

Course code	Course title	L	T	P	C
BAEEE101	Basic Engineering	3	0	2	4
Pre-requisite	NIL	Syllabus version			
		1.0			
Course Objectives					
- To introduce fundamental principles of major engineering disciplines. - To create awareness of interdisciplinary engineering systems and their applications					
Course Outcomes					
At the end of the course students will be able to					
- Analyse the electrical circuits, electrical motors and the role of power electronics in industrial applications. - Acquire foundational knowledge of electronic devices and communication systems. - Apply BIS standards to create basic 2D and 3D representations of engineering components. - Explain the fundamental principles and applications of manufacturing processes, energy conversion systems, and mechanical automation technologies. - Analyse real-world examples where bio-inspired solutions have led to breakthroughs in engineering.					
Module:1	Principles of Electrical Engineering: Circuits and Power conversion equipment	12 hours			
Electric circuit components, Mesh current analysis, Node voltage analysis, Thevenin's and Superposition theorems, Single phase AC circuits- RL, RC, RLC, Power and Energy Calculations, Power Factor, Basics of Electrical Safety and Earthing.					
Introduction to electro mechanical energy conversion, principle of operation of Electrical Machines - DC Motor, Induction motors, BLDC Motor and single phase Transformer, Concepts of Power Electronics and Industrial Applications of Electrical Drives (Qualitative Analysis)					
Module:2	Foundations of Electronics and Communication systems: Devices, Circuits, and Systems	8 hours			
Characteristics of PN Junction Diode, Zener Diode, BJT and MOSFET. Rectifiers and Voltage Regulators. Introduction to Operational Amplifiers. Electromagnetic Spectrum. Elements of Communication Systems. Overview of cellular communication. Fundamentals of Satellite Communication and Radar.					
Module:3	Engineering Graphics and CAD	9 hours			
Introduction to Engineering Drawing – Importance and scope of engineering graphics, BIS standards for lines, lettering and dimensioning. Orthographic Projections – Principles of projection, first angle and third angle projections. Introduction to Projection of Solids- Isometric Projections and perspective projections. Freehand Sketching – Sketching of simple machine components and objects. Drawing of a simple residential floor plan as per IS SP7, Introduction to CAD.					
Module:4	Manufacturing Processs, Energy conversions and Mechanical Automation	9 hours			
Basic Metal Casting, Forming, Joining and Cutting Processes - Introduction to CNC Machining. Additive Manufacturing (3D Printing): Principles and Applications.					

Fundamentals of Thermal engineering systems, Internal Combustion Engine. Introduction to Power Plants. Introduction to Refrigeration and Air Conditioning. Basics of Fuel Cells and Sustainable Energy Technologies. Introduction to Mechanisms - Four-bar mechanism and its inversions- Hexapod mechanisms. Mechanical Components and Motion Control in mechanical systems. Introduction to Robotics and Automation – Pneumatic and hydraulic actuators.		
Module:5	Bio-Inspired Design in Engineering	5 hours
Introduction to Biomimicry- Core principles. Case Studies Across Disciplines: Velcro inspired by burrs, self-healing materials based on skin regeneration -Termite mound-inspired ventilation systems in green buildings-Insect-inspired drones and soft robotics-Neural networks based on the human brain -Identify a problem and brainstorm a bio-inspired solution.		
Module: 6	Contemporary Topics	2 hours
Lectures by Industry or Research experts		
	Total Lecture hours:	45 hours
Text Book(s)		
1.	Allan R. Hambley, “Electrical Engineering -Principles & Applications”, 2019, 6th Edition, Pearson Education	
2	R.L. Boylestad and L. Nashelsky, “Electronic Devices and circuit theory”, 11 th Edition, person Publications	
3	Louis E Frenzel Jr, “Principles of Electronics Communication Systems”, 2016, McGraw Hill Education.	
4	Bhatt N. D., Engineering Drawing, Charotar Publishing House Pvt. Ltd, 2019.	
Reference Books		
1.	John bird, “Electrical Circuit Theory and Technology”, 4th edition, Newnes Publications, Elsevier, 2010	
2.	George Kennedy,Brendan Davis, Srm Prasanna “Electronic Communication Systems”, McGraw Hills, 2011	
3.	Serope Kalpakjian, and Steven Schmid, Manufacturing Engineering and Technology, 2020, 8th edition, Pearson education.	
4.	Nag P. K., Basic & Applied Thermodynamics, 2009, 2nd Edition, McGraw Hill Education.	
5.	Rattan S. S, Theory of Machines, Tata McGraw Hill, 2019	
6.	Craig, John. J. (2008), Introduction to Robotics: Mechanics and Control, Second Edition, Pearson Education, New Delhi.	
List of Lab Experiments (Electrical and Electronics Engineering)		
1. Verification of KCL and KVL in an Electrical Circuit		
2. Verification of Mesh and Nodal Analysis in an Electrical Circuit		
3. Time domain analysis of a single phase series RL Circuit		
4. Measurement of Power and power factor in a single phase RL Circuit using 3- volt meter method		
5. Speed Control of a PMDC Motor with DC-DC Buck Converter		
6. Measurement of Earth Resistance using an Meggar		

7. Analysis of a Zener Diode Voltage Regulator
8. Single-Phase Full-Wave Diode Rectifier with Resistive Load
9. Design and Testing of a Light Dimmer Circuit Using a Darlington Pair.
10. Create a 2D profile using basic sketch tools and apply appropriate geometric and dimensional constraints.
11. Develop a simple 3D solid model using features such as extrude, revolve, cut, fillet, chamfer, and shell.
12. Generate detailed 2D engineering drawings of simple parts from 3D solid models, including multiple views, dimensions, and annotations.

Mode of Evaluation: CAT, Assignment, Quiz, Seminar, Project, FAT

Recommended by Board of Studies	23-05-2025
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Approved by Academic Council	No. 78	Date	12-06-2025
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