JKK MUNIRAJAH COLLEGE OF TECHNOLOGY

Approved by AICTE & Affiliated to Anna university,
(Autonomous)
T.N.PALAYAM-ERODE
Regulations 2024 (UG)
Curriculum and Syllabus
B.E-AUTOMOBILE ENGINEERING

B.E/B.TECH REGULATION 2024

CHOICE BASED CREDIT SYSTEM

B.E-AUTOMOBILE ENGINIEERING

CURRICULUM AND SYLLABI

For the Student Admitted form the academic year 2024-2025

Version 1.0	Date:14.08.2024

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B.E-AUTOMOBILE ENGINEERING

I. INSTITUTION VISION & MISSION

VISION

- To create and Mold students as engineers with adequate core and interdisciplinary knowledge and skills for the welfare of mankind and society through quality education for students with value added education and Ethical values.

MISSION

- To mould our students in the attainment of professional competence for coping with the rapid and challenging advancements in technologies and the ever changing world of business, industry and services.
- To help and guide our students in their personal growth shaping them into mature and responsible individuals.
- Providing rigorous academic knowledge to the students through high quality education, training models and research activities.
- Providing platform to the students for holistic development with participation in co-curricular and extracurricular activities.

II. DEPARTMENT OF AUTOMOBILE ENGINEERING

VISION

To impart quality education, skills and attributes based on global standards and local industrial requirement and hence emerge as centre for advance studies and research.

MISSION

- To impart quality education through demanding academic programme.
- To enhance career opportunities for students through exposure to industry.
- To promote excellence by encouraging creativity, critical thinking and discipline.
- To inculcate sensitivity towards society and a respect for the environment.

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PROGRAM EDUCATIONAL OBJECTIVE (PEO)

PEO1: Abilities to apply the acquired knowledge in automobile domain in the design and development of innovative solutions in the automobile industries.

PEO2: Knowledge and skills towards hybrid vehicle design, development and maintenance.

III. PROGRAM OUTCOMES (POS)

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

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

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

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions

5. Modern tool usage: Create, select, and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability; Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8.Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

IV. PROGRAM SPECIFIC OUTCOMES(PSO)

PSO1: Abilities to apply the acquired knowledge in automobile domain in the design and development of innovative solutions in the automobile industries.

PSO2: Knowledge and Skills towards hybrid vehicle design, development and maintenance.

MAPPING OF COURSE OUTCOMES WITH PROGRAM OUTCOME																
Year	**Sem**	**Course name**	**PO**												**PSO**	
			1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
I	**I**	Induction Programme	-													
		Technical English-I	-	-	-	2	-	1	-	-	2.4	3	-	2.6	-	-
		Matrices and Differential Calculus	3	3	1	-	-	-	-	-	-	-	-	-	-	-
		Engineering Physics	3	1.2	1.2	1	-	-	-	1.2	1	1.4	1.2	1.4	-	-
		Engineering Chemistry	2	2	2	1	-	1	1	-	-	-	-	1	-	-
		Fundamentals of Computing & programming in C	2	2	2	2	1.6	1.6	1.6	0.8	0.4	0.4	0.4	-	2	1.6
		Heritage of Tamils	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Programming in C Laboratory	**2**	**3**	**3**	**1**	**2**	**-**	**-**	**-**	**1**	**1**	**-**	**2**	**3**	**3**
		Physics and Chemistry Laboratory	3	3	1	1	-	-	-	-	-	-	-	-	-	-
			3	2	1	-	1	3	2	1	-	-	-	1	-	-
		Communication Skills-I	-	-	-	2	-	1	-	-	2	3	-	3	-	-
	II	Technical English-II	-	1	1	-	-	-	1	1	2	3	-	2	-	-
		Statistics and Numerical Methods	3	3	1	1	1	-	-	-	2	-	2	3	-	-
		Material Science	3	1	2	1	2	1	1	1	-	-	-	-	-	-
		Basic Electrical and Electronics Engineering	3	3	2	2	-	-	-	-	-	1	-	-	3	3
		Tamils and Technology	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Engineering Graphics	3	2	3	3	2	-	-	-	3	2	3	3	3	3
		Basic Electrical and Electronics Engineering Laboratory	3	2	-	-	1	1	1	-	-	-	-	2	2	1
		Engineering Practices Laboratory	3	2	-	-	1	1	1	-	-	-	-	2	2	1
		Communication Skills-II	-	-	-	2	-	1	-	-	2	3	-	3	-	-

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SUMMARY OF CREDITS

SEMESTER-WISE CREDITS DISTRIBUTION											
SUMMARY											
Sr.No	Course Category	Credits per Semester								Credits	Credit %
		I	II	III	IV	V	VI	VII	VIII		
1	HS	7	4	4	2					**17**	10.17%
2	BS	10	7							**17**	10.17%
3	ES	7	9							**16**	9.58%
4	PC			20	16	21	10	7		**74**	44.31%
5	PE					4	7	4		**15**	8.98%
6	OE						4	8		**12**	7.18%
7	EEC	1	1	1	1	1	1	1		**7**	4.19%
8	MC/NC/AC/PW	0	0						9	**9**	5.38%
TOTAL		**25**	**21**	**25**	**19**	**26**	**22**	**20**	**9**	**167**	**100%**

CATEGORIZATION OF COURSES

i. Foundation Courses (FC)
ii. Research Methodology & IPR Courses (RMC)
iii. Professional Cores (PC)
iv. Professional Elective Courses (PEC)
v. Employability Enhancement Courses (EEC

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B.E-AUTOMOBILE ENGINEERING

SEMESTER III

S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	Max. Marks		
				L	T	P			CIA	ESE	TM
THEORY											
1	24AU301	Spark Ignition Engines	PC	3	0	0	3	3	40	60	100
2	24AU302	Mechanics of Machines	PC	3	0	0	3	3	40	60	100
3	24AU303	Automotive Engines	PC	3	0	0	3	3	40	60	100
4	24MA304	Transforms and Partial Differential Equations	HS	3	1	0	4	4	40	60	100
5	24AU305	Automotive Chassis	PC	3	0	0	3	3	40	60	100
THEORY CUM PRACTICAL COURSE											
6	24AU306	Strength of Materials	PC	2	0	2	3	3	60	40	100
PRACTICALS											
7	24AU307	Automotive Components Laboratory	PC	0	0	4	4	2	60	40	100
8	24AU308	Computer Aided Machine Drawing	PC	0	0	4	4	2	60	40	100
EMPLOYABILITY ENHANCEMENT COURSE											
9	24EEC309	Soft skills and Effective Communication	EEC	1	0	0	1	1	100	0	100
Total				**18**	**1**	**10**	**28**	**24**			

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SEMESTER IV

S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	Max. Marks		
				L	T	P			CIA	ESE	TM
THEORY											
1	24CY401	Environmental Science and Engineering	HS	2	0	0	2	2	40	60	100
2	24AU402	Engineering Materials and Metallurgy	PC	3	0	0	3	3	40	60	100
3	24AU403	Compression Ignition Engines	PC	3	0	0	3	3	40	60	100
4	24AU404	Vehicle Body Engineering	PC	3	0	0	3	3	40	60	100
THEORY CUM PRACTICAL COURSE											
5	24AU405	Fuels and Lubricants	PC	2	0	2	3	3	60	40	100
PRACTICALS											
EMPLOYABILITY ENHANCEMENT COURSE											
6	24EEC408	Personality Development	EEC	1	0	0	1	1	100	0	100
Total				**14**	**0**	**2**	**15**	**15**			

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SEMESTER V

S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	Max. Marks		
				L	T	P			CIA	ESE	TM
THEORY											
1	24AU501	Lean Manufacturing	PC	3	0	0	3	3	40	60	100
2	24AU502	Off Road Vehicles	PC	3	0	1	4	4	40	60	100
3	24AU503	Transport Management	PC	3	0	1	4	4	40	60	100
4	24AU504	Vehicle Body Engineering	PC	3	0	0	3	3	40	60	100
5	-	Professional Elective-I	PE	3	0	2	4	4	50	50	100
THEORY CUM PRACTICAL COURSE											
6	24AU505	Two and Three Wheelers	PC	2	0	2	3	3	60	40	100
PRACTICALS											
7	24AU506	CAD/CAM Laboratory	PC	0	0	4	4	2	60	40	100
EMPLOYABILITY ENHANCEMENT COURSE											
8	24EEC507	Aptitude Skills	EEC	1	0	0	1	1	100	0	100
Total				**18**	**0**	**10**	**26**	**24**			

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SEMESTER VI

S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	Max. Marks		
				L	T	P			CIA	ESE	TM
THEORY											
1	24AU601	Non Destructive Testing	PC	3	0	0	3	3	40	60	100
2	24AU602	Unconventional Machining Process	PC	3	0	1	4	4	40	60	100
3	-	Professional Elective-II	PE	3	0	1	4	4	50	50	100
4	-	Professional Elective-III	PE	3	0	0	3	3	50	50	100
5	-	Open Elective-I	OE	3	0	2	4	4	50	50	100
THEORY CUM PRACTICAL COURSE											
6	24AU603	Vehicle Maintenance	PC	2	0	2	3	3	60	40	100
PRACTICALS											
7	24PW605	Mini Project	PW	0	0	2	2	1	60	40	100
EMPLOYABILITY ENHANCEMENT COURSE											
8	24EEC606	Aptitude Skills	EEC	1	0	0	1	1	100	0	100
Total				**18**	**0**	**8**	**24**	**23**			

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SEMESTER VII

S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	Max. Marks		
				L	T	P			CIA	ESE	TM
THEORY											
1	24AU701	Plastic Materials For Automobile Engineers	PC	3	0	0	3	3	40	60	100
2	-	Professional Elective-IV	PC	3	0	1	4	4	40	60	100
3	-	Professional Elective-V	PE	3	0	1	4	4	50	50	100
4	-	Open Elective-II	OE	3	0	2	4	4	50	50	100
5	-	Open Elective-III	OE	3	0	2	4	4	50	50	100
PRACTICALS											
6	24AU702	Summer Internship	EEC	0	0	0	0	1	0	0	100
EMPLOYABILITY ENHANCEMENT COURSE											
7	24AU704	Technical Comprehension and Mock Interview	EEC	1	0	0	1	1	100	0	100
Total				**16**	**0**	**6**	**20**	**21**			

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SEMESTER VIII											
S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	Max. Marks		
				L	T	P			CIA	ESE	TM
THEORY											
PRACTICALS											
1	24AU801	Project Work	PW	0	0	18	18	9	60	40	100
Total				**3**	**0**	**18**	**18**	**9**			

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PROFESSIONAL ELECTIVE COURSES

ELECTIVE I – SEMESTER V

S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	Max.Marks		
				L	T	P			CIA	ESE	TM
1.	24PE501	Composite Materials	PE	3	0	2	4	4	50	50	100
2.	24PE502	New Generation and Hybrid Vehicles	PE	3	0	2	4	4	50	50	100
3.	24PE503	Transport Management	PE	3	0	2	4	4	50	50	100
4.	24PE504	Engine and Vehicle Management System	PE	3	0	2	4	4	50	50	100
5.	24PE505	Manufacturing of Automotive Components	PE	3	0	2	4	4	50	50	100
6.	24PE506	Advanced Automotive Materials	PE	3	0	2	4	4	50	50	100
7.	24PE507	Computer Integrated Manufacturing in Automotive Sector	PE	3	0	2	4	4	50	50	100

ELECTIVE II – SEMESTER VI

S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	Max.Marks		
				L	T	P			CIA	ESE	TM
1.	24PE601	Disaster Management	PE	3	0	2	4	4	50	50	100
2.	24PE602	Hydraulics and Pneumatics	PE	3	0	2	4	4	50	50	100
3.	24PE603	Metrology and Measurements	PE	3	0	2	4	4	50	50	100
4.	24PE604	Marine Vehicles	PE	3	0	2	4	4	50	50	100
5.	24PE605	Professional Ethics in Engineering	PE	3	0	2	4	4	50	50	100
6.	24PE606	Automotive Air-Conditioning	PE	3	0	2	4	4	50	50	100
7.	24PE607	Finite Element Analysis	PE	3	0	2	4	4	50	50	100

ELECTIVE III – SEMESTER VI											
S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	Max.Marks		
				L	T	P			CIA	ESE	TM
1.	24PE608	Operations Research	PE	3	0	2	4	4	50	50	100
2.	24PE609	Fundamentals of Nano science	PE	3	0	2	4	4	50	50	100
3.	24PE610	Process Modeling and Simulation	PE	3	0	2	4	4	50	50	100
4.	24PE611	Agricultural Finance, Banking and Co -operation	PE	3	0	2	4	4	50	50	100
5.	24PE612	Product Life Cycle Management	PE	3	0	2	4	4	50	50	100
6.	24PE613	Turbo Machines	PE	3	0	2	4	4	50	50	100
7.	24PE614	Advanced Vehicle Engineering	PE	3	0	2	4	4	50	50	100

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ELECTIVE IV – SEMESTER VII											
S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	Max.Marks		
				L	T	P			CIA	ESE	TM
1.	24PE701	Precision Manufacturing	PE	3	0	2	4	4	50	50	100
2.	24PE702	Power Plant Engineering	PE	3	0	2	4	4	50	50	100
3.	24PE703	Energy Saving Machinery and Components	PE	3	0	2	4	4	50	50	100
4.	24PE704	Smart Mobility and Intelligent Vehicles	PE	3	0	2	4	4	50	50	100
5.	24PE705	Conventional and Futuristic Vehicle Technology	PE	3	0	2	4	4	50	50	100
6.	24PE706	Automotive Chassis Components Design	PE	3	0	2	4	4	50	50	100

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OPEN ELECTIVE COURSES

ELECTIVE I – SEMESTER VI											
S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	Max.Marks		
				L	T	P			CIA	ESE	TM
1.	24OE601	Gas Dynamics and Jet Propulsion	OE	3	0	0	3	3	40	60	100
2.	24OE602	Industrial Safety Engineering	OE	3	0	0	3	3	40	60	100
3.	24OE603	Construction Vehicles	OE	3	0	0	3	3	40	60	100
4.	24OE604	Fibre Reinforced Plastics	OE	3	0	0	3	3	40	60	100
5.	24OE605	Lean Manufacturing	OE	3	0	0	3	3	40	60	100
6.	24OE606	Product Design and Development	OE	3	0	0	3	3	40	60	100

ELECTIVE II – SEMESTER VII											
S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	Max.Marks		
				L	T	P			CIA	ESE	TM
1.	24OE701	Air Pollution and Control Engineering	OE	3	0	0	3	3	40	60	100
2.	24OE702	Automotive Systems	OE	3	0	0	3	3	40	60	100
3.	24OE703	Internal Combustion Engines	OE	3	0	0	3	3	40	60	100
4.	24OE704	World Class Manufacturing	OE	3	0	0	3	3	40	60	100
5.	24OE705	Renewable Energy Sources	OE	3	0	0	3	3	40	60	100
6.	24OE706	Introduction To Nanotechnology	OE	3	0	0	3	3	40	60	100

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ELECTIVE III – SEMESTER VII											
S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	Max.Marks		
				L	T	P			CIA	ESE	T M
1.	24OE707	Selection of Materials	OE	3	0	0	3	3	40	60	100
2.	24OE708	Marine Vehicles	OE	3	0	0	3	3	40	60	100
3.	24OE709	Electric Two and Three Wheelers	OE	3	0	0	3	3	40	60	100
4.	24OE710	Computer Aided Design and Manufacturing	OE	3	0	0	3	3	40	60	100
5.	24OE711	Transport Management	OE	3	0	0	3	3	40	60	100
6.	24OE712	Additive Manufacturing	OE	3	0	0	3	3	40	60	100

24MA102	MATRICES AND DIFFERENTIAL CALCULUS				Version : 1.0
DEPARTMENT OF SCIENCE AND HUMANITIES					
Programme & Branch	Common to all B.E / B.Tech Degree	L	T	P	C
		3	1	0	4

COURSE OBJECTIVES

- To develop a deep understanding of Matrices, including Eigenvalues, Eigenvectors, and Quadratic forms, and their Applications in various Mathematical problems.
- To provide students with a Comprehensive foundation in Differential calculus, focusing on practical applications such as Curvature, Evolutes and Envelopes.
- To equip students with the skills to handle Functions of Several Variables, including Partial differentiation, Jacobians, and Optimization Techniques.
- To teach methods for solving Ordinary differential equations, both with constant and variable coefficients, using various Techniques.
- To introduce the concepts and applications of Multiple Integrals in calculating areas and volumes, emphasizing their use in real-world problems.

UNIT - I	MATRICES	9+3

Eigen values and Eigenvectors of a real matrix – Characteristic equation – Properties of Eigen values and Eigenvectors – Cayley - Hamilton theorem (statement and problems only)– Diagonalization of matrices by Orthogonal transformation – Reduction of a Quadratic form to Canonical form by Orthogonal transformation – Nature of quadratic forms.

UNIT - II	APPLICATIONS OF DIFFERENTIAL CALCULUS	9+3

Limit of a function - Differentiation rules (sum, product and quotient rules) - Curvature in Cartesian co-ordinates – Centre of Curvature – Radius of Curvature – Circle of Curvature – Evolutes – Envelopes - Evolute as envelope of Normals.

UNIT - III	FUNCTIONS OF SEVERAL VARIABLES	9+3

Partial differentiation – Homogeneous functions and Euler's theorem– Jacobians – Taylor's series for functions of two variables – Applications: Maxima and minima of functions of two variables and Lagrange's method of undetermined Multipliers.

UNIT - IV	ORDINARY DIFFERENTIAL EQUATIONS	9+3

Linear differential equations of second and higher order with constant coefficients - Particular Integrals for the types: e^{ax} – cos ax / sin ax – x^n – $e^{ax}x^n$,e^{ax} sinbx and e^{ax} cos bx – x^n sin ax and x^n cosa x –

JKKMCT APPROVED AUTONOMOUS

Chairman
Board of Science and Humanities
J.K.K.Munirajah College of Technology
(Autonomous)
T.N.Palayam, Gobi (Tk),
Erode (Dt) - 638 506.

Method of variation of parameters - Differential Equations with variable coefficients: Euler-Cauchy's equation – Legendre's equation.

UNIT - V	MULTIPLE INTEGRALS	9+3

Double integrals– Change of order of integration – Double integrals in Cartesian coordinates – Area enclosed by plane curves – Triple integrals – Volume of solids.

TOTAL: 60 PERIODS

COURSE OUTCOMES

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

CO1: Compute Eigen values and Eigenvectors, apply the Cayley - Hamilton theorem, and perform matrix Diagonalization and Quadratic form reduction

CO2: Proficient in using Differential calculus techniques to solve problems involving Curvature, Evolutes, and Envelopes

CO3: Understand and apply Partial Differentiation, Euler's theorem, and Jacobian matrices to solve Optimization problems involving several variables.

CO4: Solve second and higher-order ordinary differential equations using various methods, including the method of variation of parameters.

CO5: Evaluate double and triple integrals to find areas and volumes, demonstrating an understanding of their applications in physical contexts.

TEXT BOOKS

1. Grewal.B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 44th Edition , 2018.
2. James Stewart, "Calculus: Early Transcendentals", Cengage Learning, 8th Edition, New Delhi, 2015.
3. M. D. Raisinghania, "Ordinary and Partial Differential equations", S.Chand publications, 13th edition, 2011.

REFERENCE BOOKS

1. Anton. H, Bivens. I and Davis. S, "Calculus", Wiley, 10th Edition, 2016
2. Bali. N., Goyal. M. and Watkins. C., "Advanced Engineering Mathematics", Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.,), New Delhi, 7th Edition, 2009.
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4. https://www.youtube.com/watch?v=hby7wFjcMTk
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MAPPING OF COs With POs AND PSOs														
COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	1	0	0	0	0	0	0	0	0	0	-	-
CO2	3	3	1	0	0	0	0	0	0	0	0	0	-	-
CO3	3	3	1	0	0	0	0	0	0	0	0	0	-	-
CO4	3	3	1	0	0	0	0	0	0	0	0	0	-	-
CO5	3	3	1	0	0	0	0	0	0	0	0	0	-	-
AVG	**3**	**3**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	-	-

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24PH103	ENGINEERING PHYSICS				Version : 1.0
DEPARTMENT OF SCIENCE AND HUMANITIES					
Programme & Branch	Common to all B.E / B.Tech Degree	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES

- To make the students effectively achieve an understanding of mechanics.
- To enable the students to gain knowledge of electromagnetic waves and its applications.
- To introduce the basics of fiber optics and lasers.
- Equipping the students to successfully understand the background of quantum physics.
- To motivate the students towards the applications of quantum mechanics.

UNIT - I	MECHANICS	9

Multi-particle dynamics: Center of mass (CM) – CM of continuous bodies -- theorems of M .I – Moment of Inertia of a diatomic molecule (derivation)– conservation of angular momentum – rotational energy state of a rigid diatomic molecule - torsional pendulum--Expression for Rigidity Modulus and moment of inertia- Introduction to nonlinear oscillations.

UNIT - II	ELECTROMAGNETIC WAVES	9

The Maxwell's equations - wave equation; Plane electromagnetic waves in vacuum – properties of electromagnetic waves: speed, amplitude, phase, orientation of waves in matter- Cell-phone reception.Reflection and transmission of electromagnetic waves from a non-conducting medium

UNIT - III	FIBER OPTICS AND LASERS	9

Introduction to optical fiber - total internal reflection –Expression for numerical aperture and Acceptanceangle - Theory of laser - characteristics - Spontaneous and stimulated emission - Einstein's coefficients (derivation)- population inversion - CO_2 laser, Semiconductor laser (Homojunction and Hetero -junction0 –Basic applications of lasers in Industry.

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WEB REFERENCES

- https://www.poriyaan.in/paper/engineering-physics-3
- https://www.msajce-edu.in/academics/sh/LectureNote/PH3151-LN.pdf
- https://rajeshvcet.home.blog/wp-content/uploads/2022/01/unit-3-laser-reg-2021.pdf
- https://rajeshvcet.home.blog/wp-content/uploads/2022/02/unit-4-basic-quantum-physics-reg-2021-1.pdf
- https://rajeshvcet.home.blog/wp-content/uploads/2022/02/unit-5-advanced-quantum-physics-reg-2021.pdf

MAPPING OF COs With POs AND PSOs

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1	-	-	-	-	2	1	1	2	2	-	-	-
CO2	3	1	1	1	-	-	-	1	1	1	1	2	-	-	-
CO3	3	2	1	-	-	-	-	1	1	1	1	1	-	-	-
CO4	3	1	1	-	-	-	-	1	1	2	1	1	-	-	-
CO5	3	1	2	1	-	-	-	1	1	2	1	1	-	-	-
AVG	3	1.2	1.2	1	-	-	-	1.2	1	1.4	1.2	1.4	-	-	-

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24CY104	ENGINEERING CHEMISTRY				Version : 1.0
DEPARTMENT OF SCIENCE AND HUMANITIES					
Programme & Branch	Common to all B.E / B.Tech Degree	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES

- To make the students conversant with boiler feed water requirements, related problems and water treatment techniques.
- To acquaint the students with the basics of nano materials, their properties and applications.
- To develop an understanding of the basic concepts of phase rule and its applications to single and two component systems and appreciate the purpose and significance of alloys.
- To facilitate the understanding of different types of fuels, their preparation, properties and combustion characteristics.
- To familiarize the students with the operating principles, working processes and applications of energy conversion and storage devices.

UNIT - I	WATER AND ITS TREATMENT	9

Hardness of water – types – expression of hardness – units – estimation of hardness of water by EDTA – numerical problems – **boiler troubles** (scale and sludge) – **treatment of boiler feed water** – Internal treatment (phosphate, colloidal, sodium aluminate and calgon conditioning) external treatment – Ion exchange process, zeolite process – **desalination of brackish water** - Reverse Osmosis.

UNIT - II	NANO MATERIALS AND FABRICATION	9

Basic Definitions of Nanomaterials- Distinction between molecules, nanomaterials and bulk materials; **Types of nanomaterials**: Definition, properties and uses of – nanoparticle, nanocluster, nanorod, nanowire and nanotube (CNT). **Preparation of nanomaterials**: sol-gel, solvothermal, laser ablation, chemical vapour deposition, electrochemical deposition. **Applications of nanomaterials** in medicine, agriculture, energy, electronics and catalysis.

UNIT - III	PHASE RULE AND ALLOYS	9

Phase rule: Introduction, definition of terms with examples – **one component system** – water system – **condensed phase rule** – construction of phase diagram by thermal analysis – **simple eutectic systems** (lead-silver system only). **Alloys** – importance, ferrous alloys – nichrome and stainless steel – heat treatment of steel, non-ferrous alloys – brass and bronze.

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UNIT - IV	FUELS AND COMBUSTION	9

Fuels: Introduction - classification of fuels - **coal** - analysis of coal (proximate) - carbonization - manufacture of metallurgical coke (Otto Hoffmann method) - **petroleum** - manufacture of synthetic petrol (Bergius process) - knocking - octane number - diesel oil - cetane number - **natural gas** - compressed natural gas (CNG) - liquefied petroleum gases (LPG) - power alcohol and biodiesel. **Combustion of fuels**: Introduction - calorific value - higher and lower calorific values- theoretical calculation of calorific value - ignition temperature - spontaneous ignition temperature - flue gas analysis (ORSAT Method).

UNIT - V	ENERGY SOURCES AND STORAGE DEVICES	9

Non-Renewable Energy Sources - Nuclear fission - controlled nuclear fission - nuclear fusion - differences between nuclear fission and fusion - nuclear chain reactions - nuclear energy - light water nuclear power plant - breeder reactor - **Renewable Energy Sources** - Solar energy conversion - solar cells - wind energy.

Batteries: Types of batteries, Primary battery - dry cell, Secondary battery - lead acid battery and lithium-ion-battery; Electric vehicles-principles, working; Fuel cells: H_2-O_2 fuel cell, microbial fuel cell.

TOTAL: 45 PERIODS

COURSE OUTCOMES

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

CO1: Obtain the knowledge of water treatment in engineering field

CO2: Identify the basic concepts of Nano science and nanotechnology in designing the synthesis of nanomaterial for engineering and technology applications.

CO3: Apply the knowledge of phase rules and alloys.

CO4. Recommend suitable fuels for engineering processes and applications.

CO5. Recognize different forms of energy resources and apply them for suitable applications in energy sect.

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4. Kannan P., Ravikrishnan A., "Engineering Chemistry", Sri Krishna Hi-tech Publishing Company Pvt. Ltd. Chennai, 2024-2025.
5. S. Vairam, P. Kalyani and Suba Ramesh, "Engineering Chemistry", Wiley India PVT, LTD, New Delhi, 2021.

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2. PrasantaRath, "Engineering Chemistry", Cengage Learning India PVT, LTD, Delhi, 2015
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4. Ozin G. A. and Arsenault A. C., "Nanochemistry: A Chemical Approach to Nanomaterials", RSC Publishing, 2015.
5. O.G. Palanna, "Engineering Chemistry" McGraw Hill Education (India) Private Limited, 2nd Edition, 2017.
6. Friedrich Emich, "Engineering Chemistry", Scientific International PVT, LTD, New Delhi, 2014.

MAPPING OF COs With POs AND PSOs

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	2	1	2	2	2	1	-	-	-	1	-	-	-
CO2	2	2	1	1	2	1	1	0	-	-	-	1	-	-	-
CO3	2	2	2	1	1	1	1	0	-	-	-	1	-	-	-
CO4	2	2	1	1	1	1	1	0	-	-	-	1	-	-	-
CO5	2	1	3	2	1	2	1	0	-	-	-	1	-	-	-
AVG	2.0	1.8	1.8	1.2	1.4	1.4	1.2	0.2	-	-	-	1	-	-	-

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24CS105	FUNDAMENTALS OF COMPUTING AND PROGRAMMING IN C	Version : 1.0			
Common to all B.E/B.Tech Degree					
Programme & Branch	B.E – COMPUTER SCIENCE AND ENGINEERING	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES

- To Understand and analyze foundational concepts in computer systems.
- To understand the fundamentals of C programming and its structure.
- To apply fundamental programming constructs and functions in decision-making and iterative Processes.
- To evaluate proficiency in manipulating arrays and strings, and applying fundamental programming operations.
- To apply and evaluate fundamental concepts and advanced applications of pointers, structures, and file handling in C programming.

UNIT - I	BASICS OF COMPUTERS	9

Introduction to Computers -Input and Output Devices -Computer Memory and Processors - Computer Software - Computer Networks and Internet - **Computer Organization and Architecture**: Central Processing Unit - Internal Communications - The Bus - **Operating Systems**: History of Operating Systems- Types of Operating Systems- Security and privacy.

UNIT - II	INTRODUCTION TO C PROGRAMMING	9

Introduction to C– Structure of C Program – Writing the First C Program - Compiling and Executing C Programs -Using Comments – Keywords – Identifiers – Basic Data Types in C – Variables – Constants – I/O Statements in C- Operators in C- Programming Examples – Type Conversion and Type Casting.

UNIT - III	DECISION CONTROL AND LOOPING STATEMENTS	9

Introduction to Decision Control Statements – Conditional Branching Statements – Iterative Statements – Nested Loops – Break and Continue Statement – Goto Statement- Functions: Introduction – Function Definition – Function Declaration/ Prototype - Function Call – Return Statement – Passing Parameters – Scope of Variables – Storage Classes – Recursive Function.

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UNIT - IV	ARRAYS	9

Arrays: Introduction – Declaration Of Arrays – Accessing Elements Of the Array – Storing Values in Array – Calculating the Length of the Array – Operations on Array – One Dimensional Array– Two Dimensional Arrays – Operations on Two Dimensional Arrays- Strings: Introduction -String and Character Functions.

UNIT - V	POINTERS AND FILES	9

Introduction to Pointers – Declaring Pointer Variables – Pointer Expressions and Pointer Arithmetic – Null Pointers – Generic Pointers - Passing Arguments to Functions using Pointer – Pointer and Arrays–Introduction to Structure – Nested Structures – Arrays Of Structures – Unions- Introduction To Files – Using Files in C – Reading Data from Files – Writing Data from Files – Detecting the End-of-File –Close a File – Random Access Files – Binary Files – Command Line Arguments.

TOTAL: 45 PERIODS

COURSE OUTCOMES

Upon Completion of the Course, The Students Will Be Able To

- Students will be able to Understand and explain the components and functions of computer systems.
- Identify basic elements of C programming (keywords, identifiers, data types).
- Students will be able to analyze programming problems, design solution, and implement them effectively using functions.
- Students will be able to analyze, apply, and create programs that manipulate arrays and strings.
- Students will be able to analyze, evaluate, and apply pointer arithmetic, structure, and file manipulation techniques.

TEXT BOOKS

1. "Fundamentals of Computers" by Reema Thareja from Oxford University Press, 2023.
2. "Windows 10: The missing Manual" by David Pogue, O'Reily First Edition.2022.
3. Ashok.N.Kamthane, "Computer Programming", Pearson Education (India) (2020).
4. E.Balagurusamy, (2020), Programming in ANSI C, Fifth Edition, and Tata McGraw- Hill Publications.

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2. Henry Mullish& Herbert L Cooper, (2021), "The Spirit of C", 30th Edition, West Publishing Company.
3. Pradip Dey, Manas Ghoush, "Programming in C", Oxford University Press. (2016).
4. Stephen G.Kochan, "Programming in C", 4th Edition, Pearson Education India,(2014).
5. Brian W.Kernighan and Dennis M.Ritchie, "The C Programming Language", Pearson Education Inc., (2005).
6. S.Thamarai Selvi and R.Murugan, "C for All", Anuradha Publishers, (2008).

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2. https://www.tutorialspoint.com/cprogramming/index.htm
3. https://www.javatpoint.com/c-programming-language-tutorial

VIDEO REFERENCES

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2. https://youtu.be/EjavYOFoJJ0?si=Via8CM3xAvmKfMab
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COURSE REFERENCES

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3. https://www.udemy.com/course/introduction-to-the-c-language/
4. https://www.coursera.org/courses?query=c%20programming

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MAPPING OF COs With POs AND PSOs														
COs	POs												PSO`s	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	2	-	-	-	-	-	-	-	-	2	2
CO2	2	2	2	2	2	2	2	-	-	-	-	-	2	2
CO3	2	2	2	2	2	2	2	2	-	-	-	-	2	2
CO4	2	2	2	2	2	2	2	-	-	-	-	-	2	-
CO5	2	2	2	2	2	2	2	2	2	2	2	-	2	2
AVG	2	2	2	2	1.6	1.6	1.6	0.8	0.4	0.4	0.4	-	2	1.6

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24TA106	தமிழர் மரபு	Version : 1.0
அறிவியல் மற்றும் மனிதநேயம் தமிழ் துறை		

Programme & Branch	அனைத்து துறைகளுக்கும் பொதுவானது (B.E / B.Tech)	L	T	P	C
		1	0	0	1

முன் கூட்டிய துறைசார் அறிவு: தேவை இல்லை

அலகு - I	மொழி மற்றும் இலக்கியம்	3

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

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

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

அலகு - III	நாட்டுப்புறக் கலைகள் மற்றும் வீர விளையாட்டுகள்	3

தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான் கூத்து, ஒயிலாட்டம், தோல்பாவைக் கூத்து, சிலப்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் விளையாட்டுகள்.

அலகு - IV	தமிழர்களின் திணைக் கோட்பாடுகள்	3

தமிழகத்தின் தாவரங்களும், விலங்குகளும் - தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக்கோட்பாடுகள்- தமிழர்கள் போற்றிய அறக்கோட்பாடு- சங்கக்காலத்தில் தமிழகத்தில் எழுத்தறிவும் கல்வியும் - சங்ககால நகரங்களும் துறைமுகங்களும் - சங்ககாலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி – கடல் கடந்த நாடுகளில் சோழர்களின் வெற்றி.

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

இந்திய விடுதலைப் போரில் தமிழர்களின் பங்கு - இந்தியாவின் பிற பகுதிகளில் தமிழ் பண்பாட்டின் தாக்கம் - சுயமரியாதை இயக்கம்- இந்திய மருத்துவத்தில் சித்த மருத்துவத்தின் பங்கு கல்வெட்டுகள் கையெழுத்துப்படிகள்- தமிழ்ப் புத்தகங்களின் அச்சு வரலாறு.

TOTAL: 15 PERIODS

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பாடம் கற்றதின் விளைவுகள்:
பாடத்தை வெற்றிகரமாக கற்று முடித்த பிறகு, மாணவர்களால் முடியும் விளைவுகள்
CO1: தமிழ் மொழியின் செந்தன்மை மற்றும் இலக்கியம் குறித்த தெரிதல்.
CO2: தமிழர்களின் சிற்பக்கலை, ஓவியக்கலை மற்றும் இசைக்கருவிகள் குறித்த தெளிவு.
CO3: தமிழர்களின் நாட்டுப்புறக் கலைகள் மற்றும் வீரவிளையாட்டுகள் குறித்த தெளிவு.
CO4: தமிழர்களின் திணைக்கோட்பாடுகள், சங்ககால வணிகம் மற்றும் சோழர்களின் வெற்றிகள் குறித்த தெளிவு.
CO5: இந்திய தேசிய இயக்கம், சுயமரியாதை இயக்கம் மற்றும் சித்த மருத்துவம் பற்றிய புரிதல்.

TEXT BOOKS

1. "தமிழக வரலாறு - மக்களும் பண்பாடும்" கே கே பிள்ளை (வெளியீடு தமிழ்நாடு பாடநூல் மற்றும் கல்வியில் பணிகள் கழகம்) உலக தமிழாராய்ச்சி நிறுவனம், சென்னை, 2022.
2. கணினித்தமிழ் முனைவர் இல. சுந்தரம், விகடன்பிரசுரம், 2016

REFERENCE BOOK

1. கீழடி- வைகை நதிக்கரையில் சங்ககால நகரநாகரிகம் (தொல்லியல் துறை வெளியீடு)
2. பொருநை – ஆற்றங்கரை நாகரிகம் (தொல்லியல் துறை வெளீயிடு
3. Social Life of Tamils (Dr.K.K.Pillay) A joint Publication of TNTB & ESC and RMRL- (in print)
4. Social Life of the Tamils – The Classical Period (Dr. S.Sigaravelu)(Published by: International Institute of Tamil Studies).

MAPPING OF COs With POs AND PSOs

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	1	-	-	-	-	1	-	1	-	-	-
CO2	-	-	-	-	-	-	-	-	3	1	-	2	-	-	-
CO3	-	-	-	-	-	-	-	-	3	1	-	2	-	-	-
CO4	-	-	-	-	-	-	-	-	1	2	-	2	-	-	-
CO5	-	-	-	-	-	-	-	-	-	2	-	2	-	-	-
AVG	-	-	-	-	1	-	-	-	2.3	1.4	-	1.8	-	-	-

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24PC109	PHYSICS AND CHEMISTRY LABORATORY				Version : 1.0
DEPARTMENT OF SCIENCE AND HUMANITIES					
Programme & Branch	Common to all B.E / B.Tech Degree	L	T	P	C
		0	0	4	2

PHYSICS LABORATORY

COURSE OBJECTIVES

- To learn the proper use of various kinds of physics laboratory equipment.
- To learn how data can be collected, presented and interpreted in a clear and concise manner.
- To learn problem solving skills related to physics principles and interpretation of experimental data.
- To determine error in experimental measurements and techniques used to minimize such error.
- To make the student an active participant in each part of all lab exercises.

LIST OF EXPERIMENTS (Any Five Experiments)

1. Determination of rigidity modulus of wire and moment of inertia using Torsional pendulum
2. Determination of Young's modulus using simple harmonic oscillations of cantilever.
3. Determination of Young's modulus using Non-uniform bending method
4. Determination of Young's modulus using Uniform bending method
5. Determination of the wavelength of the diode laser using diffraction grating.
6. Determination of thickness of a thin sheet or wire using Air wedge
7. Determination of Numerical Aperture and acceptance angle using Optical fiber
8. Determination of width of the groove using laser and Compact disc
9. Determination of Band gap of a semiconductor.

REFERENCE BOOKS

1. Dr.G.Senthil Kumar, 'Physics Laboratory Manual', VRB Publishers,2023
2. Dr. P.Mani, 'Physics Laboratory Manual', Dhanam publications,2021

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WEB REFERENCES

1. https://www.studocu.com/en-us/home
2. https://rajeshvcet.home.blog/wp-content/uploads/2022/11/physics-finalised-2022-2023.pdf
3. https://www.studypool.com/documents/35211079/lab-manual-physics-bs3171-21-22
4. https://www.youtube.com/watch?v=M80PXEKeQnM
5. https://www.youtube.com/watch?v=QPiOn4XYqa0

NOTE

1. Laboratory classes on alternate weeks for Physics and Chemistry.
2. 60 % of the listed experiments shall be conducted for the Physics laboratory

CHEMISTRY LABORATORY

COURSE OBJECTIVES

- To inculcate experimental skills to test basic understanding of water quality parameters, such as, acidity, alkalinity, hardness, chloride.
- To induce the students to familiarize with electroanalytical techniques such as, pH metry, potentiometry and conductometry in the determination of impurities in aqueous solutions.
- To demonstrate the synthesis of nanoparticles.

LIST OF EXPERIMENTS (Any Five Experiments)

1. Determination of total, temporary & permanent hardness of water by EDTA method.
2. Determination of alkalinity in water sample.
3. Determination of chloride content of water sample by Argentometric method.
4. Conductometric titration of strong acid vs. strong base.
5. Determination of strength of given hydrochloric acid using pH meter.
6. Estimation of iron content of the given solution using potentiometer.
7. Estimation of sodium and potassium present in water using flame photometer.
8. Preparation of nanoparticles (TiO2/ZnO/CuO) by Sol-Gel method.
9. Corrosion experiment-weight loss method.

TOTAL: 60 PERIODS

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COURSE OUTCOMES

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

1. Understand the functioning of various Physics laboratory equipment.
2. Understand and analyze scientific information related to the basic concepts in Physics.
3. Analyze problems related to Physics principles individually and collaboratively..
4. Analyse the quality of water samples with respect to their acidity, alkalinity, hardness and DO.
5. Quantitatively analyse the impurities in solution by electro analytical techniques such as pH metry.

REFERENCE BOOKS

6. Dr.G.Senthil Kumar, 'Chemistry Laboratory Manual', VRB Publishers,2023.
7. Dr. A.Ravikrishnan, 'Chemistry Laboratory Manual', Sri Krishna publications, 2021.

WEB REFERENCES

1. https://www.education.com/science-fair/article/measure-size-light-wave/
2. https://vlab.amrita.edu/index.php?sub=1&brch=280&sim=1518&cnt=6
3. https://arunkumard.yolasite.com/resources/6%20Air%20Wedge.pdf
4. https://www.scribd.com/document/511504064/Experiment#:~:text=Total%20hardness%20is%20measured%20by,hardness%2C%20temporary%20hardness%20is%20calc ulated.
5. https://www.slideshare.net/slideshow/alkalinity-of-given-water-samplepdf/256956376
6. https://www.slideshare.net/slideshow/estimation-of-chloride-ion-in-water/256956670

VIDEO REFERENCES

1. https://www.youtube.com/watch?v=vMRwTFVPlCU
2. https://www.youtube.com/watch?v=JhBs_8DrPYo
3. https://www.youtube.com/watch?v=uI17TAUYHhU
4. https://www.youtube.com/watch?v=m8yAALCE0LE
5. https://www.youtube.com/watch?v=CLrgeQzFkGA
6. https://www.youtube.com/watch?v=ya_v3mgr79I

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ONLINE REFERENCES

1. https://www.youtube.com/watch?v=qTVgJm1Ntss
2. https://onlinecourses.nptel.ac.in/noc20_cy17/preview
3. https://www.classcentral.com/subject/chemical-engineering
4. https://www.classcentral.com/course/openlearn-science-maths-technology-laboratory- skills-chemistry-96070

NOTE

- Laboratory classes on alternate weeks for Physics and Chemistry.
- 60 % of the experiments shall be conducted for the course.

MAPPING OF COs With POs AND PSOs

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	-	-	1	1	1	-	-	-	1	-	-	-
CO2	3	2	2	-	-	1	1	1	-	-	-	1	-	-	-
CO3	3	2	2	-	-	1	1	1	-	-	-	1	-	-	-
CO4	3	2	2	-	-	1	1	1	-	-	-	1	-	-	-
CO5	3	2	2	-	-	1	1	1	-	-	-	1	-	-	-
AVG	3	2	2	-	-	1	1	1	-	-	-	1	-	-	-

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24CS108	PROGRAMMING IN C LABORATORY	Version : 1.0			
Common To All B.E/B.Tech Degree					
Programme & Branch	B.E – Computer Science and Engineering	L	T	P	C
		0	0	4	2

COURSE OBJECTIVES

- To Understand and Apply Basic Programming Constructs.
- To Develop Skills in Array and String Manipulations.
- To Demonstrate the Use of Functions in Programming.
- To Analyze and Implement Complex Data Structures Using Pointers.
- To Design and Evaluate Programs for File Management and Command Line Processing.

LIST OF PRACTICAL PROGRAMS

1. Formatted I/O statements, Operators.
2. Decision Making statements: Simple If, If – else, Switch- case.
3. Looping Statements: For, While, Do – while.
4. Single dimensional arrays and multi-dimensional arrays.
5. Operations on Strings.
6. Pass by value and pass by address, Recursion using functions.
7. Structures and nested structures.
8. String handling operations using pointers.
9. Operations on arrays using pointers.
10. File operations using command line arguments.

TOTAL: 60 PERIODS

COURSE OUTCOMES

Upon Completion Of The Course, The Students Will Be Able To

- Develop and debug programs utilizing c programming constructs.
- Implement various operations on arrays and perform string manipulations.
- Create and evaluate recursive functions to solve specific problems.
- Analyze and implement pointer-based operations on arrays and strings.

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- Create programs that include file operations such as reading, writing, and error handling using command line arguments

REFERENCES

1. Byron S. Gottfried, Jitendar Kumar Chhabra, "Programming with C", Tata McGraw Hill Publishing Company., New Delhi, 2018, Fourth edition.
2. Herbert Schildt, "C – The Complete Reference", Tata McGraw Hill Publishing Company, New Delhi, 2010, Fourth edition.
3. PradipDey and Manas Ghosh, "Programming in C", Oxford University Press., New Delhi, 2018
4. Yashavant P. Kanetkar, "Let Us C", BPB Publications., 2017, Sixteenth edition
5. H.M.Deitel, P.J.Deitel, "C How to Program", Pearson Education., New Delhi, 2013, Seventh Edition.

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1. https://www.javatpoint.com/c-programming-language-tutorial
2. https://www.tutorialspoint.com/cprogramming/index.htm

VIDEO REFERENCES

1. https://www.youtube.com/watch?v=udKcT5UPCDs&list=PLJx23jPZ2MP6CKw9h9wN2zD_Wu63tr-T
2. https://www.youtube.com/watch?v=j5nkMFsXId4&list=PLCbgvALMG7QWp-h_UVGBAFydX5qDyGa2n

COURSE REFERENCES

1. https://archive.nptel.ac.in/courses/106/104/106104128/
2. https://www.shiksha.com/online-courses/c-programming-for-beginners-master-the-c-language-course-udeml653

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MAPPING OF COs WITH POs AND PSOs														
COs	POs												PSO`s	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	3	1	2	-	-	-	1	1	-	2	3	3
CO2	2	3	3	1	2	-	-	-	1	1	-	2	3	3
CO3	2	3	3	1	2	-	-	-	1	1	-	2	3	3
CO4	2	3	3	1	2	-	-	-	1	1	-	2	3	3
CO5	2	3	3	1	2	-	-	-	1	1	-	2	3	3
AVG	2	3	3	1	2	-	-	-	1	1	-	2	3	3

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24EN110	COMMUNICATION SKILLS - I				Version : 1.0
DEPARTMENT OF SCIENCE AND HUMANITIES					
Programme & Branch	Common to all B.E / B.Tech Degree	L	T	P	C
		0	0	2	1

COURSE OBJECTIVES

- To improve the communicative competence of learners
- To help learners use language effectively in academic /work contexts
- To develop various listening strategies to comprehend various types of audio materials likelectures, discussions, videos etc.
- To build on students' English language skills by engaging them in listening, speaking and grammar learning activities that are relevant to authentic contexts.
- To use language efficiently in expressing their opinions via various media.

UNIT - I	INTRODUCTION TO FUNDAMENTALS OF COMMUNICATION	6

Listening - For general information-specific details- conversation: Introduction to classmates - Audio /video (formal & informal); Telephone conversation.

Speaking - Making telephone calls - Self Introduction; Introducing a friend; - politeness strategies- making polite requests, making polite offers, replying to polite requests and offers - understanding basic instructions (filling out a bank application for example).

UNIT - II	NARRATION AND SUMMATION	6

Listening - Listening to podcasts, anecdotes / stories / event narration; documentaries and interviews with celebrities.

Speaking - Narrating personal experiences / events - Talking about current and temporary situations & permanent and regular situations - describing experiences and feelings- engaging in small talk- describing requirements and abilities.

UNIT - III	DESCRIPTION OF A PROCESS PRODUCT	6

Listening - Listen to product and process descriptions; a classroom lecture; and advertisements about products.

Speaking – Picture description- describing locations in workplaces- Giving instruction to use the product- explaining uses and purposes- Presenting a product- describing shapes and sizes and weights-talking about quantities (large & small) - talking about precautions

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UNIT - IV	CLASSIFICATION AND RECOMMENDATIONS	6

Listening – Listening to TED Talks; Listening to lectures - and educational videos.

Speaking – Small Talk; discussing and making plans - talking about tasks - talking about progress - talking about positions and directions of movement-talking about travel preparations-talking about transportation.

UNIT - V	EXPRESSION	6

Listening – Listening to debates/ discussions; different viewpoints on an issue; and paneldiscussions.

Speaking –making predictions- talking about a given topic-giving opinions-understanding awebsite-describing processes

TOTAL: 30 PERIODS

COURSE OUTCOMES

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

CO1 - Listen and comprehend general as well as complex academic information

CO2 - Listen and understand different points of view in a discussion

CO3 - Speak fluently and accurately in formal and informal communicative contexts

CO4 - Describe products and processes and explain their uses and purposes clearly and accurately

CO5 - Express their opinions effectively in both formal and informal discussions

NOTE

Internal mode only.

E- RESOURCES

1. https://www.youtube.com/watch?v=UEYCOq9wcvc&pp=ygUgcHJvZHVjdCBhbmQgcHJvY2VzcyBkZXNjcmlwdGlvbiA%3D
2. https://www.youtube.com/watch?v=Kz2Eq7bZ41U&pp=ygUQUEFORUwgRElTQ1VTU0lPTg%3D%3D
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MAPPING OF COs With POs AND PSOs															
COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	1	-	-	-	-	1	-	1	-	-	-
CO2	-	-	-	-	-	-	-	-	3	1	-	2	-	-	-
CO3	-	-	-	-	-	-	-	-	3	1	-	2	-	-	-
CO4	-	-	-	-	-	-	-	-	1	2	-	2	-	-	-
CO5	-	-	-	-	-	-	-	-	-	2	-	2	-	-	-
AVG	-	-	-	-	1	-	-	-	2.3	1.4	-	1.8	-	-	-

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SEMESTER II

24EN201	TECHNICAL ENGLISH – II	Version : 1.0			
DEPARTMENT OF SCIENCE AND HUMANITIES					
Programme & Branch	Common to all B.E / B.Tech Degree	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES

The course is intended to

- Engage learners in meaningful language activities to improve their reading and writing skills
- Learn various reading strategies and apply in comprehending documents in professional context.
- Help learners understand the purpose, audience, contexts of different types of writing
- Develop analytical thinking skills for problem solving in communicative contexts
- Demonstrate an understanding of job applications and interviews for internship and placements

UNIT - I	MAKING COMPARISONS	9

Soft Skills – Effective communication – Mastering the art of conveyance. Reading - Reading advertisements, user manuals, brochures; Writing – Professional emails, Email etiquette - Compare and Contrast Essay; Grammar – Auxiliary verbs, Prepositional phrases, Vocabulary- Contextual meaning of words.

UNIT - II	EXPRESSING CAUSAL RELATIONS IN SPEAKING AND WRITING	9

Soft Skills – Time Management: Balancing multiple responsibilities. Reading - Reading longer technical texts– Cause and Effect Essays, and Letters / emails of complaint, Writing - Writing responses to complaints. Grammar - Active Passive Voice transformations, Infinitive and Gerunds, Conjunctions.

UNIT - III	PROBLEM SOLVING	9

Soft Skills – Team Building and Collaboration: Fostering positive team dynamics. Reading - Case Studies, excerpts from literary texts, news reports etc. Writing – Letter to the Editor, Checklists, Problem solution essay / Argumentative Essay. Grammar – Error correction; If conditional sentences, Vocabulary- Compound words, Sentence Completion, Misspelled words, Sequencing Jumbled Sentences.

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UNIT – IV	REPORTING OF EVENTS AND RESEARCH	9
Soft Skills – Critical Thinking: ability to analyse, evaluate ideas & argument. Reading – Newspaper articles; Writing – Recommendations, Transcoding, Accident Report, Survey Report Grammar – Reported Speech, Modals Vocabulary – Conjunctions - use of prepositions.		
UNIT - V	**THE ABILITY TO PUT IDEAS OR INFORMATION COGENTLY**	**9**
Soft Skills – Leadership: Ability to influence and guide to common goal or vision. Reading – Company profiles, Statement of Purpose, (SOP), an excerpt of interview with professionals; Writing – Job / Internship application – Cover letter & Resume; Grammar – Numerical adjectives, Relative Clauses.		
		TOTAL: 45 PERIODS

LEARNING OUTCOMES

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

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

TEXT BOOKS

1. English for Engineers & Technologists (2020 edition) Orient Blackswan Private Ltd. Department of English, Anna University.
2. English for Science & Technology Cambridge University Press 2021.
3. Authored by Dr. Veena Selvam, Dr. Sujatha Priyadarshini, Dr. Deepa Mary Francis, Dr. KN.Shoba, and Dr. Lourdes Joevani, Department of English, Anna University.

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REFERENCE BOOKS

1. Raman. Meenakshi, Sharma. Sangeeta (2019). Professional English. Oxford university press. New Delhi.
2. Improve Your Writing ed. V.N. Arora and Laxmi Chandra, Oxford Univ. Press, 2001, New Delhi.
3. Learning to Communicate – Dr. V. Chellammal. Allied Publishers, New Delhi, 2003
4. Business Correspondence and Report Writing by Prof. R.C. Sharma & Krishna Mohan, TataMcGraw Hill & Co. Ltd., 2001, New Delhi.
5. Developing Communication Skills by Krishna Mohan, Meera Bannerji- Macmillan India Ltd. 1990,Delhi.

E – RESOURCES

- https://www.youtube.com/watch?v=x60GHpQ8gJk&list=PLWPirh4EWFpFIElSxplDlEhRDZHkBD-0n
- https://www.youtube.com/playlist?list=PLCcteVWYyBtteZ69xEH2HG-hwK5ZuNvHc

MAPPING OF COs With POs AND PSOs

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	1	-	-	-	-	-	1	2	3	-	2	-	-	-
CO2	-	-	-	-	-	-	1	-	3	3	-	3	-	-	-
CO3	-	1	1	-	-	-	-	-	3	3	-	3	-	-	-
CO4	-	-	-	-	-	-	-	-	2	3	-	2	-	-	-
CO5	-	-	-	-	-	-	-	-	2	3	-	2	-	-	-
AVG	-	1	1	-	-	-	-	-	2.4	3	-	2.4	-	-	-

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24MA202	STATISTICS AND NUMERICAL METHODS	Version : 1.0			
DEPARTMENT OF SCIENCE AND HUMANITIES					
Programme & Branch	Common to all B.E / B.Tech Degree	L	T	P	C
		3	1	0	4

COURSE OBJECTIVES

- To introduce fundamental concepts in Probability, hypothesis testing, Experimental Design, Numerical methods for equations, Interpolation, Numerical Integration, and Differential Equations.
- To equip students with practical skills in applying Statistical Methods like Chi-Square, ANOVA, and Numerical Techniques such as Newton - Raphson, Runge-Kutta, and Interpolation Methods.
- To develop Analytical thinking and problem-solving abilities in handling complex Mathematical and Statistical Problems in Engineering and Scientific contexts.
- To prepare students for advanced studies and professional careers where knowledge of Advanced Mathematical Techniques and Statistical analysis is essential.
- To foster an understanding of the importance and applications of mathematical modeling and computational methods in diverse fields.

UNIT - I	PROBABILITY AND TESTING OF HYPOTHESIS	9+3

Probability–Basic definitions of probability – Total probability theorem(Statement only) - Axioms of probability - conditional probability- Baye's theorem (statement and problems only)- Sampling distribution- large and small samples(Concept only) – Chi-square test for goodness of fit – Independence of attributes.

UNIT - II	DESIGN OF EXPERIMENTS	9+3

Analysis of variance (ANOVA) - Completely Randomized Design – Randomized Block Design – Latin Square Design.

UNIT - III	SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS	9+3

Solution of Algebraic and Transcendental Equations– Newton Raphson method- Solution of linear system of equations - Gauss Elimination method – Pivoting - Gauss Jordan method – Iterative methods of Gauss Jacobi and Gauss Seidel – Eigen values of a matrix by Power method.

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UNIT – IV	INTERPOLATION AND NUMERICAL INTEGRATION	9+3

Lagrange's Interpolation -Newton's forward and backward difference interpolation - Newton's divided difference interpolations –Numerical integration: single and double integrals using Trapezoidal and Simpson's rules.

UNIT - V	NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS	9+3

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

TOTAL: 60 PERIODS

COURSE OUTCOMES

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

CO1: Demonstrate proficiency in applying Probability Theory and hypothesis testing methods to Analyze data and make informed decisions.

CO2: Design and conduct experiments using various Experimental Designs, Analyze Variance, and Interpret Experimental results

CO3: Acquire practical skills in solving Algebraic and Transcendental equations, computing Eigen values and applying Numerical Integration Techniques.

CO4: Demonstrate competence in using Interpolation methods to approximate Functions and Numerical Methods to solve Ordinary differential equations.

CO5: Develop the ability to critically evaluate mathematical models, assess numerical accuracy, and apply appropriate methods to solve real-world problems in their field of study.

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TEXT BOOKS

1. Grewal, B.S., and Grewal, J.S., "Numerical Methods in Engineering and Science", Khanna Publishers, 10th Edition, New Delhi, 2015.
2. Curtis F. Gerald, Patrick. Wheatley, "Applied numerical analysis", Pearson Education publication, 7th edition, 2012.
3. S. P. Gupta, "Statistical Methods", Sultan Chands and Sons, 44th edition, 2014.

REFERENCE BOOKS

1. Burden, R.L and Faires, J.D, "Numerical Analysis", 9th Edition, Cengage Learning, 2016.
2. Devore. J.L., "Probability and Statistics for Engineering and the Sciences", Cengage Learning, New Delhi, 8th Edition, 2014.
3. Gerald. C.F. and Wheatley. P.O. "Applied Numerical Analysis" Pearson Education, Asia, New Delhi, 7th Edition, 2007.
4. Gupta S.C. and Kapoor V. K., "Fundamentals of Mathematical Statistics", Sultan Chand & Sons, New Delhi, 12th Edition, 2020.
5. Spiegel. M.R., Schiller. J. and Srinivasan. R.A., "Schaum's Outlines on Probability and Statistics ", Tata McGraw Hill Edition, 4th Edition, 2012.
6. Walpole. R.E., Myers. R.H., Myers. S.L. and Ye. K., "Probability and Statistics for Engineers and Scientists", 9th Edition, Pearson Education, Asia, 2010.

WEB REFERENCE

- https://www.ucl.ac.uk/~rmjbale/Stat/2.pdf
- https://www.atmos.albany.edu/facstaff/timm/ATM315spring14/R/IPSUR.pdf
- https://www.stat.auckland.ac.nz/~fewster/325/notes/ch2annotated.pdf
- https://documentviewer.herokuapp.com/?state=%7B%22ids%22:%5B%221qXjHIB0IFllEJZ0P3LKqi4yfhGusbqrP%22%5D,%22action%22:%22open%22,%22userId%22:%22103047595551916871878%22,%22resourceKeys%22:%7B%7D%7D
- https://drive.google.com/file/d/1P43ac42aJ8zqBSPbLJK1bHZ12JJYyPAT/view?usp=sharing
- https://drive.google.com/file/d/1qXjHIB0IFllEJZ0P3LKqi4yfhGusbqrP/view?usp=drive_link

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VIDEO REFERENCE

- https://www.youtube.com/watch?v=V3iEsLPAD68&list=PLU6SqdYcYsfLRq3tug_hvkHDcorrtcBK
- https://www.youtube.com/watch?v=VCCH9mvGHu4&list=PLOmHrZkA584_AljHMHktLuuqulBLF00xa
- https://www.youtube.com/watch?v=9dFWkDhw7CQ&t=107s&pp=ygUgc3RhdGlzdGljcyBhbmQgbnVtZXJpY2FsIG1ldGhvZHM%3D
- https://www.youtube.com/watch?v=c29S3dpHaNk&list=PLkLKUGSSZo5e1qTAvFFUAJb5TaizAR-jF
- https://www.youtube.com/watch?v=d9loVslsqIA&pp=ygUgc3RhdGlzdGljcyBhbmQgbnVtZXJpY2FsIG1ldGhvZHM%3D

ONLINE REFERENCE

- https://onlinecourses.nptel.ac.in/noc21_ma45/preview
- https://onlinecourses.nptel.ac.in/noc21_ma74/preview

MAPPING OF COs With POs AND PSOs

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	1	0	0	0	0	0	0	0	0	0	-	-
CO2	3	3	1	0	0	0	0	0	0	0	0	0	-	-
CO3	3	3	1	0	0	0	0	0	0	0	0	0	-	-
CO4	3	3	1	0	0	0	0	0	0	0	0	0	-	-
CO5	3	3	1	0	0	0	0	0	0	0	0	0	-	-
AVG	3	3	1	0	0	0	0	0	0	0	0	0	-	-

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24PH205	MATERIALS SCIENCE				Version : 1.0
DEPARTMENT OF SCIENCE AND HUMANITIES					
Programme & Branch	Common to B.E - Automobile, Civil & Mechanical	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES

- To make the students to understand the basics of crystallography and its importance in studying materials properties.
- To understand the electrical properties of materials including free electron theory, applications of quantum mechanics and magnetic materials.
- To instill knowledge on physics of semiconductors, determination of charge carriers and device applications.
- To establish a sound, grasp of knowledge on different optical properties of materials, optical displays and applications.
- To inculcate an idea of significance of nanostructures, quantum confinement and ensuing nano device applications.

UNIT - I	CRYSTALLOGRAPHY	9

Single crystalline, polycrystalline and amorphous materials – single crystals: unit cell, directions and planes in a crystal- Procedure to find Miller indices –Relation between Miller Indices and Inter-planar distances - Coordination number and packing factor for SC, BCC and FCC structures - crystal imperfections: point defects and line defects.

UNIT - II	ELECTRICAL AND MAGNETIC PROPERTIES OF MATERIALS	9

Classical free electron theory - Expression for electrical conductivity – Expression for Thermal conductivity – Wiedemann Franz law- Density of energy states (Derivation)– Carrier concentration in metals. Magnetic materials:- Dia, para and ferromagnetic materials–Domain theory and energies involved in domain growth – HDD with GMR sensor.

UNIT - III	SEMICONDUCTOR AND TRANSPORT PHYSICS	9

Classification of Semiconductors–direct and indirect band gap semiconductors–Carrier concentration in intrinsic semiconductors – Carrier concentration in N-type and P-type semiconductors–Hall Effect and its applications

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UNIT – IV	OPTICAL PROPERTIES OF MATERIALS	9

Classification of optical materials – Carrier generation and recombination – Optoelectronic devices: light detectors and solar cells – light emitting diode – laser diode - optical processes in organic semiconductor devices – Electro-optics and nonlinear optics.

UNIT - V	NANO DEVICES	9

Quantum confinement – Quantum structures: quantum wells, wires and dots – Band gap of nano materials – Single electron phenomena – Single electron Transistor-Carbon nanotubes: Properties and applications.

TOTAL: 45 PERIODS

COURSE OUTCOMES

At the end of the course the students should be able to

CO1: Remember the basics of crystallography and its importance for studying various materials properties

CO2: Understand the electrical and magnetic properties of materials and their applications

CO3: Understand clearly about semiconductor physics and functioning of semiconductor devices

CO4: Understand the optical properties of materials and working of various optical devices

CO5: Analyze the importance of functional nanoelectronic devices.

TEXT BOOKS

1. A.Marikani, 'Materials Science', PHI learning Private Ltd. Delhi, 2021
2. Dr.R.Suresh 'Materials Science', Sri Krishna Hitech Publications,2023
3. Dr. P.Mani, 'A Textbook on Materials Science', Dhanam publications,2021
4. Dr.G.Senthil Kumar & Dr. S.Murugavel, 'Materials Science', VRB Publishers,2023.

REFERENCE BOOKS

1. Charles Kittel, 'Introduction to solid state Physics', John Wiley & sons
2. Laszlo Solymar, Walsh, Donald, Syms and Richard R.A.,' Electrical Properties of Materials", Oxford Univ. Press (Indian Edition) 2022.

3. Jasprit Singh, "Semiconductor Optoelectronics: Physics and Technology", McGraw- Hill Education (Indian Edition), 2019.
4. S.L.Gupta & R.V.Kumar,'Solid State Physics', K.Nath & Co. educational Publishers,2009
5. S.M.Sze, 'Physics of semiconductor devices', John Wiley & sons,2004
6. G.W.Hanson. "Fundamentals of Nanoelectronics". Pearson Education(Indian Edition),2022

WEB REFERENCES

1. https://www.poriyaan.in/paper/materials-science-16/
2. https://n.stucor.in/semester/STUCOR_PH3251-DG.pdf
3. https://www.youtube.com/watch?v=9f-EA1pYDDY
4. https://www.youtube.com/watch?v=X-FMsYDTl5I
5. https://www.youtube.com/watch?v=ei_jTRKgA2Y

MAPPING OF COs With POs AND PSOs

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1	1	-	-	-	-	-	-	-	-	1	-	-
CO2	3	2	2	2	-	-	-	-	-	1	-	-	1	-	-
CO3	3	2	2	1	-	-	-	-	-	1	-	2	1	1	-
CO4	3	1	1	1	-	-	-	-	-	-	-	2	1	1	-
CO5	3	2	2	1	-	-	-	-	-	1	-	-	-	-	-
AVG	**3**	**1.6**	**1.6**	**1.2**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**2**	**1**	**1**	**-**

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24EE201	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING	Version : 1.0			
Common to all B.E/B.Tech Degree					
Programme & Branch	B.E – ELECTRICAL AND ELECTRONICS ENGINEERING	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES

- To impart knowledge in the basics of wiring methods
- To introduce the basics of DC machines
- To impart knowledge in the basics of working principles and application of AC machines
- To introduce and their characteristics and fundamental concepts of digital electronics
- To introduce the functional elements and working of measurements and instruments

UNIT - I	BASICS OF WIRING	9

Introduction - Types of wiring (open/Concealing type) - Symbols and IE rules - types of wires and cables – Earthing methods -– Electrical wiring accessories – Service connection (Single Phase & Three Phase) - Protective devices (Fuse, MCB, ELCB, RCCB) – Safety precautions and First Aid.

UNIT - II	DC MACHINES	9

Dynamically induced E.M.F- Fleming's right hand rule - Construction and Working principle of DC Generators, EMF equation-Types and Applications- Construction and Principle of DC motors- Types and Applications – Necessity of starters and Types of stator- speed control of DC motors, characteristics & applications of DC motors - electric braking.

UNIT - III	AC MACHINES	9

Constructional details of single phase induction motor -Types of single-phase induction motors - Universal motor - stepper motors - working principle and construction details of three Phase Induction motor - working principle and construction details of single Phase & three Phase Transformer and its Applications.

UNIT - IV	ANALOG AND DIGITAL ELECTRONICS	9

Resistor – Colour Coding - Inductor and Capacitor in Electronic Circuits- Silicon & Germanium – PN Junction Diodes, Zener Diode –Characteristics and Applications-BJT construction and working principle -UPS and SMPS. Combinational logic gates (AND, OR, NOT)-Truth table - representation of logic functions.

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UNIT - V	MEASUREMENTS AND INSTRUMENTATION	9

Functional elements of an instrument, Standards and calibration, Error and types-Operating Principle, types Moving Coil and Moving Iron meters-wattmeter- Energy Meter - Block diagram -Types of sensors - Smart sensors- solenoid contractor (NC/NO)

TOTAL: 45 PERIODS

COURSE OUTCOMES

1. After completing this course, the students will be able to
2. Compute the basic fundamentals of electrical
3. Explain the working principle and applications of DC machines
4. Analyze the characteristics of AC machines
5. Explain the basic concepts of analog and digital electronics
6. Explain the operating principles of measuring instruments

TEXT BOOKS

1. Kothari DP and I.J Nagrath, "Basic Electrical and Electronics Engineering", Second Edition, McGraw Hill Education, 2020
2. S. K. Bhattacharya "Basic Electrical and Electronics Engineering", Pearson Education, Second Edition, 2017.
3. Sedha R.S., "A textbook book of Applied Electronics", S. Chand & Co., 2008
4. James A. Svoboda, Richard C. Dorf, "Dorf's Introduction to Electric Circuits", Wiley, 2018.
5. A.K. Sawhney, Puneet Sawhney 'A Course in Electrical & Electronic Measurements & Instrumentation', Dhanpat Rai and Co,

REFERENCE BOOKS

1. Kothari DP and I.J Nagrath, "Basic Electrical Engineering", Fourth Edition, McGraw Hill Education, 2019.
2. Thomas L. Floyd, 'Digital Fundamentals', 11th Edition, Pearson Education, 2017.
3. Albert Malvino, David Bates, 'Electronic Principles, McGraw Hill Education; 7th edition, 2017.
4. Mahmood Nahvi and Joseph A. Edminister, "Electric Circuits", Schaum' Outline Series, McGraw Hill, 2002.
5. H.S. Kalsi, 'Electronic Instrumentation', Tata McGraw-Hill, New Delhi, 2010

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WEB REFERENCES

1. https://www.electrical4u.com/electrical-engineering-materials/
2. https://mrcet.com/downloads/digital_notes/hs/beee%20digital%20notes%202020.pdf
3. https://www.maritimeknowledge.in/course-details.php?course_id=125&course_name=BasicElectricalandElectronicsEngineering

COURSE REFERENCES

1. https://archive.nptel.ac.in/courses/108/105/108105053/
2. https://nptel.ac.in/courses/108108076
3. https://onlinecourses.nptel.ac.in/noc22_ee113/preview

MAPPING OF COs With POs AND PSOs

COs	POs												PSO`s		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	2	-	-	-	1	-	-	-	2	-	-	1
CO2	3	2	1	2	-	-	-	1	-	-	-	2	-	-	1
CO3	3	1	1	1	-	-	-	1	-	-	-	2	-	-	1
CO4	3	2	1	2	-	-	-	1	-	-	-	2	-	-	1
CO5	3	2	1	2	-	-	-	1	-	-	-	2	-	-	1
AVG	3	1.8	1	1.8	-	-	-	1	-	-	-	2	-	-	1

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24GE204	ENGINEERING GRAPHICS				Version : 1.0
DEPARTMENT OF MECHANICAL ENGINEERING					
Programme & Branch	Common to B.E - Mechanical, Automobile & Civil	L	T	P	C
		2	0	2	3

COURSE OBJECTIVES

- To develop foundational skills in geometrical constructions and plane curves.
- To understand and apply principles of orthographic projection.
- To learn techniques for projecting simple solids with inclinations.
- To understand the sectioning and development of various solid shapes.
- To gain knowledge in creating pictorial projections of solid objects

UNIT - I	PLANE CURVES	9

Basic Geometrical constructions, Curves used in engineering practices: Conics. Construction of ellipse, parabola and hyperbola by eccentricity method Construction of cycloid, construction of involutes of square and circle. Drawing of tangents and normal to the above curves.

UNIT - II	ORTHOGRAPHIC PROJECTION	9

Orthographic projection- Principles-Principal Planes-First angle projection-projection of points. Projection of straight lines (only First angle projections) inclined to both the principal planes Determination of true lengths and true inclinations by rotating line method and traces Projection of planes (polygonal and circular surfaces) inclined to both the principal planes by rotating object method.

UNIT - III	PROJECTION OF SOLIDS	9

Projection of simple solids like prisms, pyramids, cylinder, cone and truncated solids when the axis is inclined to one of the principal planes by rotating object method.

UNIT - IV	SECTIONS AND DEVELOPMENT	9

Sectioning of above solids in simple vertical position when the cutting plane is inclined to the one of the principal planes and perpendicular to the other obtaining true shape of section. Development of lateral surfaces of simple and sectioned solids, Prisms, pyramids cylinders and cones.

UNIT - V	ISOMETRIC PROJECTIONS	9

Principles of isometric projection, isometric scale. Isometric projections of simple solids and truncated solids Prisms, pyramids, cylinders, cones- combination of two solid objects in simple vertical positions.

TOTAL: 60 PERIODS

COURSE OUTCOMES

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

- Execute accurate geometrical constructions and draw common engineering curves.
- Create detailed orthographic projections of points, lines, and planes.
- Project and visualize simple solids from different angles using standard methods.
- Section and develop the surfaces of solids to represent true shapes.
- Produce isometric and perspective projections for various engineering applications.

TEXT BOOKS

1. Bhatt N.D. and Panchal V.M., "Engineering Drawing", Charotar Publishing House, 53rd Edition, 2019.
2. Natarajan K.V., "A Text Book of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 2018.

REFERENCE BOOKS

1. Basant Agarwal and Agarwal C.M., "Engineering Drawing", McGraw Hill, 2nd Edition, 2019.
2. Gopalakrishna K.R., "Engineering Drawing" (Vol. I&II combined), Subhas Publications, Bangalore, 27th Edition, 2017.
3. Luzzader, Warren.J. and Duff,John M., "Fundamentals of Engineering Drawing with an introduction to Interactive Computer Graphics for Design and Production, Eastern Economy Edition, Prentice Hall of India Pvt. Ltd, New Delhi, 2005.
4. Parthasarathy N. S. and Vela Murali, "Engineering Graphics", Oxford University, Press, New Delhi, 2015.

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MAPPING OF COs With POs AND PSOs														
COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	2	3	2	2	2	2	1	1	-	2	2	2
CO2	2	3	2	3	2	1	2	1	1	2	-	2	2	2
CO3	2	3	2	3	2	1	2	2	2	2	-	2	2	2
CO4	2	3	2	3	1	1	2	1	2	2	-	2	2	2
CO5	2	3	2	3	1	2	1	1	1	1	-	2	2	2
AVG	2.00	3.00	2.00	3.00	1.60	1.40	1.80	1.40	1.40	1.60	-	2.00	2.00	2.00

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24TA206	தமிழரும் தொழில் நுட்பமும்	Version : 1.0			
அறிவியல் மற்றும் மனிதநேயம் தமிழ் துறை					
Programme & Branch	அனைத்து துறைகளுக்கும் பொதுவானது (B.E / B.Tech)	L	T	P	C
		1	0	0	1

முன் கூட்டிய துறைசார் அறிவு: தேவை இல்லை

அலகு - I	நெசவு மற்றும் பானைத் தொழில்நுட்பம்	3

சங்க காலத்தில் நெசவு தொழில்- பானைத் தொழில் நுட்பம் கருப்பு சிவப்பு பாண்டங்கள்- பாண்டங்களில் கீறல் குறியீடுகள்.

அலகு - II	வடிவமைப்பு மற்றும் கட்டிட தொழில்நுட்பம்	3

சங்க காலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் & சங்க காலத்தில் வீட்டுப் பொருட்களில் வடிவமைப்பு - சங்க காலத்தில் கட்டுமான பொருட்களும் நடுகல்லும் - சிலப்பதிகாரத்தில் மேடை அமைப்பு பற்றிய விவரங்கள் - மாமல்லபுர சிற்பங்களும், கோவில்களும் - சோழர் காலத்து பெருங்கோவில்கள் மற்றும் பிற வழிபாட்டு தலங்கள் - நாயக்கர் காலக் கோவில்கள் - மாதிரி கட்டமைப்புகள் பற்றி அறிதல், மதுரை மீனாட்சி அம்மன் ஆலயம் மற்றும் திருமலை நாயக்கர் மஹால் - செட்டிநாட்டு வீடுகள் - பிரிட்டிஷ் காலத்தில் சென்னை இந்தோ – சாராசெனிக் கட்டிடக் கலை

அலகு - III	உற்பத்தித் தொழில்நுட்பம்	3

கப்பல் கட்டும் கலை – உலோகவியல் - இரும்புத்தொழிற்சாலை - இரும்பை உருக்குதல், எ.கு – வரலாற்றுச் சான்றுகளாக செம்பு மற்றும் தங்கநாணயங்கள் - நாணயங்கள் அச்சடித்தல் - மணி உருவாக்கும் தொழிற்சாலைகள் - கல் மணிகள் - கண்ணாடி மணிகள் - சுடுமண் மணிகள் சங்கு மணிகள் - எலும்புத் துண்டுகள் - தொல்லியல் சான்றுகள் - சிலப்பதிகாரத்தில் மணிகளின் வகைகள்.

அலகு - IV	வேளாண்மை மற்றும் நீர்ப்பாசன தொழில்நுட்பம்	3

அணை, ஏரி, குளங்கள், மதகு - சோழர்கால குமிழித்தூம்பின் முக்கியத்துவம் - கால்நடை பராமரிப்பு – கால்நடைகளுக்காக வடிவமைக்கப்பட்ட கிணறுகள் - வேளாண்மை மற்றும் வேளாண்மை சார்ந்த செயல்பாடுகள் - கடல்சார் அறிவு – மீன் வளம் - முத்து மற்றும் முத்துக்குளித்தல் - பெருங்கடல் குறித்த பண்டைய அறிவு – அறிவுசார் சமூகம்.

அலகு - V	அறிவியல் தமிழ் மற்றும் கணினித்தமிழ்	3

அறிவியல் தமிழின் வளர்ச்சி - கணினித்தமிழ் வளர்ச்சி –தமிழ் நூல்களை மின்பதிப்பு செய்தல் - தமிழ் மென்பொருட்கள் உருவாக்கம் - தமிழ் இணையக்கல்வி கழகம் - தமிழ் மின் நூலகம் - இணையத்தில் தமிழ் அகராதிகள் சொற்குவைத்திட்டம் .

TOTAL: 15 PERIODS

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பாடம் கற்றதின் விளைவுகள்:

பாடத்தை வெற்றிகரமாக கற்று முடித்த பிறகு, மாணவர்களால் முடியும் விளைவுகள்

CO1: சங்ககால தமிழர்களின் நெசவு மற்றும் பானை வனைதல் தொழில் நுட்பம் குறித்து கற்றுணர்தல்.

CO2: சங்ககால தமிழர்களின் கட்டிட தொழில்நுட்பம் கட்டுமான பொருட்கள் மற்றும் அவற்றை விளக்கும் தளங்கள் குறித்து அறிவு

CO3: சங்ககால தமிழர்களின் உலோகத் தொழில், நாணயங்கள் மற்றும் மணிகள் சார்ந்த தொல்லியல் சான்றுகள் பற்றிய அறிவு.

CO4: சங்ககால தமிழர்களின் வேளாண்மை, நீர்ப்பாசன முறைகள் மற்றும் முத்துக்குளித்தல் குறித்த தெளிவு.

CO5: நவீன அறிவியல் தமிழ் மற்றும் கணினித்தமிழ் குறித்த புரிந்துகொள்ளலும் மற்றும் பயன்படுத்தலும்.

RFERENCE BOOKS

1. "தமிழக வரலாறு - மக்களும் பண்பாடும்" கே கே பிள்ளை (வெளியீடு தமிழ்நாடு பாடநூல் மற்றும் கல்வியில் பணிகள் கழகம்) உலக தமிழாராய்ச்சி நிறுவனம், சென்னை, 2022.
2. "கணினித்தமிழ்" முனைவர் இல. சுந்தரம், விகடன்பிரசுரம், 2016.
3. கீழடி- வைகை நதிக்கரையில் சங்ககால நகரநாகரிகம் (தொல்லியல் துறை வெளியீடு).
4. பொருநை – ஆற்றங்கரை நாகரிகம் (தொல்லியல் துறை வெளீயிடு).

MAPPING OF COs With POs AND PSOs

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	1	-	-	-	-	1	-	1	-	-	-
CO2	-	-	-	-	-	-	-	-	3	1	-	2	-	-	-
CO3	-	-	-	-	-	-	-	-	3	1	-	2	-	-	-
CO4	-	-	-	-	-	-	-	-	1	2	-	2	-	-	-
CO5	-	-	-	-	-	-	-	-	-	2	-	2	-	-	-
AVG	-	-	-	-	1	-	-	-	2.3	1.4	-	1.8	-	-	-

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24EE202	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LABORATORY	Version : 1.0			
Common to all B.E/B.Tech Degree					
Programme & Branch	B.E – ELECTRICAL AND ELECTRONICS ENGINEERING	L	T	P	C
		0	0	4	2

COURSE OBJECTIVES

- To train the students in conducting load tests on electrical machines
- To gain practical experience in characterizing electronic devices
- To train the students to use DSO for measurements.

LIST OF EXPERIMENT

1. Verification of ohms and Kirchhoff's Laws.
2. Load test on DC Shunt Motor.
3. Load test on Shunt Generator
4. Load test on Single Phase Transformer
5. Load Test on Single Phase Induction Motor
6. Load test on three phase Induction Motor
7. Measurement of three phase power by using two wattmeter method.
8. Characteristics of PN and Zener Diodes
9. Design and analysis of Half wave and Full Wave rectifiers
10. Measurement of displacement of LVDT.
11. Study the necessity of starters.

TOTAL: 60 PERIODS

COURSE OUTCOMES

After completing this course, the students will be able to

1. Use experimental methods to verify the Ohm's law and Kirchhoff's Law and to measure three phase power
2. Analyze experimentally the load characteristics of electrical machines
3. Analyze the characteristics of basic electronic devices
4. Use LVDT to measure displacement

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WEB REFERENCES
1. https://www.vlab.co.in/broad-area-electrical-engineering 2. http://vlabs.iitkgp.ernet.in/be/index.html
VIDEO REFERENCES
1. https://www.vlab.co.in/broad-area-electrical-engineering 2. https://www.pathlms.com/siam/courses/480/sections/730 3. https://www.nih.gov/news-events/videos/virtual-ep-lab-there-better-way 1. https://nvl-au.vlabs.ac.in/

MAPPING OF COs With POs AND PSOs

COs	POs												PSO`s		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	-	-	-	-	1	-	-	-	2	-	-	1
CO2	3	2	1	-	-	-	-	1	-	-	-	2	-	-	1
CO3	3	1	1	-	-	-	-	1	-	-	-	2	-	-	1
CO4	3	2	1	-	-	-	-	1	-	-	-	2	-	-	1
CO5	3	2	1	-	-	-	-	1	-	-	-	2	-	-	1
AVG	3	1.8	1	-	-	-	-	1	-	-	-	2	-	-	1

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WEB REFERENCES
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VIDEO REFERENCES
1. https://www.vlab.co.in/broad-area-electrical-engineering 2. https://www.pathlms.com/siam/courses/480/sections/730 3. https://www.nih.gov/news-events/videos/virtual-ep-lab-there-better-way 1. https://nvl-au.vlabs.ac.in/

MAPPING OF COs With POs AND PSOs

COs	POs												PSO`s		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	-	-	-	-	1	-	-	-	2	-	-	1
CO2	3	2	1	-	-	-	-	1	-	-	-	2	-	-	1
CO3	3	1	1	-	-	-	-	1	-	-	-	2	-	-	1
CO4	3	2	1	-	-	-	-	1	-	-	-	2	-	-	1
CO5	3	2	1	-	-	-	-	1	-	-	-	2	-	-	1
AVG	3	1.8	1	-	-	-	-	1	-	-	-	2	-	-	1

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24EP203	ENGINEERING PRACTICES LABORATORY	Version : 1.0			
Programme & Branch	B.E – CIVIL, MECHNANICAL, ECE & EEE ENGINEERING	L	T	P	C
		0	0	4	2

COURSE OBJECTIVES:

The main learning objective of this course is to provide hands on training to the students in:

- Drawing pipe line plan; laying and connecting various pipe fittings used in common household plumbing work; Sawing; planning; making joints in wood materials used in common household woodwork.
- Wiring various electrical joints in common household electrical wire work.
- Welding various joints in steel plates using arc welding work; Machining various simple processes like turning, drilling, tapping in parts; Assembling simple mechanical assembly of common household equipment's; Making a tray out of metal sheet using sheet metalwork.
- Soldering and testing simple electronic circuits; Assembling and testing simple electronic components on PCB.

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GROUP-A (CIVIL & MECHANICAL ENGINEERING PRACTICES)		
PART - I	**CIVIL ENGINEERING PRACTICES**	**15**

PLUMBING WORK:

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

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

c) Preparing plumbing line sketches.

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

WOOD WORK:

a) Sawing & Planning

b) Making joints like T-Joint, Mortise joint and Tenon joint and Dovetail joint.

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PART - II	MECHANICAL ENGINEERING PRACTICES	15

WELDING WORK:

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

b) Practicing gas welding.

BASIC MACHINING WORK:

a) (Simple) Turning.

b) (Simple) Drilling.

c) (Simple) Tapping.

ASSEMBLY WORK:

a) Assembling a centrifugal pump.

b) Assembling a household mixer.

c) Assembling an Air-conditioner.

SHEET METAL WORK:

a) Making of a square tray

FOUNDRY WORK:

Demonstrating basic foundry operations.

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GROUP-B (ELECTRICAL & ELECTRONICS ENGINEERING PRACTICES)		
PART – III	**ELECTRICAL ENGINEERING PRACTICES**	**15**
1. Introduction to Switches, Fuses, Indicators and Lamps - Basic switch board wiring with lamp, fan and three pin socket. 2. To construct a Staircase wiring. 3. Fluorescent Lamp wiring with introduction to CFL and LED types. 4. Measurement of Resistance to earth of an electrical equipment. 5. Study of Fan, Fan Regulator (Resistor type and Electronic type using Diac/Triac)		
PART – IV	**ELECTRONICS ENGINEERING PRACTICES**	**15**
1. Resistor color coding and soldering practices. 2. Assembling and testing electronic components on a small PCB. 3. Study elements of Smart Phone and computer. 4. Study of Assembly and dismantle procedure of LED TV. 5. Mini project: to construct a circuit by using LED with Battery or Solar panel.		
		TOTAL: 60 PERIODS

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COURSE OUTCOMES
Upon completion of this course, the students will be able to: CO1: Draw pipeline plan; lay and connect various pipe fittings use din common house holdplumbing work; Saw; plan; make joints in wood materials used in common household woodwork. CO2: Weld various joint sin steel plate susing arc welding work; Machine various simple Processes turning, drilling, tapping in parts; Assemble simple mechanical assembly of Common house hold equipment's; Make a tray out of metal sheet using sheet metal work. CO3: Wire various electrical joint sin common house hold electrical wirework. CO4: Solder and test simple electronic circuits; Assemble and test simple electronic Components on PCB
VIDEO REFERENCES
1. https://www.youtube.com/watch?v=xJnIYNdz_3U 2. https://www.youtube.com/watch?v=9Z45E-V7S24 3. https://www.youtube.com/watch?v=VCX78nrgkiI 4. https://www.youtube.com/watch?v=1fsCTSrRXv8 5. https://www.youtube.com/watch?v=3GMju9wsGZM

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WEB REFERENCES
1. https://psr.edu.in/video-of-lab-experiments/ 2. https://www.stannescet.ac.in/cms/staff/qbank/CSE/Lab_Manual/GE3271-ENGINEERING%20PRACTICES%20LABORATORY-988056784-EP%20LAB%20GE3271%20new.pdf 3. https://shanmugha.edu.in/pdf/course/mech/labmanual_1/EP%20Lab%20Manual.pdf
ONLINE COURCES
1. https://www.youtube.com/watch?v=njwdsMI3PcY 2. https://www.youtube.com/watch?v=NMBjv7VaLsg 3. https://www.youtube.com/watch?v=LxXdkceiGTY

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SMAPPING OF COs With POs AND PSOs														
COs	POs												PSO`s	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	-	-	1	1	1	-	-	-	-	2	2	1
CO2	3	2	-	-	1	1	1	-	-	-	-	2	2	1
CO3	3	2	-	-	1	1	1	-	-	-	-	2	2	1
CO4	3	2	-	-	1	1	1	-	-	-	-	2	2	1
CO5	3	2	-	-	1	1	1	-	-	-	-	2	2	1
AVG	3	2	-	-	1	1	1	-	-	-	-	2	2	1

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24EN210	COMMUNICATION SKILLS - II	Version : 1.0			
DEPARTMENT OF SCIENCE AND HUMANITIES					
Programme & Branch	Common to all B.E / B.Tech Degree	L	T	P	C
		0	0	2	1

COURSE OBJECTIVES

- To identify varied group discussion skills and apply them to take part in effective discussions ina professional context.
- To analyses concepts and problems and make effective presentations explaining them clearlyand precisely.
- To be able to communicate effectively through formal and informal writing. To be able to use appropriate language structures to write emails, reports and essaysTo give instructions and recommendations that are clear and relevant to the context

UNIT - I		9

Speaking-Role Play Exercises Based on Workplace Contexts, - talking about competition-discussing progress toward goals-talking about experiences- discussing past events.

Writing: Writing emails (formal & semi-formal).

UNIT - II		9

Speaking: Discussing news stories -talking about travel problems- discussing travel procedures and problems - talking about travel problems- making arrangements-describing arrangements- discussing plans and decisions- discussing purposes and reasons - understanding commontechnology terms.

Writing: - Paragraph Writing

UNIT - III		9

Speaking: Discussing predictions-describing the climate-discussing forecasts and scenarios-talkingabout purchasing-discussing advantages and disadvantages- making comparisons- discussing likes and dislikes- discussing feelings about experiences-discussing imaginary scenarios

Writing: Short essays and reports-formal/semi-formal letters.

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UNIT – IV		9
Speaking: Discussing the natural environment-describing systems-describing position and movement- explaining rules-(example- discussing rental arrangements)- understanding technical instructions **Writing**: Writing instructions-writing a short article.		
UNIT - V		**9**
Speaking: Describing things relatively-describing clothing-discussing safety issues (making recommendations) talking about electrical devices-describing controlling actions **Writing**: Job application (Cover letter + Curriculum vitae)-writing recommendations.		
		TOTAL: 30 PERIODS

LEARNING OUTCOMES

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

- Speak effectively in group discussions held in a formal / semiformal context.
- Discuss, analyse and present concepts and problems from various perspectives toarrive at suitable solutions
- Write emails, letters and effective job applications.
- Write critical reports to convey data and information with clarity and precision
- Give appropriate instructions and recommendations for safe execution of tasks

NOTE

1. Internal mode only

E- RESOURCES

1. https://www.youtube.com/watch?v=DPaU8kYS3mI&list=PLMfo9NXs6ZfGa3qqm6GS98sMsBqkQy5-a

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MAPPING OF COs With POs AND PSOs															
COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	3	3	3	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-
CO3	-	-	-	-	-	-	-	-	3	3	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	2	3	-	3	-	-	-
CO5	-	-	-	2	-	2	-	-	-	-	-	-	-	-	-
AVG	-	-	-	2	-	2	-	3	2.6	3	-	3	-	-	-

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