil, and D. W. Maurice, '*Thomas Calculus'*. Pearson Education, New Delhi, 2018.
2. Erwin Kreyszig, '*Advanced Engineering Mathematics'*. Wiley India, New Delhi, 2018.

REFERENCES

1. H. Anton, I. Bivens, and S. Davis, '*Calculus*'. John Wiley and Sons, USA, 2016.
2. C. R. Wylie and L. C. Barrett, '*Advanced Engineering Mathematics*'. Tata McGraw-Hill, New Delhi, 2019.
3. D. G. Michael, '*Foundations of Applied Mathematics*'. Dover Publications, New York, 2013.
4. Gilbert Strang, '*Calculus*'. Wellesley Cambridge Press, USA, 2017.

COURSE OUTCOMES

At the end of the course, students will be able to:		**Bloom's Level**
CO1	Explain the concepts related to Calculus, Differential Equations and Vector Calculus.	**K2**
CO2	Apply the techniques of Calculus, Differential Equations and Vector Calculus to solve engineering problems.	**K3**
CO3	Analyze the solutions of engineering problems employing Calculus, Differential Equations and Vector Calculus.	**K4**
CO4	Use modern tools to solve engineering problems with the help of Calculus, Differential Equations and Vector Calculus.	**-**

COs-POs & PSOs MAPPING

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PSO1**	**PSO2**
CO1													
CO2	3												
CO3		3											
CO4					2								
@	**3**	**3**			**2**								

1 – low, 2 – medium, 3 – high @-Overall Contribution to the Course

25PH103 PHYSICS FOR ELECTRICAL ENGINEERING
(Common to EEE, ECE and EE-VLSI)

3 0 0 3

ELECTROMAGNETISM: Review of definitions of fundamental terms. Permeability. Forces due to currents - Uniform and non-uniform magnetic fields - Static and time-varying magnetic fields. Electromagnetic induction - Expression for induced emf. Electric fields definition of fundamental terms. Dielectric constant, Permittivity. Dielectric displacement. Gauss theorem. Electromagnetic waves. Propagation of electromagnetic waves through isotropic media. Maxwell's equations and interpretation of Maxwell's equations. **(9)**

QUANTUM MECHANICS: Wave particle duality, de Broglie waves- Heisenberg's uncertainty principle. Wave function- normalization. The wave equation - Schrodinger's equation of motion: Time dependent form, steady-state form. Particle in a box - Quantum Tunneling and applications: Zener diode and Tunnel diode. **(9)**

ELECTRICAL PROPERTIES: Conducting materials-quantum free electron theory -Fermi Dirac Statistics-Band theory of solids-the density of states. Dielectrics-types of polarization-measurement of dielectric permittivity-Loss Factor-Dielectric loss mechanisms. **(9)**

PHYSICS OF SEMICONDUCTORS: P type and N type semiconductors-the effective mass. Electrical conductivity in P type and N type semiconductors - P-N junction, rectifier equation. Hall effect and its applications. Hetero junction-Quantum well, wire, dots- Optical properties of Semiconductors: LD, LED, Photo diode. Introduction to MEMS. **(9)**

MAGNETIC PROPERTIES: Types of magnetic materials-domain theory-hysteresis- hard and soft magnetic materials-Applications-eddy current brakes, regenerative braking. Magnetic lenses, Magnetostriction. Superconductivity –Meissner's effect- Josephson junction, SQUID magnetometer, applications. **(9)**

Total L: 45 periods

TEXTBOOKS:

1. William D Callister Jr, '*Materials Science and Engineering-An Introduction'*. John Wiley and Sons Inc., 10th Edition, New York, 2018.
2. Arthur Beiser, '*Concepts of Modern Physics*'. Tata McGraw Hill, India, 2017.
3. Richard Wolfson, '*Essential University Physics*'. Vols 1 and 2. Pearson Education, Singapore, 2021.

REFERENCES:

1. Rolf E. Hummel, '*Electronic Properties of Materials*'. Springer, 2013
2. Van Vlack, '*Elements of Material Science and Engineering*'. Pearson Education India, 2008.
3. S. M. Sze, '*Physics of Semiconductor Devices'*. John Wiley and Sons, USA, 4th Edition, 2021.
4. D. Halliday, R. Resnick and Walker, '*Fundamentals of Physics*'. John Wiley and sons, 12th edition, 2021.

COURSE OUTCOMES

At the end of the course, students will be able to:		**Bloom's Level**
CO1	Explain the fundamental concepts of electromagnetism, quantum mechanics, electrical properties, semiconductors, and magnetic materials, focusing on their principles and applications in engineering.	**K2**
CO2	Apply mathematical models to calculate electromagnetic field parameters, quantum states, carrier concentration in semiconductors, and magnetic flux in engineering systems.	**K3**
CO3	Analyze the performance of materials and devices based on their electrical, magnetic, and quantum properties, using appropriate equations and measurement techniques.	**K4**
CO4	Prepare a report or presentation on the applications of quantum mechanics, semiconductor devices, and magnetic materials in modern electronic systems, emphasizing their operational principles and practical uses.	**–**

COs-POs & PSOs MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1													
CO2	3												
CO3		1											
CO4						1			1		1		
@	**3**	**1**				**1**			**1**		**1**		

1 – low, 2 – medium, 3 – high @-Overall Contribution to the Course

25CY103 CHEMISTRY FOR ELECTRICAL ENGINEERING

3 0 0 3

ELECTROCHEMISTRY: Electrode potential – standard and reference electrodes, Nernst equation, emf series – applications. Galvanic and concentration cells. Applications of potential measurements - redox titration, sensors – ion-selective electrodes –glass electrode - pH measurement, potentiometric gas sensing – oxygen sensor, dissolved CO_2 sensor - Conductance measurements – applications – conductometric titrations. **(9)**

BATTERIES AND FUEL CELLS: Batteries- types - battery characteristics-fabrication and working of zinc-carbon and lithium primary cells, lead- acid, Ni-metal-hydride and lithium ion batteries. Advanced and specialty batteries, supercapacitors. **Fuel cells**: Classification, working principle and components of proton exchange membrane, direct methanol, solid oxide, and molten carbonate fuel cells. Hydrogen as a fuel-production and storage**.** **(9**)

CORROSION: Atmospheric corrosion- oxidation – Pilling –Bedworth rule. Electrochemical corrosion – galvanic and differential aeration corrosion, soil corrosion. Rate of corrosion - factors influencing corrosion. Corrosion control –protective coatings - metallic coatings – galvanising, tinning, chemical conversion coatings– anodising, phosphating, chromating. Paints– constituents and their functions. Vitreous enamel coatings. Cathodic protection - sacrificial anode and impressed current methods. Corrosion in electronic components - vapour phase inhibitors, dehumidifier gels. Corrosion issues in power transmission and distribution. **(9)**

POLYMERS: Mechanisms of polymerisation reactions – chain and condensation, copolymers, degree of polymerisation, polydispersity, topologies - amorphous and crystalline states. Thermal properties - thermoplastics and thermosetting plastics, mechanical properties, electrical properties– conducting polymers – charge transport, doping and applications, insulating polymers - dielectric breakdown – aging of polymers - protective and functional additives. Modification of properties of polymers – composites – types of fillers. Photoresists – chemistry, types, application in microchip fabrication – overview. Adhesives – chemical types, application methods, factors influencing adhesion, applications in electronic packaging. **(9)**

CHEMICAL PROCESSES AND MATERIALS FOR ELECTRONICS AND ELECTRICAL ENGINEERING: Ultrapure water for electronics industry – specification, water purification – ion exchange, reverse osmosis, continuous electrode ionization. PCB fabrication – electroless and electroplating of copper and nickel – formation of copper track on plastic board. Electroforming of nickel - fabrication of CD stampers. Soldering alloys – phase diagrams, lead free alloys. Oils for insulation and lubrication–- chemical constitution, characterisation of oils – kinematic viscosity, water content, neutralisation value, flash and fire point, cloud and pour point, oxidation stability, electric properties - breakdown voltage, dielectric constant, dissipation factor. Grease – preparation, types and properties. **(9)**

Total L: 45 periods

TEXT BOOKS:

1. Shashi Chawla, '*A Textbook of Engineering Chemistry*'. Dhanpat Rai and Co., 6th edition, 2022.
2. Derek Pletcher and Frank C. Walsh, '*Industrial Electrochemistry*'. Chapman and Hall, 1993.

REFERENCES:

1. J. M. G. Cowie and Valeria Arrighi, '*Polymers: Chemistry and Physics of Modern Materials*'. CRC Press, 3rd edition 2016.
2. Florinel-Gabriel Banica, '*Chemical Sensors and Biosensors – Fundamentals and Applications'*. John Wiley and Sons Ltd, 2012.
3. Peter Van Zant, '*Microchip Fabrication: A Practical Guide to Semiconductor Processing*'. McGraw Hill, 2014.

4. Ravindra Arora and Wolfgang Mosch, '*High Voltage Electrical Insulation Engineering*'. John Wiley and Sons Ltd., 2011.

COURSE OUTCOMES

At the end of the course, students will be able to:		**Bloom's Level**
CO1	Describe the fundamental concepts of electrochemical methods and engineering materials.	**K2**
CO2	Apply the concepts of electrochemistry and polymer technology in electrical and electronic systems.	**K3**
CO3	Analyze the properties of materials and select the appropriate materials for engineering applications	**K4**

COs-POs & PSOs MAPPING

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PSO1**	**PSO2**
CO1													
CO2	3										3		
CO3		3						1	1				
@	**3**	**3**						**1**	**1**		**3**		

1 – low, 2 – medium, 3 – high @-Overall Contribution to the Course

25ME101 BASICS OF MECHANICAL ENGINEERING

2 2 0 4

BASIC MANUFACTURING PROCESSES: Carpentry, Fitting, Lathe, Welding, Smithy, Foundry and Sheet Metal-Basic tools, applications and practices; Overview of manufacturing processes-Introduction to metal casting process, bulk deformation processes, powder metallurgy and plastic processing. **(6+6)**

POWER TRANSMISSION: Types of drives, construction and operation of belt drives, flat and V belts, rope drive, chain drive; Gear drives - spur, helical, bevel, worm and worm wheel, rack and pinion; Gear trains - simple and compound gear trains. **(6+6)**

BASIC CONCEPTS OF THERMODYNAMICS AND FLUID MECHANICS: Thermodynamics: System, property, state and equilibrium, process and cycle, work, heat and other forms of energy, zeroth law and application, first law of thermodynamics-application to closed and open systems, second law of thermodynamics - Clausius and Kelvin- Planck statements; Fluid mechanics: Properties of fluids, measurement of pressure using manometers, flow measurement using orifice, venturi-meter, nozzle meters and pitot tubes. **(6+6)**

INTERNAL COMBUSTION ENGINES AND AIR COMPRESSORS: Engines: Classification of IC engines, construction and working principle of petrol and diesel engines, four stroke and two stroke cycles, comparison of four stroke and two stroke engines, petrol, diesel and duel engines, Electrical vehicle; Air compressors: Classification, constructional details and working principle-axial flow, reciprocating and centrifugal compressors. **(6+6)**

PUMPS, TURBINES, REFRIGERATION AND AIR-CONDITIONING: Pumps: Basic concepts of centrifugal and reciprocating pumps - constructional details and working principle; Turbines: Principle and working of Pelton wheel, Francis and Kaplan turbine; Refrigeration and air conditioning: Principle and working of vapour compression and absorption systems, layout of typical domestic refrigerator; window and split type room air conditioners. **(6+6)**

Total L: 30 + T: 30 = 60 periods

TEXT BOOKS:

1. S. Kalpakjian. '*Manufacturing Engineering and Technology'*. Pearson Education India Edition, 2013
2. K. Venugopal, V. Prabhu Raja and G. Sree Kanjana, '*Basic Mechanical Engineering*'. Anuradha Publications, Chennai, 2014

REFERENCES:

1. L. S. Jayagopal and R. Rudramoorthy, '*Elements of Civil and Mechanical Engineering*'. Vikas Publishing House Pvt. Ltd., 2003
2. D. S. Kumar, '*Fluid Mechanics and Fluid Power Engineering*'. Kataria and Sons, New Delhi, 2010
3. V. Ganesan, '*Internal Combustion Engines*'. Tata McGraw Hill, 2007

COURSE OUTCOMES

At the end of the course, students will be able to:		**Bloom's Level**
CO1	Explain the working principles of thermodynamic systems, fluid machinery, internal combustion engines, and refrigeration and air-conditioning units.	**K2**
CO2	Apply basic concepts of mechanical, fluid, and thermal systems to practical engineering scenarios.	**K3**
CO3	Analyze various power transmission mechanisms including belt, chain, rope, and gear drives for mechanical motion and force transfer.	**K4**

COs-POs & PSOs MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1													
CO2	3												
CO3		1											
@	**3**	**1**											

1 – low, 2 – medium, 3 – high @-Overall Contribution to the Course

25HS101 ENGLISH LANGUAGE PROFICIENCY
(Common to CIVIL, CSE, EEE, ECE, ICE, MECH, AI&DS and EE-VLSI)

3 1 0 4

VOCABULARY: Etymology-Prefixes and suffixes–Synonyms–Antonyms–Guessing meanings from context–Word formation- Single-word substitutes- Different forms of a word–Phrasal verbs–Collocations. **(9+3)**

LISTENING AND SPEAKING: Understanding listening – Listening techniques - Introducing oneself and others – Seeking and sharing information– Description-Conversation skills– Extempore speaking– Speech practice in varied formal contexts. **(9+3)**

GRAMMAR: Wh-questions – Yes/no questions– Parts of speech – Articles– Prepositions–Gerunds–Conjunctions- Degrees of comparison– Tenses– Modal verbs – Adverbs - Direct and indirect questions. **(9+3)**

READING: Reading strategies: Skimming and scanning, predicting– Reading comprehension: techniques –Practice reading. **(9+3)**

WRITING: Discourse markers – Dialogue writing - Completing sentences – Jumbled sentences – Paragraph writing –Writing compare & contrast paragraphs – Letter writing. **(9+3)**

Total L: 45 + T: 15 = 60 periods

TEXTBOOKS:

1. K. N. Shoba and Lourdes Joavani Rayen, '*Communicative English*'. Cambridge University press, Cambridge, 2021.
2. Raymond Murphy, '*Intermediate English Grammar*'. Cambridge University Press, New Delhi, 2020.
3. Dr M. Sambaiah, '*Technical English an integrated text book*'. Wiley India Pvt. Ltd., 2025.

REFERENCES:

1. Raymond Murphy, '*English Grammar in Use*'. Cambridge University Press, New Delhi 2020.
2. N. P. Sudharshana and C. Savitha, '*English for Engineers*'. Cambridge University Press, New York, 2018.
3. Helen Naylor with Raymond Murphy, '*Essential English Grammar*'. Cambridge University Press, New Delhi, 2019.

COURSE OUTCOMES

At the end of the course, students will be able to:		**Bloom's Level**
CO1	Demonstrate the ability to recognize and use a wide range of vocabulary and key grammatical structures accurately, while developing inferential reading skills to comprehend, interpret, and analyze written texts across diverse contexts.	**K2**
CO2	Organize their ideas logically in essay writing, develop paragraphs with clear topic sentences and adapt their letter-writing skills to various real-world scenarios.	**K3**
CO3	Demonstrate clear and confident speaking skills in formal and informal contexts.	**-**

COs-POs & PSOs MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1									3		3		
CO2									3		3		
CO3									1		1		
@									**3**		**3**		

1 – low, 2 – medium, 3 – high @-Overall Contribution to the Course

25HS102 *தமிழர் மரபு*
(Common to CIVIL, CSE, EEE, ECE, ICE, MECH, AI&DS and EE-VLSI)

1 0 0 1

மொழி மற்றும் இலக்கியம்: *இந்திய மொழிக் குடும்பங்கள் – திராவிட மொழிகள் – தமிழ் ஒரு செம்மொழி – தமிழ் செவ்விலக்கியங்கள் – சங்க இலக்கியத்தின் சமயச்சார் பற்ற தன்மை – சங்க இலக்கியத்தில் பகிர்தல் அறம் – திருக்குறளில் மேலாண்மைக் கருத்துக்கள் – தமிழ் காப்பியங்கள், தமிழகத்தில் சமண பௌத்த சமயங்களின் தாக்கம் – பக்தி இலக்கியம், ஆழ்வார்கள் மற்றும் நாயன்மார்கள் – சிற்றிலக்கியங்கள் – தமிழில் நவீன இலக்கியத்தின் வளர்ச்சி – தமிழ் இலக்கிய வளர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசன் ஆகியோரின் பங்களிப்பு.* **(3)**

மரபு – பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை – சிற்பக்கலை: *நடுகல் முதல் நவீன சிற்பங்கள் வரை – ஐம்பொன் சிலைகள் – பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினைப் பொருட்கள், பொம்மைகள் – தேர் செய்யும் கலை – சுடுமண் சிற்பங்கள் – நாட்டுப்புறத் தெய்வங்கள் – குமரி முனையில் திருவள்ளுவர் சிலை – இசைக்கருவிகள் – மிருதங்கம், பறை, வீணை, யாழ், நாதஸ்வரம் – தமிழர்களின் சமூக பொருளாதார வாழ்வியல் கோவில்களின் பங்கு.* **(3)**

நாட்டுப்புறக்கலைகள் மற்றும் வீரவிளையாட்டுகள்: *தெருக்கூத்து, கரகாட்டம், வில்லுப் பாட்டு, கணியான் கூத்து, ஒயிலாட்டம், தோல்பாவைக் கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் விளையாட்டுகள்.* **(3)**

தமிழர்களின் திணைக்கோட்பாடுகள்: *தமிழகத்தின் தாவரங்களும், விலங்குகளும் – தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக்கோட்பாடுகள் – தமிழர்கள் போற்றிய அறக்கோட்பாடு – சங்க காலத்தில் தமிழகத்தில் எழுத்தறிவும், கல்வியும் – சங்க கால நகரங்களும் துறைமுகங்களும் – சங்க காலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி – கடல் கடந்த நாடுகளில் சோழர்களின் வெற்றி.* **(3)**

இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு: *இந்திய விடுதலைப் போரில் தமிழர்களின் பங்கு – இந்தியாவின் பிறப் பகுதிகளில் தமிழ்ப் பண்பாட்டின் தாக்கம் – சுயமரியாதை இயக்கம் – இந்திய மருத்துவத்தில், சித்த மருத்துவத்தின் பங்கு – கல்வெட்டுகள், கையெழுத்துப் படிகள் – தமிழ் புத்தகங்களின் அச்சு வரலாறு.* **(3)**

Total L: 15 periods

25HS102 HERITAGE OF TAMILS
(Common to CIVIL, CSE, EEE, ECE, ICE, MECH, AI&DS and EE-VLSI)

1 0 0 1

LANGUAGE AND LITERATURE: Language Families in India - Dravidian Languages – Tamil as a Classical Language - Classical Literature in Tamil – Secular Nature of Sangam Literature – Distributive Justice in Sangam Literature - Management Principles in Thirukural - Tamil Epics and Impact of Buddhism & Jainism in Tamil Land - Bakthi Literature Azhwars and Nayanmars - Forms of minor Poetry - Development of Modern literature in Tamil - Contribution of Bharathiyar and Bharathidhasan. **(3)**

HERITAGE - ROCK ART PAINTINGS TO MODERN ART – SCULPTURE: Hero stone to modern sculpture - Bronze icons - Tribes and their handicrafts - Art of temple car making - Massive Terracotta sculptures, Village deities, Thiruvalluvar Statue at Kanyakumari, Making of musical instruments - Mridhangam, Parai, Veenai, Yazh and Nadhaswaram - Role of Temples in Social and Economic Life of Tamils. **(3)**

FOLK AND MARTIAL ARTS: Therukoothu, Karagattam, Villu Pattu, Kaniyan Koothu, Oyillattam, Leather puppetry, Silambattam, Valari, Tiger dance - Sports and Games of Tamils. **(3)**

THINAI CONCEPT OF TAMILS: Flora and Fauna of Tamils & Aham and Puram Concept from Tholkappiyam and Sangam Literature - Aram Concept of Tamils - Education and Literacy during Sangam Age - Ancient Cities and Ports of Sangam Age - Export and Import during Sangam Age - Overseas Conquest of Cholas. **(3)**

CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE: Contribution of Tamils to Indian Freedom Struggle - The Cultural Influence of Tamils over the other parts of India – Self-Respect Movement - Role of Siddha Medicine in Indigenous Systems of Medicine – Inscriptions & Manuscripts – Print History of Tamil Books. **(3)**

Total L: 15 periods

TEXT – CUM – REFERENCE BOOKS

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

REFERENCES

1. V Priyadharshini, *தமிழர் மரபு* (Heritage of Tamils), VK publications, Sivakasi.

COURSE OUTCOMES

At the end of the course, students will be able to:		**Bloom's Level**
CO1	Describe the Dravidian language family, outline the features of Tamil classical literature, and explain the development of Tamil art, sculpture, and temple-related traditions in a historical context.	**K2**
CO2	Demonstrate the cultural relevance of Tamil folk and martial arts, apply the concepts of Sangam landscape classification to social contexts, and relate Tamil contributions to India's freedom struggle, cultural legacy, and Siddha medicine.	**K3**

COs-POs & PSOs MAPPING

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PSO1**	**PSO2**
CO1							3				3		
CO2							3				3		
@							**3**				**3**		

1 – low, 2 – medium, 3 – high @-Overall Contribution to the Course

25BS112 BASIC SCIENCES LABORATORY
(Common to EEE, ECE, Mech and EE-VLSI)

0 0 4 2

Physics (Any eight experiments)

1. Measurement of Hall coefficient of a semiconductor using Hall effect setup.
2. Determination of Young's modulus of the material- Uniform Bending
3. Determination of electrical resistivity of a given material using four probe setups.
4. Determination of wavelength of laser using diffraction grating - LASER.
5. Determination of Thickness of a thin wire – Air wedge method.
6. Study of I-V characteristics of solar cell and determination of its efficiency
7. Determination of velocity of sound and compressibility of liquid - Ultrasonic Interferometer.
8. Determination of Planck's constant and work function of a metal -Photoelectric Effect
9. Determination of bandgap of a semiconductor – Post office box.
10. Determination of force in Truss Bridge
11. Validation of faraday's law of induction
12. Interpreting the working mechanism of spirometer, CO_2 sensor, venturi tube and heart rate sensor

Demonstration:

1. Determination of Numerical Aperture and Acceptance angle - Optical Fiber
2. Study the energy loss of a ferrite magnetic material specimen by B-H curve.

REFERENCES:

1. Department of Physics, Physics Laboratory Observation, 2025.

2. Jerry D Wilson, A. Cecilia and Hernandez Hall, '*Physics Laboratory Experiments*'. Boston, Cengage Learning, 2016.

Chemistry (Any eight experiments):

1. Determination of total, temporary & permanent hardness of water by EDTA method.
2. Determination of strength of acids in a mixture of acids using conductivity meter.
3. Determination of strength of given hydrochloric acid using pH meter.
4. Estimation of iron content of the given solution using potentiometer.
5. Corrosion experiment-weight loss method.
6. Electroplating of copper and Nickel and determination of coulombic efficiency.
7. Designing a battery and determination of its characteristics.
8. Construction of phase diagram of a simple eutectic system.
9. Determination of kinematic viscosity and acid value of a lubricating oil.
10. Anodizing of aluminium and determination of thickness of anodised film.

Total P: 60 periods

REFERENCE:

1.J Mendham, Vogel's Textbook of '*Quantitative Chemical Analysis'*. 6th Edition, Pearson Education, 2009.

COURSE OUTCOMES

At the end of the course, students will be able to:		**Bloom's Level**
CO1	Relate the scientific principles and compare the experimental results with theoretical calculations and apply graphical analysis to visualise the importance of precise measurements.	**K3**
CO2	Analyse the experimental result outcomes using analytical and experimental skills for various engineering materials and applications.	**K4**
CO3	Demonstrate the measurement of water quality parameters in the given water sample	**K3**
CO4	Analyze the properties of materials for Engineering applications	**K4**

COs-POs & PSOs MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3												
CO2		2											
CO3	3								3		3		
CO4				3				3					
@	**3**	**2**		**3**				**3**	**3**		**3**		

1 – low, 2 – medium, 3 – high @-Overall Contribution to the Course

25GE111 DESIGN THINKING FOR INNOVATION
(Common to CIVIL, CSE, EEE, ECE, ICE, MECH, AI&DS and EE-VLSI)

0 0 2 1

Foundations of Design Thinking: History & Origins: Roots in Creative Problem Solving: Traces back to mid-20th century practices in architecture, engineering, and psychology. Herbert Simon's "Sciences of the Artificial" (1969): Introduced design as a way of thinking distinct from scientific inquiry. IDEO and the Rise of Human-Centered Design: Popularized design thinking as a repeatable, user-focused innovation process. Stanford school's Influence: Helped institutionalize design thinking in education and entrepreneurship.

Variations of Design Thinking Phases: IDEO's 3-Phase Model: Inspiration, Ideation, Implementation A flexible, non-linear approach emphasizing creativity and action. Stanford school's 5-Phase Model: Empathize, Define, Ideate, Prototype, Test A structured yet iterative framework centered on user empathy. Double Diamond Model (Design Council UK): Divides the process into Discover, Define, Develop, and Deliver—highlighting divergent and convergent thinking.

Related Concepts & Frameworks: Human-Centered Design (HCD): Focuses on designing solutions that deeply resonate with users' needs and contexts. Systems Thinking: Encourages understanding the broader ecosystem and interdependencies within a problem space. Agile & Lean UX: Integrates design thinking with iterative development and minimal viable experimentation. Service Design: Applies design thinking to orchestrate holistic user experiences across touchpoints. Participatory Design: Involves stakeholders directly in the design process to ensure relevance and inclusivity.

EMPATHIZE: Apply Human-Centric Design Principles: Focus on designing solutions that prioritize user needs, experiences, and values throughout the process. Consult Experts: Engage with subject matter experts to gain foundational knowledge about the problem space. Competitive Analysis: Identify & studying similar products or services to identify gaps and opportunities. Stakeholder Interviews: Engaging with people who influence or are affected by the product or service. Conduct Observations: Observe users in their natural environment to understand behaviors, challenges, and interactions. Engage with Users: Use interviews, conversations, and other methods to connect with users and hear their stories. Immerse Yourself: Step into the users' context to experience their environment and challenges firsthand. Create Empathy Maps: Visualize what users say, think, feel, and do to synthesize insights. Identify User Needs and Pain Points: Extract meaningful patterns and needs from user interactions and observations. Set Aside Assumptions: Approach the research with an open mind, suspending personal biases and preconceptions. Document Insights: Capture quotes, observations, and emotional cues to inform the next stage (Define). **(6)**

DEFINE: Organize Research Findings: Review and structure the data collected during the Empathize stage. Analyze Observations: Identify patterns, themes, and insights from user interactions and behaviors. Craft a Human-Centered Problem Statement: Frame the problem from the user's perspective, focusing on their needs—not business goals. Avoid Business-Centric Framing: Refrain from defining problems based on company objectives alone (e.g., market share). Persona Development: Synthesizing research into user personas to guide design decisions. Use Empathy to Guide Definition: Ensure the problem statement reflects real user challenges and motivations. Develop Point-of-View Statements: Create concise summaries that capture who the user is, what they need, and why. Prepare for Ideation: Formulate "How Might We" questions to spark creative thinking in the next phase. **(6)**

IDEATE: Review the Problem Statement: Revisit the user-centric problem defined in the previous stage to guide ideation. Explore Multiple Perspectives: Encourage diverse viewpoints to broaden the range of potential solutions. Use Ideation Techniques: Apply methods like Brainstorming, Brain writing, SCAMPER, and Worst Possible Idea to spark creativity. Encourage Free Thinking: Create a judgment-free space to generate as many ideas as possible without filtering. Expand the Problem Space Push boundaries and explore unconventional or extreme ideas to uncover hidden opportunities. Refine and Select Ideas: Use evaluation techniques to identify promising concepts that address user needs effectively. Prepare for Prototyping: Choose ideas that are feasible and impactful to develop into tangible prototypes in the next stage. **(6)**

PROTOTYPE: Build Low-Cost Prototypes: Create simple, scaled-down versions of the product or its features to explore ideas. Experiment with Solutions: Implement different solutions from the Ideate stage into prototypes for testing. Test Internally and Externally: Share prototypes with team members, other departments, or a small group of users. Observe User Interactions: Watch how users engage with the prototypes to uncover usability issues and insights. Evaluate and Iterate: Accept, refine, or discard prototypes based on user feedback and performance. Identify Limitations: Discover constraints and challenges in the proposed solutions through hands-on testing. Gain Deeper User Understanding: Learn how users think, feel, and behave when interacting with the product. **(6)**

TEST: Conduct Rigorous Testing: Evaluate the complete product using the most promising prototypes. Observe Real User Interactions: Study how users behave, think, and feel while using the product. Gather Feedback and Insights: Collect qualitative and quantitative data to assess usability and effectiveness. Identify Remaining Issues: Detect limitations, pain points, and areas for improvement. Refine and Iterate: Use test results to improve the product and revisit earlier stages if needed. Redefine Problems if Necessary: Reframe or adjust problem statements based on new insights. Enhance Understanding of Users: Deepen empathy and knowledge of user needs through real-world testing. **(6)**

Design Thinking & Customer Centricity: A human-centered approach that blends empathy and innovation to create solutions that truly resonate with customer needs. Practical Examples of Customer Challenges: Real-world scenarios where customers face friction, unmet needs, or emotional disconnects in their product or service journey. Use of Design Thinking to Enhance Customer Experience: Applying iterative problem-solving and user insights to craft experiences that are intuitive, delightful, and deeply relevant. Parameters of Product Experience: Key dimensions like usability, accessibility, emotional impact, and consistency that shape how customers perceive and interact with a product. Alignment of Customer Expectations with Product Design: Ensuring that every design decision reflects what customers value, expect, and aspire to achieve through the product.

Total P: 30 periods

TEXT BOOKS

1. T. Brown, '*Change by Design*'. Harper Business, 2009.
2. J. Liedtka and T. Ogilvie, '*Designing for Growth*'. Columbia Business School Publishing, 2011.

REFERENCE BOOKS

1. T. Kelley and D. Kelley, '*Creative Confidence*'. Crown Business, 2013.
2. Stanford d. School resources: https://dschool.stanford.edu/
3. https://apphaus.sap.com/toolkit/methods#design-thinking

COURSE OUTCOMES

At the end of the course, students will be able to:		**Bloom's Level**
CO1	Apply empathy-driven research to understand user needs.	**K3**
CO2	Frame actionable problem statements and generate creative ideas.	**K6**
CO3	Develop and test prototypes to refine innovative solutions to real-world problems.	**K4**

COs-POs & PSOs MAPPING

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PSO1**	**PSO2**
CO1	3					3	3	3	3		3		
CO2		2				2	2	2	2		2		
CO3			1			1	1	1	1		1		
@	**3**	**2**	**1**			**3**	**3**	**3**	**3**		**3**		

1 – low, 2 – medium, 3 – high @-Overall Contribution to the Course

25GE112 ENGINEERING GRAPHICS
(Common to EEE, ECE, ICE and EE-VLSI)

0 0 4 2

INTRODUCTION TO ENGINEERING GRAPHICS **(4)**

1. Introduction to Engineering Graphics.
2. Lettering practice as per BIS.
3. Principles of Dimensioning.

ORTHOGRAPHIC PROJECTIONS **(40)**

1. Introduction to Orthographic Projections.
2. Drawing multiple views from pictorial views of objects.
3. Projection of points.
4. Projection of straight lines (only First angle projections) inclined to both the principal planes.
5. Projection of planes (polygonal and circular surfaces) inclined to both the principal planes by rotating object method.
6. Projection of simple solids when the axis is inclined to one of the principal planes and parallel to the other by rotating object method.

SECTION OF SOLIDS **(8)**

1. Section of simple solids in simple vertical position when the cutting plane is inclined to one of the principal planes and perpendicular to the other and obtaining true shape of section.

ISOMETRIC PROJECTIONS **(8)**

1. Isometric projection of simple solids in simple vertical positions.

Total P: 60 periods

TEXT BOOKS:

1. N.D. Bhatt, '*Engineering Drawing*'. Charotar Publishing House Pvt. Ltd., 55th Edition, 2025.
2. K.C. John, '*Engineering Graphics for Degree*'. Prentice Hall India Publishers, 2009.
3. K.V. Natarajan, '*A Text book of Engineering Graphics*'. Dhanalakshmi Publications, 34th Refined Edition, 2021.

REFERENCES:

1. K. Venugopal and V. Prabhu Raja, '*Engineering Graphics*'. New Age International Publishers, 17th Edition, 2024.
2. '*Bureau of Indian Standards*'. Engineering Drawing Practices for Schools and Colleges SP 46-2003, BIS, New Delhi, 2003.

COURSE OUTCOMES

At the end of the course, students will be able to:		**Bloom's Level**
CO1	Use the standards and specifications for engineering drawing.	**K2**
CO2	Apply projection techniques to create basic shapes, solids, and sectioned objects.	**K3**

COs-POs & PSOs MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3												
CO2	1												
@	**3**												

1 – low, 2 – medium, 3 - high @-Overall Contribution to the Course

25EE111 PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY

0 0 2 1

List of Experiments

1. Identification and solving of simple real life or scientific or technical problems, and developing algorithm and flow charts for the same.
2. Python programming using simple statements and expressions
3. Scientific problems using Conditionals and Iterative loops.
4. Implementing real-time/technical applications using Lists, Tuples.
5. Implementing real-time/technical applications using Sets, Dictionaries.
6. Implementing programs using Functions.
7. Implementing programs using Strings.
8. Implementing programs using written modules and Python Standard Libraries
9. Implementing real-time/technical applications using File handling.
10. Implementing real-time/technical applications using Exception handling.
11. Exploring Pygame tool and developing a game activity using Pygame.

Total P:30 periods

TEXT BOOKS:

1. Allen B. Downey, '*Think Python: How to Think like a Computer Scientist*'. 2nd Edition, O'Reilly Publishers, 2016.
2. Karl Beecher, '*Computational Thinking: A Beginner's Guide to Problem Solving and Programming*'. 1st Edition, BCS Learning and Development Limited, 2017.

REFERENCES:

1. Paul Deitel and Harvey Deitel, 'Python for Programmers'. Pearson Education, 1st Edition, 2021.
2. John V Guttag, 'Introduction to Computation and Programming Using Python: With Applications to Computational Modeling and Understanding Data'. 3rd Edition, MIT Press, 2021

COURSE OUTCOMES:

At the end of the course, students will be able to:		**Bloom's Level**
CO1	Describe the basic constructs of Python Programming	**K2**
CO2	Apply the different data structures like list, tuple, set or dictionary to solve complex problems.	**K3**
CO3	Implement real-time applications using the modules and packages	**K4**

COs-POs & PSOs MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1													
CO2	3				3							2	1
CO3			2		3							2	1
@	**3**		**2**		**3**							**2**	**1**

1 – low, 2 – medium, 3 – high @-Overall Contribution to the Course

25GEM01 INDUCTION PROGRAMME
(Common to CIVIL, CSE, EEE, ECE, ICE, MECH, AI&DS and EE-VLSI)

All students shall undergo an induction programme at the beginning of the first semester for a duration of three weeks as per the guidelines of All India Council for Technical Education (AICTE). A student completing the induction programme will be awarded a completed grade in the grade sheet, and only the students who complete the induction programme shall be considered as eligible for award of degree subject to satisfying other conditions. A student who does not complete the induction programme in the first semester shall redo the same in the subsequent semester.

SEMESTER II

25MA201 COMPLEX VARIABLES AND TRANSFORMS
(Common to CIVIL, EEE, ECE, ICE, MECH and EE-VLSI)

3 1 0 4

COMPLEX DIFFERENTIATION: Derivative, analytic function, Cauchy-Riemann equations, Laplace's equation, linear fractional transformations. **(9+3)**

COMPLEX INTEGRATION: Cauchy's integral theorem, Cauchy's integral formula, derivatives of analytic functions, Laurent series, singularities and zeros, residue integration method (Residue integration of complex integrals only). **(9+3)**

LAPLACE TRANSFORMS: Laplace transform, linearity, first shifting theorem, transforms of derivatives and integrals, unit step function, second shifting theorem, Dirac's delta function, periodic functions, differentiation and integration of transforms, solving ODEs with constant coefficients and initial value problems. **(9+3)**

FOURIER ANALYSIS: Fourier series – arbitrary period, even and odd functions, half range expansions. Fourier transforms, Fourier cosine and sine transforms. **(9+3)**

PARTIAL DIFFERENTIAL EQUATIONS: Basic concepts of PDEs, wave equation, heat equation, steady state two-dimensional heat problems, solution by Fourier series. **(9+3)**

Total L: 45 + T: 15 = 60 periods

TEXT BOOKS

1. Erwin Kreyszig, '*Advanced Engineering Mathematics*'. Wiley India, New Delhi, 2018.
2. G. Z. Dennis, '*Advanced Engineering Mathematics*'. Jones and Bartlett Pvt Ltd, New Delhi, 2017.

REFERENCES

1. G.Z. Dennis and D. S. Patrick, '*A first course in Complex Analysis with Applications*'. Jones and Bartlett Pvt Ltd, New Delhi, 2015.
2. C. R. Wylie and L. C. Barret, '*Advanced Engineering Mathematics*'. Tata McGraw-Hill, New Delhi, 2019.
3. Peter V. O Neil, '*Advanced Engineering Mathematics*'. Cengage, New Delhi, 2018.
4. G. D. Dean, '*Advanced Engineering Mathematics with MATLAB*'. CRC Press, USA, 2017.

COURSE OUTCOMES

At the end of the course, students will be able to:		**Bloom's Level**
CO1	Explain the concepts related to Complex Variables, Laplace Transforms, Fourier Analysis and Partial Differential Equations.	**K2**
CO2	Apply the techniques of Complex Variables, Laplace Transforms, Fourier Analysis and Partial Differential Equations to solve engineering problems.	**K3**
CO3	Analyze the solutions of engineering problems employing Complex Variables, Laplace Transforms, Fourier Analysis and Partial Differential Equations.	**K4**
CO4	Use modern tools to solve engineering problems with the help of Complex Variables, Laplace Transforms, Fourier Analysis and Partial Differential Equations.	-

COs-POs & PSOs MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1													
CO2	3												
CO3		1											
CO4					1								
@	**3**	**1**			**1**								

1 – low, 2 – medium, 3 – high @-Overall Contribution to the Course

25EE201 ELECTRIC CIRCUITS AND NETWORKS

3 1 0 4

DC CIRCUITS: Fundamentals of Circuit Elements –Independent and Dependent Sources - Ohm's law - Kirchhoff's Laws– Network Reduction Techniques- Series Circuits, Parallel Circuits and Star to Delta and Delta to Star Transformations. Mesh and Nodal analysis of DC circuits with independent and Dependent Sources. Network Theorems: Superposition Theorem – Thevenin's and Norton's Theorems–Maximum Power Transfer Theorem. **(10+4)**

AC CIRCUITS: Fundamental concepts of AC circuits, R, L and C elements -phasor diagram -complex impedance-real power, reactive power, apparent power, complex power and power factor -series and parallel circuits - Analysis using Mesh, Nodal, and Network theorems. **(10+4)**

THREE PHASE CIRCUITS: Phase sequence–Star and Delta connection–Phase and line quantities -Phasor diagram-Balanced and unbalanced loads–Analysis–3-phase power measurement–Two wattmeter method-Power factor calculation-Reactive power measurement. **(8+3)**

NETWORK TRANSIENTS: Transient concepts–Complex frequency-Transient response of simple RL, RC, and RLC series and parallel circuits for DC excitation. **(8+2)**

MAGNETICALLY COUPLED CIRCUITS AND TWO PORT NETWORKS: Self and Mutual inductance – Co-efficient of coupling-Dot convention-Analysis of coupled circuits. Two port network parameters–Interconnection of two port networks: series, parallel, and cascade–Network functions - Driving point and transfer impedance/admittance. **(9+2)**

Total L: 45 +T: 15 = 60 periods

TEXT BOOKS:

1. Charles K. Alexander and Mathew N. O. Sadiku, '*Fundamentals of Electric Circuits*'. 5th edition, McGraw-Hill, 2013.
2. A. Sudhakar and S. P. Shyam Mohan, '*Circuits and Network Analysis and Synthesis*'. McGraw-Hill, 5th edition, 2017

REFERENCES:

1. A. Chakrabarti, '*Circuits Theory (Analysis and Synthesis)*'. Dhanpat Rai and Sons, New Delhi, 7th edition, 2018.
2. J. David Irwin and R. Mark Nelms, '*Basic Engineering Circuit Analysis*'. John Wiley and Sons, 12th edition, 2021.
3. William H. Hayt Jr, Jack E. Kemmerly, and Steven M. Durbin, '*Engineering Circuits Analysis*'. McGraw-Hill Publishers, New Delhi, 2020.
4. Allan H. Robbins and Wilhelm C. Miller, '*Circuit Analysis Theory and Practice*'. Cengage Learning India, 5th edition, 2013.

COURSE OUTCOMES

At the end of the course, students will be able to:		**Bloom's Level**
CO1	Explain the fundamental concepts of DC/AC electric circuits and network theorems	**K2**
CO2	Solve DC/AC electric circuits using network reduction techniques, mesh and nodal methods, and evaluate resonance parameters	**K3**
CO3	Analyze and obtain the response of DC/AC electric circuits under transient as well as steady-state conditions	**K4**
CO4	Compute and simulate electrical parameters of DC/AC circuits under various operating conditions, and validate the results using Multisim/Pspice/MATLAB software	-

COs-POs & PSOs MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1													
CO2	3												3
CO3		2											2
CO4				1	1			1	1				1
@	**3**	**2**		**1**	**1**			**1**	**1**				**3**

1 – low, 2 – medium, 3 - high @-Overall Contribution to the Course

25EE202 ELECTROMAGNETIC FIELDS

3 1 0 4

VECTOR CALCULUS: Review of 3D Co-ordinate Systems - Gradient, Divergence and Curl Operations – Divergence theorem - Stokes' theorem - Line, Surface, and Volume integrals. **(8+2)**

ELECTROSTATIC FIELDS: Coulomb's law - Electric field intensity - Electric flux density -Gauss's law and its Applications-Absolute potential - Potential difference -Potential Gradient - Determination of electric field and potential due to point, line, surface, and volume charge distributions - Electric Dipole - Energy density in the electrostatic field. **(10+4)**

ELECTRIC FIELDS IN MATERIAL SPACE AND BOUNDARY-VALUE PROBLEMS: Properties of conductors and dielectrics - convection and conduction currents -polarization in dielectrics - dielectric constant and strength - continuity equation and relaxation time- Capacitance determination - Method of images - Boundary conditions involving conductors, dielectric, and free space - Poisson's and Laplace's equations- Uniqueness theorem - Solution of Laplace's equation of single variable only. **(8+2)**

MAGNETOSTATIC FIELDS: Biot-Savart's law - Ampere's circuital law and its applications -Magnetic flux density - Scalar and Vector magnetic potentials - Maxwell's equations for static EM fields - Forces due to magnetic fields - Force and Torque on a closed-circuit - Magnetic materials - Boundary conditions at the interface of two different magnetic materials. **(10+4)**

INDUCTANCE: Inductance of Solenoid, Toroid, Coaxial cable, and Transmission line - Energy density in the magnetic field - Lifting force of a magnet. **TIME VARYING FIELD:** Faraday's Law - Transformer and Motional EMFs - Displacement Current- Maxwell's Equations in final form - Poynting theorem. **(9+3)**

Total L: 45 + T: 15 = 60 periods

TEXT BOOKS:

1. Mathew N O Sadiku and S.V. Kulkarni, '*Principles of Electromagnetics*'. 6th Edition, Oxford, University Press, New Delhi, 2015.
2. William H Hayt Jr. and John A Buck, '*Engineering Electromagnetics*'. 9th Edition, Tata McGraw-Hill, 2019.

REFERENCE:

1. Joseph A Edminister, '*Electromagnetics Schaum's Outline Series*'. Tata McGraw-Hill, New Delhi, 2014.
2. K. A. Gangadhar, '*Field Theory*'. Khanna Publishers, New Delhi, 2009.
3. Nannapaneni Narayana Rao, '*Elements of Engineering Electromagnetics*'. 6th Edition, Prentice Hall, New Delhi, 2011.
4. Nathan Ida, '*Engineering Electromagnetics*'. 3rd Edition, Springer, Switzerland, 2015.

COURSE OUTCOMES

At the end of the course, students will be able to:		**Bloom's Level**
CO1	Describe the fundamental concepts of electromagnetic fields including vector calculus, electrostatics, magnetostatics and electromagnetic wave theory.	**K2**
CO2	Apply the principles of vector calculus, electrostatics and magnetostatics to compute electric and magnetic field intensities, potentials, capacitance, inductance and energy storage in various media	**K3**
CO3	Analyze time-varying electromagnetic fields, Maxwell's equations and wave propagation characteristics in different media and solve electromagnetic field problems by combining concepts of electrostatics, magnetostatics and wave theory in different media	**K4**
CO4	Make a presentation on the applications of electrostatics and magnetostatics in the field of electrical and electronics engineering.	**-**

COs-POs & PSOs MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1													
CO2	3												1
CO3		2	1										1
CO4					1			1			1		
@	**3**	**2**	**1**		**1**			**1**			**1**		**1**

1 – low, 2 – medium, 3 - high @-Overall Contribution to the Course

25PH203 SEMICONDUCTOR DEVICES

3 0 0 3

P-N JUNCTION DIODE: Review of semiconductor properties, charge densities in semiconductor, Intrinsic and Extrinsic semiconductors - Energy band diagrams for P type and N type semiconductor. Theory of p-n junction, diode - V-I characteristics – Effect of temperature on characteristics, diffusion and transition capacitances, Elementary applications - Clippers and clampers, Diode switching times- p-n junction diode ratings. Zener diode - Avalanche breakdown and Zener breakdown mechanisms. **Photo devices:** Light Emitting Diodes (LED): Seven Segment Displays – Liquid Crystal Cells - Photoconductive cells -Photodiodes and Solar Cells-Photo transistors - Opto couplers. **(12)**

BIPOLAR JUNCTION TRANSISTOR: Construction of a BJT – working – transistor currents – transistor configurations - Modes of transistor operation and input-output characteristics – Early effect (base-width modulation) – Ebers Moll model. Transistor switching times - Transistor as a switch and an amplifier, small signal ac model, Miller effect capacitance – high frequency response- hybrid – π model - BJT ratings. **(8)**

FIELD EFFECT TRANSISTORS: JFET-JFET operation - V-I characteristics, transfer characteristics, regions of operation **MOSFET**- Construction of MOSFET-Types of MOSFET- Operation of enhancement and depletion type MOSFETs, V-I characteristics, transfer characteristics, analytic expression for drain current. Comparison of PMOS and NMOS devices - MOSFET biasing, MOSFET as a switch, resistor and amplifier, small signal ac model. Introduction to CMOS and BiCMOS devices. **(8)**

TRANSISTOR BIASING: AC and DC load lines - Need for stability of Q-Point - Bias stability- Biasing techniques - fixed bias, collector to base bias, self-bias. Bias compensation - Methods of MOSFET biasing. **(8)**

INTEGRATED CIRCUIT FABRICATION: Monolithic IC technology - Planar processes, Epitaxial growth, Oxidation, Photolithography, Diffusion, Ion implantation, metallization. BJT fabrication - need for buried layer, Junction and dielectric isolation, Fabrication of p-n-p, multiple emitter transistors., Monolithic diodes. NMOS enhancement and depletion MOSFETs, self-isolation, CMOS technology, Monolithic IC Resistors: sheet resistance - diffused, ion implanted, epitaxial, pinch, MOS and thin film resistors, Monolithic IC capacitors - junction, MOS and thin film capacitors. IC packaging. **(9)**

Total L: 45 periods

TEXT BOOKS:

1. J. Millman and A. Grabel, '*Microelectronics*'. McGraw Hill Education, 2nd edition, 2017.
2. L. R. Boylestead and L. Nashelsky, '*Electronic Devices and Circuit Theory*'. Pearson Prentice Hall, 11th edition, New Delhi, 2015.

REFERENCES:

1. Abel S Sedra and Kenneth C Smith, '*Microelectronic Circuits*'. Oxford University Press, New York,2017.
2. Thomas L Floyd, '*Electronic Devices'*. Pearson Education, New Delhi, 2017.
3. David A Bell, '*Electronic Devices and Circuits*'. Oxford University Press, 2018.
4. Muhammad H Rashid, '*Introduction to PSpice using OrCAD for Circuits and Electronics*'. PHI Learning, New Delhi, 2016.

COURSE OUTCOMES

At the end of the course, students will be able to:		Bloom's Level
CO1	Explain the working principles, characteristics, and applications of semiconductor devices, including P-N junction diodes, bipolar junction transistors (BJTs), and field-effect transistors (FETs), focusing on their V-I characteristics, modes of operation, and applications.	**K2**
CO2	Apply theoretical concepts to calculate the operating characteristics of semiconductor devices, including the V-I characteristics of diodes, transistor switching times, and the performance of MOSFETs in various applications.	**K3**
CO3	Analyse the performance of semiconductor devices such as BJTs, MOSFETs, and integrated circuits by examining their characteristics, biasing techniques, and fabrication processes, and assess their impact on the design of electronic systems.	**K4**
CO4	Prepare a report or presentation on the working, applications, and performance of semiconductor devices such as diodes, BJTs, FETs, and MOSFETs, with an emphasis on their role in modern electronics.	-

COs-POs & PSOs MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1													
CO2	3												
CO3		1											
CO4						1			1				
@	**3**	**1**				**1**			**1**				

1 – low, 2 – medium, 3 – high @-Overall Contribution to the Course

25EE203 PROGRAMMING IN C LANGUAGE

3 0 0 3

INTRODUCTION: Analysing and Defining the Problem - Algorithm - Flowchart – Program development steps - Types of programming language. C: The C character set - Identifiers and keywords – Data types – Constants - Variables - Declarations -input and output functions-pre-processor directives. **(8)**

OPERATORS AND EXPRESSIONS: Arithmetic operators - Unary operators - Relational operators - logical operators - Assignment operators - Conditional operators - comma operator – size of operator -precedence and associativity- Library functions. Control Statements: simple if, if-else, nested if-else, else if ladder, switch case - while -do while - for - Nested loops - break – continue – go to statements. **(9)**

ARRAYS AND POINTERS: Defining an array - Processing an array - Multi dimensional arrays -strings. **Pointers**: Definition - Pointer Arithmetic – types of pointer - constant pointer, pointer to a constant, void pointer, null pointer. **(10)**

FUNCTIONS: Function prototype - Defining a function – function call - Passing arguments to a function –nested function – recursive function- Storage classes - auto - static - extern and register variables. Pointers as Function Arguments, Pointers to Functions. **(9)**

STRUCTURES: Definitions - Processing a structure – Array and structures – Nested structures - Structures and functions. File Management: Defining, Opening and Closing a File, I/O operations on Files, Dynamic Memory Allocation: Malloc, Calloc, Free, Realloc, Linked List **(9)**

Total L:45 periods

TEXT BOOKS:

1. B. W. Kernighan and D. M. Ritchie, '*Programming Language (ANSI C)*'. Prentice Hall of India, New Delhi, 2013.
2. H. M. Deitel and P. J. Deitel, '*C: How to Program*'. Prentice Hall of India, New Delhi, 2015.

REFERENCES:

1. B. Gottfried, '*Programming with C*'. McGraw Hill Education, New Delhi, 2018.
2. Herbert Schildt, '*C: The Complete Reference*'. McGraw Hill, New Delhi, 2017.
3. Ajay Mittal, '*Programming in C - A Practical approach*'. Pearson, New Delhi, 2010.

COURSE OUTCOMES

At the end of the course, students will be able to:		**Bloom's Level**
CO1	Explain the basic concepts and syntax of C Programming	**K2**
CO2	Write C programs involving structures, arrays of structures, nested structures, file I/O operations, and dynamic memory management techniques.	**K3**
CO3	Analyze the usage of operators, arrays, functions and structures to solve computational problems efficiently.	**K4**
CO4	Simulate the basic concepts of C programming using the open source software.	**-**

COs-POs & PSOs MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1													
CO2	3				3								
CO3		2			2								
CO4			1		1			1		1	1	1	
@	**3**	**2**	**1**		**3**			**1**		**1**	**1**	**1**	

1 – low, 2 – medium, 3 – high @-Overall Contribution to the Course

25HS201 *தமிழரும் தொழில்நுட்பமும்*
(Common to CIVIL, CSE, EEE, ECE, ICE, MECH, AI&DS and EE-VLSI)

1 0 0 1

நெசவு மற்றும் பானைத் தொழில்நுட்பம்: *சங்க காலத்தில் நெசவுத் தொழில் – பானைத் தொழில்நுட்பம் – கருப்பு சிவப்பு பாண்டங்கள் – பாண்டங்களில் கீறல் குறியீடுகள்.* **(3)**

வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம்: *சங்க காலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள், சங்க காலத்தில் வீட்டுப் பொருட்களில் வடிவமைப்பு – சங்க காலத்தில் கட்டுமான பொருட்களும் நடுகல்லும் – சிலப்பதிகாரத்தில் மேடை அமைப்பு பற்றிய விவரங்கள் – மாமல்லபுரச் சிற்பங்களும், கோவில்களும் – சோழர் காலத்துப் பெருங்கோயில்கள் மற்றும் பிற வழிபாட்டுத் தலங்கள் – நாயக்கர் காலக் கோயில்கள் – மாதிரி கட்டமைப்புகள் பற்றி அறிதல், மதுரை மீனாட்சி அம்மன் ஆலயம் மற்றும் திருமலை நாயக்கர் மஹால் – செட்டிநாட்டு வீடுகள் – பிரிட்டிஷ் காலத்தில் சென்னையில் இந்தோ-சாரோசெனிக் கட்டிடக் கலை.* **(3)**

உற்பத்தித் தொழில் நுட்பம்: *கப்பல் கட்டும் கலை – உலோகவியல் – இரும்புத் தொழிற்சாலை – இரும்பை உருக்குதல், எஃகு – வரலாற்றுச் சான்றுகளாக செம்பு மற்றும் தங்க நாணங்கள் – நாணயங்கள் அச்சடித்தல்- மணி உருவாக்கும் தொழிற்சாலைகள் – கல்மணிகள், கண்ணாடி மணிகள் – சுடுமண் மணிகள் – சங்கு மணிகள் – எலும்புத் துண்டுகள் – தொல்லியல் சான்றுகள் – சிலப்பதிகாரத்தில் மணிகளின் வகைகள்.* **(3)**

வேளாண்மை மற்றும் நீர்ப்பாசனத் தொழில் நுட்பம்: *அணை, ஏரி, குளங்கள், மதகு – சோழர்காலக் குமுழித் தூம்பின் முக்கியத்துவம் – கால்நடை பராமரிப்பு – கால்நடைகளுக்காக வடிவமைக்கப்பட்ட கிணறுகள் – வேளாண்மை மற்றும் வேளாண்மைச் சார்ந்த செயல்பாடுகள் – கடல்சார் அறிவு – மீன்வளம் – முத்து மற்றும் முத்துக்குளித்தல் – பெருங்கடல் குறித்த பண்டைய அறிவு – அறிவுசார் சமூகம்.* **(3)**

அறிவியல் தமிழ் மற்றும் கணினித்தமிழ்: *அறிவியல் தமிழின் வளர்ச்சி –* ***கணினித்தமிழ்*** *வளர்ச்சி – தமிழ் நூல்களை மின்பதிப்பு செய்தல் – தமிழ் மென்பொருட்கள் உருவாக்கம் – தமிழ் இணையக் கல்விக்கழகம் – தமிழ் மின் நூலகம் – இணையத்தில் தமிழ் அகராதிகள் – சொற்குவைத் திட்டம்.* **(3)**

Total L: 15 periods

25HS201 TAMILS AND TECHNOLOGY
(Common to CIVIL, CSE, EEE, ECE, ICE, MECH, AI&DS and EE-VLSI)

1 0 0 1

WEAVING AND CERAMIC TECHNOLOGY: Weaving Industry during Sangam Age – Ceramic technology – Black and Red Ware Potteries (BRW) – Graffiti on Potteries. **(3)**

DESIGN AND CONSTRUCTION TECHNOLOGY: Designing and Structural construction House & Designs in household materials during Sangam Age - Building materials and Hero stones of Sangam age – Details of Stage Constructions in Silappathikaram - Sculptures and Temples of Mamallapuram - Great Temples of Cholas and other worship places - Temples of Nayaka Period - Type study (Madurai Meenakshi Temple)- Thirumalai Nayakar Mahal - Chetti Nadu Houses, Indo - Saracenic architecture at Madras during British Period. **(3)**

MANUFACTURING TECHNOLOGY: Art of Ship Building - Metallurgical studies - Iron industry - Iron smelting, steel -Copper and gold- Coins as source of history - Minting of Coins – Beads making-industries Stone beads -Glass beads - Terracotta beads -Shell beads/ bone beads - Archeological evidences - Gem stone types described in Silappathikaram. **(3)**

AGRICULTURE AND IRRIGATION TECHNOLOGY: Dam, Tank, ponds, Sluice, Significance of Kumizhi Thoompu of Chola Period, Animal Husbandry - Wells designed for cattle use - Agriculture and Agro Processing - Knowledge of Sea - Fisheries – Pearl - Conche diving - Ancient Knowledge of Ocean - Knowledge Specific Society. **(3)**

SCIENTIFIC TAMIL & TAMIL COMPUTING: Development of Scientific Tamil - Tamil computing – Digitalization of Tamil Books – Development of Tamil Software – Tamil Virtual Academy – Tamil Digital Library – Online Tamil Dictionaries – Sorkuvai Project. **(3)**

Total L: 15 periods

TEXT – CUM – REFERENCE BOOKS

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

REFERENCE BOOK

1. Priyadharshini, *தமிழரும் தொழில்நுட்பமும்* (Tamils and Technology), VK publications, Sivakasi.

COURSE OUTCOMES

At the end of the course, students will be able to:		**Bloom's Level**
CO1	Identify the significance of ancient Tamil technologies in weaving, pottery, metallurgy, and architecture, with emphasis on traditional design and construction methods across historical periods.	**K2**
CO2	Use insights from traditional Tamil knowledge systems in agriculture, irrigation, and marine sciences, and connect the development of Tamil language to its applications in digital platforms and computing.	**K3**

COs-POs & PSOs MAPPING

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PSO1**	**PSO2**
CO1							3				3		
CO2							3				3		
@							**3**				**3**		

1 – low, 2 – medium, 3 – high @-Overall Contribution to the Course

LANGUAGE ELECTIVES

25HS211 COMMUNICATION SKILLS FOR ENGINEERS
(Common to CIVIL, CSE, EEE, ECE, ICE, MECH, AI&DS and EE-VLSI)

0 0 4 2

COMMUNICATION CONCEPTS: Process of Communication – Inter and Intrapersonal Communication – Essentials for effectiveness. **(9)**

ORAL COMMUNICATION: Oral presentations with visual aids and Group discussions. **(16)**

FOCUS ON SOFT SKILLS: Etiquette – Work Place etiquette – Telephone etiquette- Body Language – Critical Reasoning and Conflict Management based on Case Studies – Group Communication- Meetings -Interview Techniques. **(14)**

TECHNICAL WRITING: Technical Writing Principles - Style and Mechanics - Technical Definitions – Physical, Functional and Process Descriptions – Technical Report Writing – Preparing Instructions – Interpretation of Technical Data. **(14)**

BUSINESS CORRESPONDENCE: Writing Emails, Preparing Resumes. **(7)**

Total P: 60 periods

TEXT BOOKS

1. Course materials prepared by the Faculty, Department of English.

REFERENCES

1. Jeff Butterfield, '*Soft Skills for Everyone*'. Cengage Learning, New Delhi, 2020.
2. Sabina Pillai and Agna Fernandez, '*Soft skills and Employability Skills*'. Cambridge University Press, New Delhi, 2019.
3. Prashant Sharma, '*Soft Skills Personality Development for Life Success*'. BPB Publications, New Delhi, 2021.
4. K. N. Shoba and D. Praveen Sam, '*Technical English*'. Cambridge University Press, New York, 2020.

COURSE OUTCOMES

At the end of the course, students will be able to:		**Bloom's Level**
CO1	Produce clear and concise technical reports, compose professional and effective emails and develop well-structured and impactful resumes	**K2**
CO2	Plan, organize, and deliver engaging and informative presentations using appropriate visual aids and participate positively in group discussions	**K3**
CO3	Resolve disagreements constructively, embody professional conduct and a strong work ethic and apply critical thinking to generate effective solutions	**-**

COs-POs & PSOs MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1								1	3		3		
CO2								3	3		3		
CO3								3	1		3		
@								**3**	**3**		**3**		

1 – low, 2 – medium, 3 – high @-Overall Contribution to the Course

25HS212 BASIC GERMAN
(Common to CIVIL, CSE, EEE, ECE, ICE, MECH, AI&DS and EE-VLSI)

0 0 4 2

Guten Tag! - Learning: To greet, learn numbers till 20, practice telephone numbers & e mail address, learn alphabet, speak about countries & languages; **Vocabulary:** related to the topic; **Grammar:** W – Questions, Verbs & Personal pronouns I.

Freunde, Kollegen und ich - Learning: To speak about hobbies, jobs, learn numbers from 20; **Vocabulary:** related to the topic; **Grammar:** Articles, Verbs & Personal pronouns II, sein & haben verbs, ja/nein Frage, singular/plural.

In der Stadt – Learning: To know places, buildings, question, know transport systems, understand international words; **Vocabulary**: related to the topic; **Grammar:** Definite & indefinite articles, Negotiation, Imperative with Sie.

Guten Appetit! – Learning: To speak about food, shop, converse; **Vocabulary:** related to the topic; **Grammar:** Sentence position, Accusative, Accusative with verbs.

Tag für Tag and Zeit mit Freunden – Learning: To learn time related expressions, speak about family, ask excuse, fix appointments on phone, birthdays, understand & write invitations, converse in the restaurant; **Vocabulary:** related to the topic; **Grammar:** Preposition – am, im, um, von…bis, Possessive articles, Modal verbs.

Total P: 60 periods

TEXT BOOK:

1. Dengler, Stefanie et al., '*Netzwerk A1.1*'. Klett-Langenscheidt Gmbh, München, 2013.

REFERENCES:

1. Dengler, Stefanie et al., '*Netzwerk A1*'. Klett-Langenscheidt Gmbh, München, 2013.
2. Sandra Evans,Angela Pude, Franz Specht-'*Menschen A1*'–Hueber Verlag ,2012.
3. Hermann Funk, Christina Kuhn, Silke Demme, '*Studio d A1*'. Goyal Publishers & Distributors Pvt. Ltd ,2009.
4. Rosa-Maria Dallapiazza, Eduard von Jan, Til Schönherr, '*Tangram Aktuell 1*'. (Deutsch als Fremdsprache), Max Hueber Verlag, 2004.

25HS213 BASIC JAPANESE
(Common to CIVIL, CSE, EEE, ECE, ICE, MECH, AI&DS and EE-VLSI)

0 0 4 2

Orientation Session, Geographic & Socio, economic perspective to Japan, Japanese people and culture and Basic greetings and responses.

Basic script, Method of writing hiragana and katakana, and Combination sounds and simple words.

Topic marker "wa", Desu / dewa arimasen cupolas, Interrogative particle "ka", Grammar particles "mo", "no", "Introducing some one: "Kochira wa ~" and Self introductions: Hajimemashite"

Demonstratives "Kore", "Sore", "Are", Demonstrative "Kono", "Sono", "Ano", Possessive noun particle "no" and Japanese apartments: Greeting your neighbor.

Place markers "Koko", "Soko", "Asoko", Direction markers "Kochira", "Sochira", "Achira" and Japanese department stores: Asking for and buying something.

Asking for and telling the time, Particle "ni (at)" for time, kara (from) ~ made (until), Particle "to (and)", Time periods: Days of the week, months, time of day, Verbs (Present / future and past tense) and Telephone enquiry: Asking for a phone no. And business hours.

Destination particle "e", Particles "de (mode of transportation)" and "to (with) and Japanese train station: Asking for Fare and track no. / types of trains.

Direct object particle "o", Particle "de (place of action)", Verbs ("~masen ka", "~mashou") and "Ohanami" Cherry blossom viewing.

Particle "de (by means of)", Particle "ni (to)", Aaemasu (give) and Moraimasu (receive) and Visiting a Japanese house.

Adjectives ("i" and "na" type), Adjectives (Positive and negative usage), Particle "ga (however, but), "Dore which?)" and Leaving a room, thanking someone for hospitality.

Likes and dislikes, Potential verbs (wakarimasu and dekimasu), "Kara (~ because)", Adverbs and Asking someone out over the phone.

Verbs denoting presence: "Imasu" and "arimasu", Particle "ni (in)", "Dare (who?)", Adverbs ("Chikaku ni ~ "), Particle "dare mo (negative ~ no one)" , Dare ka (anyone), dare ga (who) , Nani ka (anything) , nani ga (what) - ~ya (and) ~ nado (etc.) and Asking for directions.

Counters and Counting suffixes.

Introduction to Adjectives (na and ii type), Different usages of adjectives, Comparison, Likes and dislikes and Going to a trip.

Need and desire (ga hoshii), Wanting to … (Tabeti desu), Going for a certain purpose (mi –ni ikimasu) and Choosing from a menu.

Verb groups, I, II and III and Exercises to group verbs.

Please do (te kudasai), Present continuous tenses (te imasu), Shall I? (~ mashou ka) and Describing a natural phenomenon (It is raining).

To grant permission (~te mo ii desu), Asking for permission (~ te mo ii desu ka) and Should not do (~ te waikemasen) Describing a continuing state and Describing a habitual action.

Roleplays in Japanese.

A demonstration on usage of chopsticks and Japanese tea party.

Total P: 60 periods

TEXT BOOK

1. *'Minna no nohongo'.* – Romaji ban (first 10 lessons of this book).

REFERENCE

1. *'Minna no Nihongo I Honsatsu Roma – ji ban'.* (Main Textbook Romanized Version). International publisher – 3A Corporation, Tokyo, Indian distributor – Goyal Publishers & Distributors, New Delhi.

25EE211 CIRCUITS AND DEVICES LABORATORY

0 0 2 1

LIST OF EXPERIMENTS

1. Verification of Ohm's and Kirchhoff's laws
2. Verification of Superposition theorem and Norton's theorem
3. Verification of Thevenin's theorem and Maximum power transfer theorem
4. Series and Parallel resonance circuits
5. Three-Phase Power measurement by two wattmeter method (Balanced & unbalanced)
6. Characteristics of PN Junction Diode, Design and Implementation of Clipping and Clamping Circuits
7. Characteristics of Zener Diode, Design and Implementation of Zener Diode Voltage Regulator
8. Characteristics of BJT and Photo Transistor
9. Characteristics of MOSFET, JFET and Application of MOSFET as a Switch
10. Experiments on BJT Biasing Circuits.

Total P: 30 periods

REFERENCE:

1. Laboratory Manual prepared by Department of Electrical and Electronics Engineering

COURSE OUTCOMES:

At the end of the course, students will be able to		**Bloom's Level**
CO1	Verify fundamental electrical laws and theorems through practical experimentation.	**K2**
CO2	Examine the characteristics of semiconductor devices such as PN junction diode, Zener diode, BJT, MOSFET, JFET and photo transistor; design and construct clipper, clamper, voltage regulator, and switching circuits.	**K3**
CO3	Measure and analyze electrical quantities in AC circuits, including resonance conditions and 3-phase power using the two-wattmeter method for both balanced and unbalanced loads.	**K4**
CO4	Construct BJT biasing circuits and evaluate their performance under various input conditions using lab equipment and/or simulation tools.	**K5**

COs-POs & PSOs MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1													
CO2	3											2	
CO3		3										2	
CO4					3							2	
@	**3**	**3**			**3**							**2**	

1 – low, 2 – medium, 3 – high @-Overall Contribution to the Course

25EE212 PROGRAMMING IN C LABORATORY

0 0 2 1

LIST OF EXPERIMENTS:

1. Simple programs to understand the concepts of data types.
2. Familiarizing conditional, control and repetition statements.
3. Usage of single and double dimensional arrays including storage operations.
4. Implementation of functions, recursive functions.
5. Defining and handling structures, array of structures and union.
6. Implementation of pointers, operation on pointers, dynamic storage allocation.
7. File handling.

Total P: 30 periods

REFERENCES:

1. Paul Deitel and Harvey Deitel, '*C How to Program: With an Introduction to C++*'. 8th edition, Pearson Education, 2018.
2. Ajay Mittal, '*Programming in C - A Practical approach*'. Pearson, New Delhi, 2010.
3. B. Gottfried, '*Programming with C, McGraw Hill Education*'. New Delhi, 2018.
4. Herbert Schildt, '*C: The Complete Reference*'. McGraw Hill, New Delhi, 2017.
5. B. W. Kernighan and D.M. Ritchie, '*C Programming Language (ANSI C)*'. Prentice Hall of India, New Delhi, 2013

COURSE OUTCOMES

At the end of the course, students will be able to		**Bloom's Level**
CO1	Demonstrate the basic concepts of C programming through simple programs.	**K2**
CO2	Write a program that utilizes conditional statements, arrays, functions and structures is used to solve problems.	**K3**
CO3	Create modular programs with function calls, recursive functions, and pointer-based operations to enhance program structure and increase the coding efficiency.	**K4**

COs-POs & PSOs MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1													
CO2	3				3								
CO3		2			2							2	
@	**3**	**2**			**3**							**2**	

1 – low, 2 – medium, 3 – high @-Overall Contribution to the Course

25EEC01 WORKPLACE COMMUNICATION SKILLS
(Common to CIVIL, CSE, EEE, ECE, ICE, MECH, AI&DS and EE-VLSI)

0 0 2 0

BUILDING COMMUNICATION SKILLS:

1. Introduction to Workplace Communication
2. Profile Building for Internships
3. English in the Workplace (Grammar & Vocabulary)
4. Professional Communication (Speaking & Writing)
5. Workplace Communication Tools
6. Career Exploration
7. Resume Update

Total P: 30 periods

REFERENCES:

1. P. C. Wren and H. Martin, '*High school English Grammar and Composition*'. S Chand Publishing, New Delhi, 2017.
2. Norman Lewis, '*Word Power Made Easy*'. Goyal Publisher, New Delhi, 2011.

COURSE OUTCOMES

At the end of the course, students will be able to:		**Bloom's Level**
CO1	Understand the importance of soft skills for employability and fine tune their writing skills – Resume writing	**K2**
CO2	Present with clarity and coherence while speaking in formal contexts.	**K3**

SEMESTER III

25MA304 MATRIX THEORY AND NUMERICAL METHODS

3 1 0 4

EIGENVALUES AND EIGENVECTORS: Eigenvalues and eigenvectors of a real matrix – characteristic equation, properties - diagonalization - quadratic forms, reduction to canonical form by orthogonal reduction - Errors and approximations in numerical methods, power method for dominant eigenvalue. **(10+3)**

LINEAR ALGEBRAIC SYSTEM OF EQUATIONS AND NONLINEAR EQUATIONS: System of linear equations – Gauss elimination method, Crouts method, Gauss Seidal iterative method, Roots of equations - false-position method, Newton-Raphson method, Graeffe's root squaring method. **(8+3)**

INTERPOLATION, DIFFERENTIATION AND INTEGRATION: Newton's forward and backward interpolating polynomials, Lagrange and Newton's divided difference interpolating polynomials. Numerical differentiation, numerical integration - Newton-Cotes formulae, Trapezoidal rule, Simpson's 1/3 rule. **(12+4)**

ORDINARY DIFFERENTIAL EQUATIONS: Taylor-series method, Euler method, 4^{th} order Runge-Kutta method, multi-step method – Milne's method. **(6+2)**

PARTIAL DIFFERENTIAL EQUATIONS: Finite difference: elliptic equations – Laplace equation, Poisson equation – Liebmann method, parabolic equations-heat conduction equation-Crank Nicolson's method, hyperbolic equations – vibrating string. **(9+3)**

Total L: 45 +T: 15 = 60 periods

TEXT BOOKS:

1. David C Lay, Judi J McDonald, Steven R Lay '*Linear Algebra and its Application'*. Pearson Education, New Delhi, 2021.
2. Steven C Chapra and Raymond P Canale, '*Numerical Methods for Engineer'*. Tata McGraw Hill, New Delhi, 2021.

REFERENCES:

1. Curtis F Gerald and Patrick O Wheatly, '*Applied Numerical Analysis*'. Pearson Education, New Delhi, 2017.
2. Rizwan B, '*Introduction to Numerical Analysis Using MATLAB*'. Infinity Science Press, Hingham, 2010.
3. Richard L. B and Douglas J. F, '*Numerical Analysis*'. Thomas Learning, NewYork, 2017.
4. Howard Anton, Chris Rorres, Anton Haul '*Elementary Linear Algebra*'. Wiley India, New Delhi, 2019.

COURSE OUTCOMES

At the end of the course, students will be able to:		**Bloom's Level**
CO1	Explain the concepts related to Matrix Theory and Numerical Methods.	**K2**
CO2	Apply the techniques of Matrix Theory and Numerical Methods to solve engineering problems.	**K3**
CO3	Analyze the solutions of engineering problems using Matrix Theory and Numerical Methods.	**K4**
CO4	Use modern tools to solve engineering problems with the help of Matrix Theory and Numerical Methods.	**-**

COs-POs & PSOs MAPPING

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PSO1**	**PSO2**
CO1													
CO2	3												
CO3		1											
CO4					1								
@	**3**	**1**			**1**								

1 – low, 2 – medium, 3 – high @-Overall Contribution to the Course

25EE301 ELECTRONIC CIRCUITS

3 1 0 4

POWER SUPPLIES: Rectifiers – Half-wave and Full-wave rectifiers, Average and RMS value, Ripple factor, Regulation, Rectification efficiency, Transformer Utility Factor. Filters – Capacitor, Inductor, L-type and π -type, Ripple Factor, Regulation - Need for voltage regulators – Series and Shunt regulators, Comparison, Current limiting and protection circuits. **(9+3)**

SMALL SIGNAL AMPLIFIERS: Single stage BJT and FET amplifiers – RC coupled amplifier, Analysis at low, medium and high frequencies – BJT and MOS Differential amplifier, Differential and Common mode gain with resistive load and active load, CMRR - Cascade and Darlington Amplifiers. **(9+3)**

LARGE SIGNAL AMPLIFIERS: Power amplifiers– Classification, Single ended and Push-pull Configuration, Power dissipation, Output power and Conversion efficiency, Complementary symmetry power amplifiers, Class AB operation, Class C and Class D amplifiers, thermal considerations. **(9+3)**

FEEDBACK AMPLIFIERS: Basic concepts of feedback amplifiers – Effect of negative feedback on input and output resistances, gain, gain stability, distortion and bandwidth. Voltage and current feedback circuits. Application of negative feedback in voltage regulators**.** **(9+3)**

OSCILLATORS AND PULSE CIRCUITS: Oscillators – Barkhausen criteria, RC and LC oscillators using BJT – RC phase shift, Wien bridge oscillators, Hartley and Colpitt's oscillators, Frequency stability of oscillators, Crystal oscillators. Pulse circuits – RC integrator and Differentiator, Non-sinusoidal oscillators – Multivibrators – Bistable, Monostable, Astable multivibrators and Schmitt Trigger using BJT. **(9+3)**

Total L: 45 + T: 15 = 60 periods

TEXT BOOKS:

1. Millman J, Halkias C, Satya Brata Jit, '*Electronic Devices & Circuits*'. Tata McGraw-Hill, New Delhi, 4th edition, 2015.
2. Boylestead L R, Nashelsky L, '*Electronic Devices and Circuit Theory*'. Pearson Education, New Delhi, 11th edition, 2012.

REFERENCES:

1. David A Bell, '*Electronic Devices and Circuits'*. Oxford University Press, New Delhi, 2009.
2. Adel Sedra Kenneth. C Smith, '*Microelectronics Circuits*'. Oxford University Press, New Delhi, 2010.
3. Thomas L Floyd, '*Electronic Devices*'. Prentice Hall of India, New Delhi, 2011.
4. Millman J, Taub H, Mothiki S Prakash Rao, '*Pulse, Digital and Switching Waveforms*'. Tata McGraw-Hill, New Delhi, 2017.

COURSE OUTCOMES

At the end of the course, students will be able to:		**Bloom's Level**
CO1	Explain the working of diode and transistor-based application circuits.	**K2**
CO2	Implement electronic circuits using semiconductor devices.	**K3**
CO3	Analyze the performance parameters and behaviour of electronic circuits.	**K4**
CO4	Simulate and analyze the performance of electronic circuits using a simulation tool.	**-**

COs-POs & PSOs MAPPING

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PSO1**	**PSO2**
CO1													
CO2	3										3		
CO3		3									3		
CO4			1		1						1		1
@	**3**	**3**	**1**		**1**						**3**		**1**

1 – low, 2 – medium, 3 – high @-Overall Contribution to the Course

25EE302 MEASUREMENTS AND INSTRUMENTATION

3 0 0 3

MEASUREMENT SYSTEMS: Methods – Classification of units –SI units- standards - modes of operation – functions –Applications – Input / Output Configuration of Measurement and Instrumentation – methods of correction. Static calibration – Static and Dynamic characteristics of Instruments: Accuracy, Precision, linearity, Resolution, Dead zone, loading effects- speed of response, Fidelity, measuring lag, Dynamic error. Errors in measurement: types of errors – statistical treatment of data – Histogram – Arithmetic mean – dispersion from mean – Average and standard deviation – variance – Normal or Gaussian Curve of errors. **(9)**

ANALOG INDICATING INSTRUMENTS: Types of ammeters and voltmeters- PMMC Instruments Moving Iron Instruments -Dynamometer type Instruments. Measurement of power and energy- Dynamometer type wattmeter - single phase Induction type energy meter, Calibration of meters, Instrument Transformers: ratio and phase angle errors, phasor diagram, methods of minimizing errors; testing and applications. **(9)**

MEASUREMENT OF R-L-C: Resistance measurement: Kelvin double bridge, Wheatstone bridge, substitution method, Loss of charge method, Guard Wire method. Measurement of inductance and capacitance: Maxwell, Anderson, Hay's and Schering Bridge. Measurement of Earth resistance – Megger. **(9)**

INSTRUMENTATION SYSTEMS: Elements of Instrumentation systems – Transducers - Classifications, Principle of operation of Resistance potentiometer, Strain Gauge, Inductive and capacitive transducers, LVDT, Piezo-electric transducers, Encoders, Hall effect sensors, and photo sensors and its applications. Measurement of Pressure: High Pressure and low-pressure measurement. Measurement of Temperature - Resistance thermometers, thermistors and thermocouples. **(9)**

ELECTRONIC INSTRUMENTS: Electronic voltmeter – Digital voltmeter of ramp and integrating types. Digital Multimeter- True RMS meters-Spectrum Analyser-Harmonic Distortion Analyser- Function Generator- Dual channel Oscilloscope-Digital storage Oscilloscope- PC based measurements. **(9)**

Total L: 45 periods

TEXT BOOKS:

1. Sawhney A K, '*A Course in Electrical and Electronic Measurement and Instrumentation*'. Dhanpat Rai & Sons, New Delhi, 2011.
2. David A. Bell, '*Electronic Instrumentation and Measurements*'. Oxford University Press, New Delhi, 2012.

REFERENCE BOOKS:

1. Doeblin E O, Dhanesh N Manik, '*Measurement Systems*'. McGraw-Hill, New Delhi, 2012.
2. Rangan C S, Sharma G R, Mani V S, '*Instrumentation Devices and Systems*'. Tata McGraw-Hill, New Delhi, 2004.
3. Kalsi H S, '*Electronic Instrumentation*'. Tata McGraw-Hill, New Delhi, 2013.
4. Albert D, Helfrick, William D Cooper, '*Modern Electronic Instrumentation and Measurement Techniques*'. Pearson Education, New Delhi, 2016.

COURSE OUTCOMES

At the end of the course, students will be able to:		**Bloom's Level**
CO1	Explain the principles, characteristics, and operation of measurement systems, analog and electronic instruments, transducers, and measurement techniques for electrical parameters.	**K2**
CO2	Apply appropriate measurement methods, bridge circuits, and instrumentation techniques to determine electrical quantities such as resistance, inductance, capacitance, power, and energy.	**K3**
CO3	Analyze measurement errors, instrument characteristics, and performance of measurement systems using statistical methods and calibration techniques to evaluate accuracy and reliability.	**K4**
CO4	Develop instrumentation systems using software tools to acquire, analyze, and visualize electrical measurement data.	**-**

COs-POs & PSOs MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1													
CO2	3											1	3
CO3		3										1	3
CO4					3							1	3
@	**3**	**3**			**3**							**1**	**3**

1 – low, 2 – medium, 3 – high @-Overall Contribution to the Course

25EE303 DC MACHINES AND TRANSFORMERS

3 0 0 3

BASICS CONCEPTS OF ELECTRICAL MACHINES: Electromechanical Energy Conversion – Energy Balance during Electromechanical Energy Conversion – Field energy – Co-energy– Force and Torque in Electromechanical Systems – General Concepts of Rotating Machine. **(9)**

CONSTRUCTION AND OPERATION OF DC MACHINES: Basic Principles – Fundamentals of DC Generator, DC Motor – Constructional Features of DC Machine – Armature Winding in DC Machine – Armature Reaction – Methods for compensating the effects of Armature Reaction - Commutation Process – PMDC Motor. **(9)**

CHARACTERISTICS, CONTROL, AND TESTING OF DC MACHINES: Excitation of DC Machines – Operating Characteristics of DC Generators, DC Motors – Starting of DC Motors – Speed Control of DC Motors – Braking of DC Motors – Losses and Efficiency – Testing of DC Machines. **(9)**

SINGLE PHASE TRANSFORMERS: Principle of operation – Constructional features – Equivalent Circuit - Voltage regulation– Losses –Testing of Transformers –Efficiency– All Day Efficiency–Polarity Test – Auto-Transformers – Parallel Operation – Special Purpose Transformers - Welding Transformers- Toroidal Transformers – Pulse Transformers. **(9)**

THREE PHASE TRANSFORMERS: Construction – Transformer Vector Groups – Grounding Transformers – Parallel Operation – Open Delta Connection – Three phase to Two Phase Conversion – Harmonics – Transients. **(9)**

Total L: 45 periods

TEXT BOOKS:

1. Prithwiraj Purkait, Indrayudh Bandyopadhyay, '*Electrical Machines*'. Oxford University Press, 2017
2. Ashfaq Husain, '*Electric Machines'*. Paper Back - 1, Dhanpat Rai & Co., Delhi, January 2016.
3. Nagrath, I. J. and Kothari.D. P., '*Electric Machines*'. McGraw-Hill Education, 6th edition, 2019.

REFERENCE BOOKS:

1. B. R. Gupta, '*Fundamentals of Electric Machines*'. New age International Publishers, 4th Edition, 2017.
2. S. K. Bhattacharya, '*Electrical Machines'*. McGraw - Hill Education, 4th Edition,2018
3. Murugesh Kumar K, '*Electrical Machines Vol. I*'. Vikas Publishing House, New Delhi,
4. P. S. Bimbhra, '*Electrical Machines'*. Khanna Publishing, 4th edition, 2018.

COURSE OUTCOMES

At the end of the course, students will be able to:		**Bloom's Level**
CO1	Explain the electromechanical energy conversion, construction and principle of operation of transformers and DC machines	**K2**
CO2	Compute the magnetic circuit parameters and performance parameters of transformer and DC machines	**K3**
CO3	Analyze the performance parameter of dc machines and transformers for varying load conditions.	**K4**
CO4	Choose a suitable three-phase transformer connection for given application.	**-**

COs-POs & PSOs MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1													
CO2	3												3
CO3		3											3
CO4	2												1
@	**3**	**3**											**3**

1 – low, 2 – medium, 3 – high @-Overall Contribution to the Course

25HS301 PROJECT MANAGEMENT AND FINANCE

3 0 0 3

INTRODUCTION TO PROJECT MANAGEMENT: Project: Trends in project management, project management versus general management, agile project management, the three goals of a project, life cycle of projects, project selection methods, project portfolio process, case study – friendly assisted living facility. **(9)**

ROLE OF PROJECT MANAGER AND ORGANISATION: Project manager's roles and responsibilities, selection of a project manager, project management as a profession, fitting projects into the parent organisation, the project team and agile team roles, case study – the company with traditional functional organizational structure setting up teams for the new initiatives. **(9)**

PROJECT ACTIVITIES: The planning process, work-breakdown structure and other aids, risk management, methods of budgeting, cost estimation, scheduling the project with PERT and CPM networks, allocating resources, resource loading and levelling, Goldratt's Critical Chain, application – using Project Libre for project management, case study – success of Chandrayan-3 **(9)**

INTRODUCTION TO FINANCE MANAGEMENT: Overview - finance and related disciplines, scope and objectives of financial management, time value of money, and risk and return and calculations with spreadsheet, analysis using cash flow statement and other statements **(9)**

PERSONAL FINANCE: Compounding, debt, equity and financial markets and investments- debt and bonds. Equity, mutual funds, hedge funds, real estate, and commodities, Personal financial plan to enhance wealth and job marketability, components of a financial plan, tools for planning – financial statements, applying time value concept of money and tax planning **(9)**

Total L: 45 periods

TEXTBOOKS

1. Jack R. Meredith and Scott M. Shafer, '*Project Management in Practice'*. Wiley, 2021
2. Khan M. Y. and Jain P. K., '*Basic Financial Management*'. Tata McGraw Hill, 2012
3. Michael Fisher, '*Saving and Investing'*. Author House, 2005
4. Jeff Madura, '*Personal Finance'*. Pearson, 2020

REFERENCES

1. National Finance Olympiad, '*Personal Finance Handbook'*. Pockvue Solutions, 2024
2. Glen Arnold, '*Investing*'. Financial Times Guides, 2020
3. Rachel Siegel and Carol Yacht, '*Personal Finance'*. Open Textbook Library, Saylor Foundation, 2009
4. Google, '*Google Project Management: Professional Certificate'*. Google Project Management: Professional Certificate, Coursera

COURSE OUTCOMES

At the end of the course, students will be able to:		**Bloom's Level**
CO1	Explain the fundamentals of project management, roles of project managers, and project life cycle concepts.	**K2**
CO2	Apply project planning tools like WBS, PERT, and CPM to effectively plan and schedule project activities.	**K3**
CO3	Analyse various personal finance instruments and develop a personalized financial plan considering investment, tax, and future wealth building strategies.	**K4**
CO4	Apply principles of financial management and spreadsheet-based tools to evaluate cash flows, time value of money, and risk-return trade-offs.	**-**

COs-POs & PSOs MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1										**2**			
CO2	2									**2**			
CO3		2											
CO4				1									
@	**2**	**2**		**1**						**2**			

1 – low, 2 – medium, 3 – high @-Overall Contribution to the Course

25EE311 DC MACHINES AND TRANSFORMERS LABORATORY

0 0 4 2

LIST OF EXPERIMENTS:

1. Open Circuit Characteristics and Load Test on DC Shunt Generator.
2. Open Circuit Characteristics and Load Test on Compound Generator
3. Load Characteristics of DC Shunt and DC Compound Motor.
4. Load Test on DC Series Motor &Study of DC motor Starters.
5. Swinburne's test on DC Machine.
6. Hopkinson's test on DC Machine.
7. Electrical Braking of DC Shunt Motor
8. Load Test on Single Phase Transformer.
9. Open Circuit and Short Circuit Tests on Single Phase Transformer
10. Sumpner's Test on a Single-Phase Transformer.
11. Three Phase Transformer Connections.

Total P: 60 periods

REFERENCE:

1. Laboratory Manual prepared by Department of Electrical and Electronics Engineering, PSG Institute of Technology and Applied Research, Coimbatore - 641062

COURSE OUTCOMES

At the end of the course, students will be able to:		**Bloom's Level**
CO1	Identify suitable starter for DC motor and choose suitable three phase transformer connection for a given application.	**K2**
CO2	Conduct load test on DC machines and transformers and draw the performance curves	**K3**
CO3	Analyze the performance of DC machine and transformer for different loading conditions	**K4**
CO4	Work effectively in teams to perform experiments, analyze data, and present findings through well-documented reports	**-**

COs-POs & PSOs MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1													
CO2	3										3		3
CO3		3									3		3
CO4								2	2				
@	**3**	**3**						**2**	**2**		**3**		**3**

1 – low, 2 – medium, 3 – high @-Overall Contribution to the Course

25EE312 ELECTRONIC CIRCUITS LABORATORY

0 0 2 1

LIST OF EXPERIMENTS:

1. Design and Implementation of Half-Wave and Full-Wave Rectifier with and without Capacitor Filter
2. Design and implementation of Series Voltage Regulator
3. Frequency response analysis of Common Emitter Amplifier
4. Measurement of input and output impedance of Common Collector amplifier
5. Transfer characteristics of Differential amplifier
6. Design and verification of Power Amplifiers
7. Design and verification of RC Oscillators
8. Design and implementation of current mirror circuits.
9. Wave shaping using RC Filters
10. Design and implementation of Multivibrators

Total P: 30 periods

REFERENCES:

1. Laboratory Manual prepared by Department of Electrical and Electronics Engineering, PSG Institute of Technology and Applied Research, Coimbatore - 641062

COURSE OUTCOMES

At the end of the course, students will be able to:		Bloom's Level
CO1	Explain and demonstrate power supply, amplifier, filter and oscillator circuits.	**K2**
CO2	Apply the concepts analog circuit principles to implement the basic electronic circuits	**K3**
CO3	Analyse the frequency response and impedance of small signal amplifiers.	**K4**
CO4	Design an electronic circuit using semiconductor devices for given engineering applications.	**K6**
CO5	Work effectively in teams to perform experiments, analyse data, and present findings through well-documented reports	**-**

COs-POs & PSOs MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1													
CO2	3							3			3		3
CO3		2						2			2		2
CO4			2		2			2			2		2
CO5								2					
@	**3**	**2**	**2**		**2**			**3**			**3**		**2**

1 – low, 2 – medium, 3 – high @-Overall Contribution to the Course

25EEC02 FOUNDATIONS OF PROBLEM SOLVING

0 0 2 1

PROBLEM SOLVING:

1. Speed Mathematics (SAW, Oz, Mirror methods)
2. Speed Mathematics (High5, Minion, Butterfly methods)
3. Speed Mathematics (Inception, Golden eye methods)
4. Thinking with Numbers
5. Problem Solving with Visual information
6. Words Puzzles
7. Resume Writing Essentials

Total P: 30 periods

REFERENCES:

1. R. S. Agarwal, '*Quantitative Aptitude for Competitive Examination'*. S Chand Publishing, New Delhi, 2017.

SEMESTER IV

25MA403 STOCHASTIC PROCESSES AND STATISTICAL ANALYSIS

3 1 0 4

PROBABILITY AND DISCRETE RANDOM VARIABLES: Probability, axioms, conditional probability, law of total probability, Bayes theorem, discrete random variables, probability mass function, cumulative distribution function, binomial, Poisson and geometric random variables, expected values. **(9+3)**

CONTINUOUS RANDOM VARIABLES: Cumulative distribution function, probability density function, uniform, exponential and Gaussian random variables, expected values. **(9+3)**

PAIRS OF RANDOM VARIABLES: Joint cumulative distribution function, joint probability mass function, marginal probability mass function, joint probability density function, marginal probability density function, independent random variables, expected values, covariance, correlation and independence, central limit theorem. **(9+3)**

STOCHASTIC PROCESSES: Types of stochastic processes, Poisson process, discrete time Markov chains, classification of states, limiting state probabilities. **(9+3)**

STATISTICAL INFERENCE: Point estimation, interval estimation. Hypothesis testing: one and two tailed tests, tests concerning mean, proportion, and variance, single and two samples, tests for goodness of fit and independence of attributes. **(9+3)**

Total L: 45 + T: 15 = 60 periods

TEXT BOOKS:

1. Roy D Yates and David J Goodman, '*Probability and Stochastic Processes'*. Wiley India, New Delhi, 2021.
2. Ronald E. W, Raymond H. M, Sharon L. M and Keying Ye, '*Probability and Statistics for Engineers and Scientists'*. Pearson Education, New Delhi, 2016.

REFERENCE BOOKS:

1. Saeed Ghahramani, '*Fundamentals of Probability with Stochastic Processes'*. CRC Press, USA, 2018.
2. Dougles C Montgomery and George C Runger, '*Applied Statistics and Probability for Engineers*'. Wiley India, New Delhi, 2018.
3. Athanasios P and Unnikrishna P. S, '*Probability, Random Variables and Stochastic Processes*'. Tata McGraw Hill, New Delhi, 2017.
4. Arnold O. A, '*Probability, Statistics and Queueing theory: with computer science applications'*. Academic press, USA, 2014.

COURSE OUTCOMES

At the end of the course, students will be able to:		**Bloom's Level**
CO1	Explain the concepts related to Probability, Random variables, Stochastic processes and Statistical inference.	**K2**
CO2	Apply the techniques of Probability, Random variables, Stochastic processes and Statistical inference to solve engineering problems.	**K3**
CO3	Analyze the solutions of engineering problems using Probability, Random variables, Stochastic processes and Statistical inference.	**K4**
CO4	Use modern tools to solve engineering problems with the help of Probability, Random variables, Stochastic processes and Statistical inference.	**-**

COs-POs & PSOs MAPPING

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PSO1**	**PSO2**
CO1													
CO2	3												
CO3		1											
CO4					1								
@	**3**	**1**			**1**								

1 – low, 2 – medium, 3 – high @-Overall Contribution to the Course

25EE401 GENERATION, TRANSMISSION AND DISTRIBUTION

3 0 0 3

GENERATION SYSTEMS: Structure of Electric Power System, Power system scenario, Types of generation- Thermal power plant, Hydro power plant, Oil & Gas power plant, Nuclear power plant, Renewable Energy Systems - Solar and Wind - Load capacity factor - Connected load factor - Load duration curve - Selection of units - Cost of generation - Tariffs. **(9)**

TRANSMISSION SYSTEMS & LINE PARAMETERS: Various systems of transmission – Advantages of high transmission voltages – Introduction to HVDC Transmission - Comparison of conductor materials required for various overhead systems. Electrical constants - Resistance, Inductance and capacitance of Single and 3 Phase lines – Bundled conductor lines - Effects of earth on line capacitance - Skin effect - Proximity effect - Transposition. **(9)**

MODELING AND PERFORMANCE OF TRANSMISSION LINE: Characteristics and performance of power transmission lines: short, medium, long lines, generalized constants, surge impedance and Surge impedance loading, Power flow, regulation, Series and shunt compensation, Phenomenon of Corona, Corona loss, Factors affecting Corona, Ferranti Effect, Electrostatic and Electromagnetic interference with communication lines. **(9)**

OVERHEAD LINES AND UNDERGROUND CABLES: Components of overhead line, Insulators - Types - Potential distribution over a string of suspension insulators - Methods of increasing string efficiency. Testing of insulators - Stress and Sag in overhead lines – causes - Sag tension calculation -Vibration and dampers**.** underground cables: Types - Capacitance and insulation resistance - Sheath effects - Grading – Heating – Current rating. **(11)**

DISTRIBUTION SYSTEM: Substation types and Layout – components – feeders- distributers – service mains- Schemes of distribution – Radial and ring main systems - Calculation of voltage in distributors with concentrated and distributed loads - AC single phase and three phase systems - Requirements of distribution system - voltage regulation -voltage regulating devices- power factor improvements Introduction to Substation automation protocols. **(7)**

Total L: 45 periods

TEXT BOOKS:

1. Wadhwa C L, '*Electrical Power Systems'*. New Age International, New Delhi, 2012.
2. Singh S N, '*Electric Power Generation, transmission and distribution'*. PHI Learning Pvt Ltd, New Delhi, 2015.
3. B R Gupta, '*Power System Analysis and Design'*. S. K. Kataria & Sons, 2013.

REFERENCES:

1. Soni M L, Gupta P V, Bhatnagar U S and Chakrabarthi A, '*A Text Book on Power System Engineering*'. Dhanpat Rai & Co., New Delhi, 2013.
2. Uppal S L, '*Electrical Power Systems'*. Khanna Publishers, New Delhi, 2009.
3. Mehta V K, Rohit Mehta, '*Principles of Power Systems'*. S. Chand & Co., New Delhi, 2020
4. Kothari D P and Nagrath J, '*Power System Engineering'*. Tata McGraw-Hill, New Delhi, 2008.

COURSE OUTCOMES:

At the end of the course, students will be able to:		**Bloom's Level**
CO1	Describe the principles of energy conversion from renewable and non-renewable energy sources and the structure of transmission and distribution systems	K2
CO2	Compute the performance of transmission line with different configurations, various line supports and insulators, distributors and underground cables	K3
CO3	Analyse the impact of sag and stress on the performance of transmission line under the dynamic weather conditions such as ice loading and windy atmospheric conditions	K4
CO4	Evaluate the voltage distribution characteristics of transmission and distribution system using simulation packages and validate the same using a scaled-down model of the real time system.	K5

COs-POs & PSOs MAPPING

COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PSO1**	**PSO2**
CO1													
CO2	3												1
CO3		3				1							2
CO4				1	1								2
@	**3**	**3**		**1**	**1**	**1**							**2**

1 – low, 2 – medium, 3 – high @-Overall Contribution to the Course

25EE402 DIGITAL ELECTRONICS

3 1 0 4

INTRODUCTION TO NUMBER SYSTEMS AND BOOLEAN ALGEBRA: Review of Number Systems – Number representation: Signed –Unsigned-Fixed point- Floating point- Computer codes-BCD- Gray code- Excess 3 code- Error detection and correction codes- Parity- Hamming codes- Boolean algebra-Basic Postulates and theorems-Switching functions - Canonical forms- Logic gates- Incompletely specified functions- Simplification of logic functions through K-maps and Quine – McClusky method. **(9+3)**

DIGITAL LOGIC FAMILIES: Characteristics of digital ICs – Voltage and current ratings-Noise Margin-Propagation Delay-Power dissipation. TTL logic family-Inverter-NAND-NOR-Totem pole- Open collector and tri-state outputs- wired output operations- CMOS logic Inverter- NAND, NOR High speed CMOS and ECL logic families- Comparison of performance of various logic families- Interfacing TTL and CMOS devices. **(6+3)**

COMBINATIONAL LOGIC DESIGN: Decoders, NAND, NOR, Encoders- Code Converter - Multiplexers and Demultiplexers- Implementation of Combinational circuits using Multiplexers and Demultiplexers-Hazards-Arithmetic circuits: Binary /BCD adders and subtractors- Magnitude comparator. **(8+3)**

SEQUENTIAL CIRCUITS: General model of sequential circuits- Latch- Flip-Flops – setup and hold times - Level triggering- Edge triggering- Master-slave configuration-Binary Counters-Shift register- Ring Counter- Johnson counter- Timing diagram. Mealy /Moore Models – Concept of state -State Diagram-State table - Minimal flip-flop/one hot realization -Design of synchronous sequential circuits - Up-down/Modulus counters- Sequence detector-Introduction to Asynchronous Sequential circuits. **(12+3)**

MEMORY AND PROGRAMMABLE LOGIC DEVICES: Memories – Read Write Operators – Timing Diagrams-ROM-PROM-EPROM- EEPROM-Static, Dynamic RAM- Semicustom design – Introduction to PLDs – ROM, PAL, PLA. Architecture of PLDs – PAL16L8, PAL16R4,22V10 - Implementation of digital functions. **Introduction to Verilog HDL**-Digital design process flow using HDL - Modules and ports - compiler directives - data types and operators - gate level modeling - data flow modeling – behavioural modeling - structural modeling-simple Verilog codes. **(10+3)**

Total L: 45 + T: 15 = 60 periods

TEXT BOOKS:

1. Tocci R J, Widmer N and Moss G. '*Digital Systems: Principles and Applications*'. Pearson, New Delhi, 12th edition, 2017.
2. Leach D, Malvino A and Goutam Saha, '*Digital Principles and Applications*'. Tata McGraw-Hill, New Delhi, 8th edition, 2019.

REFERENCES:

1. Donald Givone, '*Digital Principles and Design'*. Tata McGraw-Hill, New Delhi 2017.
2. Anand Kumar A, '*Fundamentals of Digital Circuits'*. Prentice Hall of India, New Delhi 2016.
3. Nelson V P, Nagle H T, Carroll B D and Irwin J D, '*Digital Logic Circuit Analysis and Design'*. Prentice Hall International, New Jersey, 1996
4. Bhasker J '*A Verilog HDL Primer'*. BS Publications, 2012.

COURSE OUTCOMES

At the end of the course, students will be able to:		**Bloom's Level**
CO1	Explain the principles of number systems, Boolean algebra, logic families, and digital design fundamentals including memory structures and HDL constructs.	**K2**
CO2	Apply Boolean algebra techniques, logic simplification methods, to implement combinational and sequential circuits for specified functionalities.	**K3**
CO3	Analyze the characteristics and performance of various digital logic families to determine their suitability in electronic circuit application.	**K4**
CO4	Design digital systems using combinational and sequential logic, applying optimization techniques and hardware description languages to solve real-world digital design problems.	**K6**

COs-POs & PSOs MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1													
CO2	3												
CO3		3										3	
CO4			2		2						2	2	2
@	**3**	**3**	**2**		**2**						**2**	**3**	**2**

1 – low, 2 – medium, 3 – high @-Overall Contribution to the Course

25EE403 LINEAR INTEGRATED CIRCUITS

3 0 0 3

OPERATIONAL AMPLIFIER CHARACTERISTICS: Functional Block Diagram – Symbol, Characteristics of an ideal operational amplifier, transfer characteristics, Circuit schematic of µA 741, Open loop gain, CMRR-input bias and offset currents, input and output offset voltages, offset compensation techniques. Frequency response, characteristics – stability, limitations, frequency compensation, slew rate. Transfer characteristics. **(9)**

APPLICATIONS OF OPERATIONAL AMPLIFIERS: Inverting and Non-inverting amplifiers – Voltage follower, Summing amplifier, Differential amplifier, Instrumentation amplifier. Integrator and Differentiator – Practical considerations. Voltage to Current and Current to Voltage converters, Phase changers. Sinusoidal oscillators. Active filters – Design of low pass, high pass, wide bandpass and Band stop Butterworth filters, Narrow band pass and notch filters. **(9)**

NON-LINEAR APPLICATIONS & SINGLE POWER SUPPLY OPERATIONAL AMPLIFIERS: Comparator – Regenerative comparator, Zero crossing detector, Window detector, Sample and hold circuit, Precision diode, Half and Full wave rectifiers, Active peak detector, Clipper and Clamper, Logarithmic, Exponential amplifiers and Multiplier, Square, and Triangular waveform generators. : Need for single power supply operational amplifiers – LM324, AC Inverting and Non-Inverting amplifiers, Applications. **(9)**

IC VOLTAGE REGULATORS: Block diagram of 723 general purpose voltage regulator – Circuit configurations, Current limiting schemes, output current boosting, Fixed and adjustable three terminal regulators- LM78XX, LM79XX, LM317, Switching regulators. **A-D and D-A Converters:** DAC/ADC performance characteristics – Digital to Analog Converters: Binary weighted and R-2R Ladder types – Analog to digital converters: Flash Type, Counter ramp, Successive approximation, Single slope, Dual slope and Sigma - Delta Converter. **(9)**

SPECIAL FUNCTION ICS: 555 Timer Functional block diagram and description – Monostable and Astable operation, Applications, 566 Voltage Controlled Oscillator, Analog Multiplier, Comparator ICs. PLL Functional Block diagram – Principle of operation, Building blocks of PLL, Characteristics, Derivations of expressions for Lock and Capture ranges, Applications: Frequency synthesis, AM and FM detection, FSK demodulator, Motor speed control. **(9)**

Total L: 45 periods

TEXT BOOKS:

1. Adel Sedra, Kenneth.C Smith, '*Microelectronic Circuits'*. 7th Edition, Oxford University Press, New Delhi, 2017.
2. Roy Choudhury Shail Jain, '*Linear Integrated Circuits*'. 5th Edition, New Academic Science, London, UK, 2018.

REFERENCES:

1. Gayakwad A R, '*OP-Amps and Linear Integrated circuits*'. 4th Edition, Prentice Hall India, New Delhi, 2015.
2. Coughlin F R, and Driscoll F F, '*Operational Amplifiers and Linear Integrated Circuits*'. 6th Edition, Prentice Hall of India, New Delhi, 2010.
3. Michael Jacob J, '*Applications and Design with Analog Integrated Circuits'*. 2nd Edition, Prentice Hall of India, New Delhi,2010.
4. K. Lal kishore, '*Operational Amplifiers and Linear Integrated Circuit'*. 1st Edition, Pearson, New Delhi, 2013.
5. Serigo Franco, '*Design with Operational Amplifiers and Analog Integrated Circuits'*. 4th Edition, Tata McGraw Hill, New Delhi, 2016.

COURSE OUTCOMES

At the end of the course, students will be able to:		**Bloom's Level**
CO1	Explain the DC and AC performance characteristics of Op-amp, and its applications, working of 555 timer, LM565 phase-locked loop, analog multipliers, voltage regulators and A-D/D-A Converters.	**K2**
CO2	Apply the basic circuit laws to obtain circuit parameters and waveform in analog electronic circuits.	**K3**
CO3	Analyse analog electronic circuits that meet desired specifications.	**K4**
CO4	Design analog electronic circuits for the desired specifications, and demonstrate through mini-project.	**K6**
CO5	Conduct investigation on analog electronic circuits using MATLAB/ Multisim/Pspice/Proteus simulation tools.	**-**

COs-POs & PSOs MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1													
CO2	3											3	1
CO3		3										3	1
CO4			1		1	1		1		1	1	1	1
CO5					3							3	1
@	**3**	**3**	**1**		**3**	**1**		**1**		**1**	**1**	**3**	**1**

1 – low, 2 – medium, 3 – high @-Overall Contribution to the Course

25EE404 AC MACHINES

3 1 0 4

SYNCHRONOUS GENERATOR: Construction - types - Winding Factors - EMF Equation - Armature Reaction - Voltage Regulation; EMF, MMF, and ZPF Methods - Parallel Operation - Synchronization - Synchronizing power - Two reaction theory - Slip test - Phasor Diagrams - Voltage Regulation. **(9+3)**

SYNCHRONOUS MOTOR: Principle of Operation - Methods of Starting - Phasor Diagrams - Power Flow Equations - Effect of Varying load angle and excitation - V and Inverted V Curves - Synchronous Condenser - Hunting and Suppression Techniques. Introduction to PMSM -Rotor configurations **(9+3)**

THREE PHASE INDUCTION MOTOR: Types - Construction - electrical steel properties- MMF in Distributed AC Windings - Rotating Magnetic Field - Principle of Operation - Torque equation - Slip-Torque Characteristics - Equivalent Circuit - Phasor Diagram Losses and efficiency. **(9+3)**

TESTING AND CONTROL OF 3-PHASE INDUCTION MOTOR : No-Load and Blocked Rotor Tests -Circle diagram - Performance prediction - Starters - Cogging and Crawling - Speed Control methods - Braking - Principle of Induction Generators. **(9+3)**

SINGLE PHASE INDUCTION MOTOR: Construction - Principle of Operation - Double Revolving Field Theory - Equivalent Circuit - Methods of Starting - Types: Split phase, Capacitor type, Shaded pole and Universal Motor. **(9+3)**

Total L: 45 + T: 15 = 60 periods

TEXT BOOKS:

1. D P Kothari, I J Nagrath, '*Electric Machines'*. McGraw Hill Education (India) Private Limited, New Delhi, 2017.
2. K Murugesh Kumar, '*Electrical Machines – II'*. Vikas Publishing House, New Delhi, 2010.

REFERENCES:

1. Bimbhra P S, '*Electrical Machinery'*. Khanna Publishers, New Delhi, 2011.
2. A E Fitzgerald, Charles Kingsley Jr, Stephen D. Umans, '*Electric Machinery'*. Tata McGraw-Hill, New Delhi, 2011.
3. Ashfaq Husain, '*Electric Machines'*. Dhanpat Rai & Co., New Delhi, 2011.
4. Bhattacharya S K, '*Electrical Machines'*. Tata McGraw-Hill, New Delhi, 2011.

COURSE OUTCOMES

At the end of the course, students will be able to:		**Bloom's Level**
CO1	Explain the construction, working principle, starting, speed control and braking methods of AC machines.	**K2**
CO2	Compute the performance parameters of induction and synchronous machines by performing various tests under different loading conditions.	**K3**
CO3	Analyze the performance of induction and synchronous machines by conducting various tests and provide the inferences based on the magnitude and nature of load.	**K4**
CO4	Choose suitable starting and speed control techniques for AC machines for given application and specification.	**-**

COs-POs & PSOs MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1													
CO2	3												3
CO3		3											3
CO4	2												2
@	**3**	**3**											**3**

1 – low, 2 – medium, 3 – high @-Overall Contribution to the Course

25EE411 AC MACHINES LABORATORY

0 0 4 2

LIST OF EXPERIMENTS:

1. Predetermination of voltage regulation of Alternator by EMF and MMF methods
2. Predetermination of voltage regulation of Alternator by ZPF Method
3. Determination of V and Inverted V Curves of Synchronous Motor
4. Predetermination of voltage regulation of Salient Pole Alternator by Blondel's Method
5. Study of parallel operation of alternator.
6. Load Test on single Phase Induction Motors
7. Load Test on Three Phase Induction Motors
8. No load Test and Blocked Rotor Test on 3-Phase Induction Motor (circle diagram)
9. Electrical Braking of 3-Phase Induction Motor & Development of three phase induction Starter
10. Separation of Losses in 3-phase Induction Motor.
11. Speed control of three phase induction motor.
12. Energy efficiency comparison of induction motors

Total P: 60 periods

REFERENCES:

1. Laboratory Manual prepared by Department of Electrical and Electronics Engineering, PSG Institute of Technology and Applied Research, Neelambur, Coimbatore – 641062.

COURSE OUTCOMES

At the end of the course, students will be able to:		**Bloom's Level**
CO1	Compute the equivalent circuit and performance parameters of single-phase and three-phase induction motor by conducting suitable experiments.	**K3**
CO2	Analyze the regulation and performance of synchronous machines for different power factors, and loading conditions.	**K4**
CO3	Choose a suitable method for connecting alternators in parallel and select a suitable starter for three phase induction motor based on the load requirement.	**K5**
CO4	Work effectively in teams to perform experiments, analyze data, and present findings through well-documented reports and presentations	**-**

COs-POs & PSOs MAPPING

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PSO1**	**PSO2**
CO1	3										3		3
CO2		3									3		3
CO3				2							2		2
CO4								1	1				
@	**3**	**3**		**2**				**1**	**1**		**3**		**3**

1 – low, 2 – medium, 3 – high @-Overall Contribution to the Course

25EE412 DIGITAL ELECTRONICS AND LIC LABORATORY

0 0 4 2

LIST OF EXPERIMENTS:

1. Study of basic digital IC's and implementation of adder and subtractor circuits.
2. Design and implementation of code converters.
3. Study of multiplexer and demultiplexer, and design of combinational circuits using multiplexer and de- multiplexer.
4. Design and implementation of counters, shift registers and synchronous sequential circuits.
5. Implementation of combinational and sequential circuit using Verilog
6. Characteristics and applications of Op-Amp: Adder, Subtractor, zero crossing detector, integrator, and Differentiator
7. Waveform Generation using operational amplifiers.
8. Performance characteristics of Voltage regulator ICs
9. Design and implementation of 555 timer applications and VCO.
10. Design and implementation of Active filters.

Total P: 60 periods

REFERENCES:

1. Laboratory Manual prepared by Department of Electrical and Electronics Engineering, PSG Institute of Technology and Applied Research, Neelambur, Coimbatore – 641062.

COURSE OUTCOMES

At the end of the course, students will be able to:		**Bloom's Level**
CO1	Explain the various types of combinational and sequential circuits and develop the logical circuit for the given scenario.	**K2**
CO2	Develop the op-amp applications such as inverting, non-inverting amplifier, Adder, comparator, Integrator, Differentiator, voltage regulator circuits and active filters.	**K3**
CO3	Analyze the waveform generator circuits such as timer IC 555 and IC 741.	**K4**
CO4	Work effectively in teams to perform experiments, analyze the analog and digital circuit, and present findings through well-documented reports and presentations.	**-**

COs-POs & PSOs MAPPING

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PSO1**	**PSO2**
CO1													
CO2	2		2										3
CO3		3											2
CO4			2					1	1		1		1
@	**2**	**3**	**2**					**1**	**1**		**1**		**2**

1 – low, 2 – medium, 3 – high @-Overall Contribution to the Course

25EEE01 MINI-PROJECT I

0 0 2 1

Students should learn project selection methodologies and teamwork skills to design hardware/software products. Create a good technical report and gain motivation to explain project ideas clearly.

Course Guidelines:

- Students can choose projects based on industry defined problems or user defined problems which must emulate real-life problems.
- It is desirable that students should work on the project in group of 2 or 3 but not more than three.
- After making the group, students must decide the title of the project and they will present to the department. Also, students will prepare the proposal report of 4-5 pages and submit at the time of presentation.
- At the end, students must submit the final report of the project and the format for the same will be given by the department.
- The plagiarism check for the final report is to be done through the required software suggested by the department and the report must be having similarity less than 25%.
- The students will report to the respective guide/supervisor at every fortnight to discuss their progress.
- The final evaluation of the project will be done based on the demonstration and presentation.

Total P: 30 periods

Course Outcomes:

At the end of the course, students will be able to:		**Bloom's Level**
CO1	Identify and define a problem statement relevant to simple engineering problems in electrical and electronics engineering.	**K2**
CO2	Apply basic electronic components and electric circuit concepts to develop a working project.	**K3**
CO3	Analyze and solve the complex problems to proposed project work	**K4**
CO4	Design and develop a basic electrical or electronic system to solve a real-world problem using appropriate tools and techniques.	**K6**
CO5	Demonstrate teamwork, project and finance planning, time management and communicate technical information effectively through reports and presentations.	-

COs-POs & PSOs MAPPING

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PSO1**	**PSO2**
CO1													
CO2	**3**				3							3	3
CO3		3			3							3	3
CO4			3	3	3	3						3	3
CO5						3	3	3	3	3	3		
@	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

1 – low, 2 – medium, 3 – high @-Overall Contribution to the Course

25EEC03 PROBLEM SOLVING

0 0 2 1

PROBLEM SOLVING:

1. Algorithmic Thinking, Branching & Repetition Problems
2. Logical Reasoning - Data Arrangements & Relations
3. Solving problems based on Coding & decoding, Series, Analogy, Odd man out and Visual reasoning
4. Problems based on Ages, Logical Connectives, Syllogisms, Data Interpretation & Data Sufficiency
5. Solving problems on Clocks Calendars, Direction Sense & Cubes
6. Problems based on Number system, Percentages, Simple & Compound Interest
7. Resume Update

Total P: 30 periods

REFERENCES:

1. R. S. Aggarwal, '*Quantitative Aptitude for Competitive Examination*'. S Chand Publishing, New Delhi, 2017.

MANDATORY COURSES

25MC001 ENVIRONMENTAL SCIENCES
(Common to Civil, CSE, EEE, ECE, ICE, MECH, AI&DS and EE-VLSI)

2 0 0 0

INTRODUCTION TO ENVIRONMENT: Environment - Definition, scope and importance. Types and composition of atmosphere – particles, ions and radicals. Ozone layer- significance, formation and depletion. Ecosystems- Structure and functions, components, energy flow, food chains, food web, Biodiversity-levels, values and threats – India as a mega-diversity nation, hotspots of biodiversity, endangered and endemic species of India, conservation of biodiversity. **(6)**

ENERGY RESOURCES: Introduction – National and International status- exploitation - sustainable strategies- Fossil fuels-classification, composition, physico-chemical characteristics and energy content of coal, petroleum and natural gas; solar energy - introduction, harnessing strategies. Wind energy - availability, wind power plants, wind energy conversion systems, site characteristics, and types of wind turbines. Supporting renewable energy resources - tidal, geothermal, hydroelectric. **(6)**

ENVIRONMENTAL POLLUTION: Definition, Sources, causes, impacts and control measures of air pollution, water pollution, soil pollution, marine pollution, noise pollution, thermal pollution, nuclear hazards, RF hazards, Role of an individual in prevention of pollution. Disaster Management: Floods, earthquake, cyclone and landslides – Case studies, consequences and rescue measures. **(6)**

WASTE MANAGEMENT: Waste water - Characteristics of domestic and industrial wastewater - COD and BOD, Various stages of treatment – primary, secondary, tertiary treatment- Biological and advanced oxidation processes. Solid waste management – Characteristics of municipal solid waste (MSW), biomedical, automobile and e-wastes and their management, landfills, incineration, pyrolysis, gasification and composting**.** **(6)**

SOCIAL ISSUES AND THE ENVIRONMENT: Environmentally Sustainable work practices- Rain water harvesting, Role of non-governmental organizations. Human ethics and rights- impact on environment and human health, role of information technology on environment and human kind. Green IT policies, Process of EIA - ISO 14000. Legislation- Environment protection act – Air (Prevention and Control of Pollution) act – Water (Prevention and control of Pollution) act – Wildlife protection act – Forest conservation act. **(6)**

Total L: 30 periods

TEXT BOOKS:

1. Gilbert M. Masters, '*Introduction to Environmental Engineering and Science*'. Pearson Education, New Delhi, 2004.
2. Deswal S and Deswal A, '*A Basic Course in Environmental Studies*'. Dhanpat Rai and Co, New Delhi, 2004.

REFERENCES:

1. Benny Joseph, '*Environmental Science and Engineering*'. Tata McGraw - Hill, New Delhi, 2006.
2. Koteswara Rao M V R, '*Energy Resources: Conventional & Non – Conventional*'. BSP Publications, New Delhi, 2006.
3. Botkin and Keller, '*Environmental Science*'. Wiley India Private Limited, New Delhi, 2013.

COURSE OUTCOMES:

At the end of the course, students will be able to:		**Bloom's Level**
CO1	Explain the basic concepts of environment, energy sources and waste management	**K2**
CO2	Use different renewable energy resources and environment protection measures for sustainable development	**K3**
CO3	Conduct a case study on real-time environmental issues and present findings as a team	**-**

COs-POs & PSOs MAPPING:

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PSO1**	**PSO2**
CO1													
CO2	1												
CO3						2	2	2			2		
@	**1**					**2**	**2**	**2**			**2**		

1-low, 2-medium, 3-high @-Overall Contribution to the Course

25MC002 INDIAN CONSTITUTION
(Common to Civil, CSE, EEE, ECE, ICE, MECH, AI&DS and EE-VLSI)

2 0 0 0

INTRODUCTION: Evolution of Indian Constitution; significance of constitution; Composition; Preamble and its Philosophy. **(4)**

RIGHTS, DUTIES AND DIRECTIVE PRINCIPLES: Fundamental Rights- Writs and Duties, Directive Principles of State Policy. **(5)**

UNION GOVERNMENT: Union Government, President and Vice President, Houses of the Parliament and their functions; Types of Bills, Stages of passing of Bill into an Act, Veto Power, Constitution Amendment Procedure, Various Amendments made and their significance for India. **(6)**

STATE GOVERNMENT AND FEDERALISM: Composition of State Legislature; Powers, Functions and Position of Governor, Function of Chief Ministers, Council of Ministers; The Indian Federal System, Administrative Relationship between Union and States. **(8)**

JUDICIARY: Supreme Court, High Court; District Court and Lower Courts - Functions and Powers – Judges – Qualifications and Powers - Judicial Review. **(7)**

Total L: 30 periods

TEXT BOOKS:

1. Subash C Kashyap, '*Our Political System*'. National Book Trust, 2011.
2. Praveenkumar Mellalli E, '*Constitution of India, Professional Ethics and Human Rights*'. Sage Publications India Pvt. Ltd., 2015.

REFERENCES:

1. Briji Kishore Sharma, '*Introduction to the Constitution of India*'. Prentice Hall of India, 2010.
2. Basu D D, '*Introduction to the Constitution of India*'. Prentice Hall of India, 2016.
3. Jain. M C, '*The Constitution of India*'. Law House, New Delhi, 2001.
4. Shukla V N, '*Constitution of India*'. Eastern Book Company Ltd., New Delhi, 2011.

COURSE OUTCOMES:

At the end of the course, students will be able to:		**Bloom's Level**
CO1	Explain the evolution, significance, and philosophy of the Indian Constitution, including its Preamble, composition, and core principles.	**K2**
CO2	Analyze the structure, powers, and functions of the Union and State Governments, including the roles of the President, Parliament, Governor, and Council of Ministers, as well as the legislative process, types of bills, and constitutional amendments.	**K4**
CO3	Conduct a case study on the Indian Constitution, demonstrating understanding of its evolution, fundamental rights and duties, structure of Union and State governments, federal system, and the role of the judiciary in governance.	**-**

COs-POs & PSOs MAPPING:

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PSO1**	**PSO2**
CO1													
CO2	2												
CO3								2	2		2		
@	**2**							**2**	**2**		**2**		

1-low, 2-medium, 3-high @-Overall Contribution to the Course

25MC003 INDUSTRIAL SAFETY
(Common to Civil, CSE, EEE, ECE, ICE, MECH, AI&DS and EE-VLSI)

2 0 0 0

SAFETY TERMINOLOGIES: Hazard-Types of Hazard- Risk-Hierarchy of Hazards Control Measures-Lead indicators- lag Indicators-Flammability- Toxicity Time-weighted Average (TWA) - Threshold Limit Value (TLV) - Short Term Exposure Limit (STEL)- Immediately dangerous to life or health (IDLH)- acute and chronic Effects-Routes of Chemical Entry-Personnel Protective Equipment- Health and Safety Policy-Material Safety Data Sheet MSDS. **(6)**

STANDARDS AND REGULATIONS: Indian Factories Act-1948- Health- Safety- Hazardous materials and Welfare- ISO 45001:2018 occupational health and safety (OH&S) - Occupational Safety and Health Audit IS14489:1998- Hazard Identification and Risk Analysis- code of practice IS 15656:2006. **(6)**

SAFETY ACTIVITIES: Toolbox Talk- Role of safety Committee- Responsibilities of Safety Officers and Safety Representatives- Safety Training and Safety Incentives- Mock Drills- On-site Emergency Action Plan- Off-site Emergency Action Plan- Safety poster and Display- Human Error Assessment. **(6)**

WORKPLACE HEALTH AND SAFETY: Noise hazard- Particulate matter- musculoskeletal disorder improper sitting poster and lifting Ergonomics RULE & REBA- Unsafe act & Unsafe Condition- Electrical Hazards- Crane Safety- Toxic gas Release. **(6)**

HAZARD IDENTIFICATION TECHNIQUES: Job Safety Analysis-Preliminary Hazard Analysis-Failure mode and Effects Analysis- Hazard and Operability- Fault Tree Analysis- Event Tree Analysis Qualitative and Quantitative Risk Assessment- Checklist Analysis- Root cause analysis- What-If Analysis- and Hazard Identification and Risk Assessment. **(6)**

Total L: 30 periods

TEXTBOOKS

1. Jain R. K. and Sunil S. Rao, '*Industrial Safety, Health and Environment Management Systems*'. Khanna Publisher, 4th Edition, 2000.
2. Deshmukh L. M., *'Industrial Safety Management: Hazard Identification and Risk Control'.* McGraw-Hill Education, 2007.

REFERENCES

1. John Ridley, John Channing, '*Safety at Work*'. Routledge, 7th Edition, 2008.
2. Dan Petersen, '*Techniques of Safety Management*: *A System Approach*'. Amer Society of Safety Engineers, 4th Edition, 2003.

COURSE OUTCOMES

At the end of the course, students will be able to		Bloom's Level
CO1	Describe the safety protocols and standard operating procedures in industrial settings to ensure compliance with safety regulations and minimize hazards in the workplace.	**K2**
CO2	Implement and test emergency response plans tailored to the industrial environments, ensuring effective action during emergencies such as fires, chemical spills or equipment malfunctions.	**K3**
CO3	Review and present on risk assessments and hazards using industry-specific tools to identify potential safety risks and choose appropriate corrective actions to prevent accidents and injuries.	-

CO - PO & PSO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1													
CO2	2					2	2						
CO3						1	1	1	1		1		1
@	**2**					**2**	**2**	**1**	**1**		**1**		**1**

1 - low, 2- medium, 3 – high @-Overall Contribution to the Course

25MC004 DISASTER RISK REDUCTION AND MANAGEMENT
(Common to CSE, EEE, ECE, ICE, MECH, AI&DS and EE-VLSI)

2 0 0 0

HAZARDS, VULNERABILITY AND DISASTER RISKS: Definition: Disaster, Hazard, Vulnerability, Resilience, Risks – Types of Disasters: Natural, Human induced, Climate change induced – Earthquake, Landslide, Flood, Drought, Fire, etc. – Technological disasters - Structural collapse, Industrial accidents, oil spills - Causes, Impacts including social, Economic, political, environmental, health, psychosocial, etc.- Disaster vulnerability profile of India and Tamil Nadu - Global trends in disasters: urban disasters, pandemics, Complex emergencies, Inter relations between Disasters and Sustainable development Goals. **(6)**

DISASTER RISK REDUCTION (DRR): Sendai Framework for Disaster Risk Reduction, Disaster cycle - Community Based DRR, Structural – Non-structural measures, Roles and responsibilities of - community, Panchayati Raj Institutions / Urban Local Bodies (PRIs/ULBs), States, Centre, and other stakeholders - Early Warning System – Relevance of indigenous Knowledge, appropriate technology and Local resources. **(6)**

DISASTER MANAGEMENT: Components of Disaster Management – Preparedness of rescue and relief, mitigation, rehabilitation and reconstruction - Disaster Risk Management and post disaster management – Compensation and Insurance- Disaster Management Act (2005) and Policy - Institutional Processes and Framework at State and Central Level - (NDMA – SDMA – DDMA – NRDF - Civic Volunteers). **(6)**

TOOLS AND TECHNOLOGY FOR DISASTER MANAGEMENT: Early warning systems - Components of Disaster Relief: Water, Food, Sanitation, Shelter, Health, Waste Management, Institutional arrangements (Mitigation, Response and Preparedness) – Role of GIS and Information Technology in Disaster Management – Disaster Damage Assessment - Elements of Climate Resilient Development – Standard operation Procedure for disaster response – Financial planning for disaster Management. **(6)**

DISASTER MANAGEMENT: CASE STUDIES: Case studies in the context of disasters - Landslide Hazard Zonation, Earthquake Vulnerability Assessment of Buildings and Infrastructure, Drought Assessment, Coastal Flooding, Storm Surge Assessment, Floods: Fluvial and Pluvial Flooding, Forest Fire, Man Made disasters. **(6)**

Total L: 30 periods

TEXTBOOKS

1. Thomas D. Schneid, and Larry Collins, '*Disaster Management and Preparedness*'. CRC Publications, 2016.
2. R. Singh, '*Disaster Management Guidelines: Earthquakes, Landslides, Avalanches and Tsunami'*. Horizon Press Publications, 2017.
3. J. P. Singhal, '*Disaster Management'*. Laxmi Publications, 2024.
4. T. Bhattacharya, '*Disaster Science and Management'*. McGraw Hill India Education Pvt. Ltd., 2012.

REFERENCES

1. Government of India, '*Disaster Management Act'*. New Delhi, 2005.
2. Government of India, '*National Disaster Management Policy'*. New Delhi, 2009.
3. R. Shaw, '*Community based Disaster risk reduction*'. Natural Hazard Science, Oxford Research Encyclopedias, 2016.

COURSE OUTCOMES

At the end of the course, students will be able to:		**Bloom's Level**
CO1	Summarize the concepts, tools, technologies and strategies for disaster risk reduction and management.	**K2**

COs-POs & PSOs MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1					1	1	1	1	1		1		
@					**1**	**1**	**1**	**1**	**1**		**1**		

1-low, 2-medium, 3-high @-Overall Contribution to the Course