

SANDWICH BE: ELECTRICAL AND ELECTRONICS ENGINEERING

MINIMUM CREDITS TO BE EARNED: 189
MINIMUM CREDITS IN INDUSTRIAL TRAINING: 68

Code No.	Course	Hours/Week			Credits	Maximum Marks		
		Lecture	Tutorial	Practical		CA	FE	Total
SEMESTER 1								
08O101	Calculus and its Applications	3	2	0	4	50	50	100
08E102	Applied Physics	3	0	0	3	50	50	100
08E103	Applied Chemistry	3	0	0	3	50	50	100
08E105	Problem Solving and C Programming	2	0	2	3	50	50	100
08E106	Electric Circuits	2	1	0	2.5	50	50	100
08E110	Engineering Graphics	2	0	3	3.5	100 ^{&}	-	100
08E211	Physics Laboratory	}	0	0	3	Refer Semester 2 and Footnote #		
08E212	Chemistry Laboratory							
08E100	Industrial Training – I (Industry Organisation structure, Safety, Environment needs)	-	-	15	4 [%]	100 ^{&}	-	100
		15	3	8+15	19+4			

SEMESTER 2

08O104	Communication Skills In English	3	0	2	4	50	50	100
08O201	Linear Algebra and Fourier Series	3	2	0	4	50	50	100
08E202	Materials Science	3	0	0	3	50	50	100
08E203	Chemistry of Electronic Materials	3	0	0	3	50	50	100
08E204	Network Theory	2	1	0	2.5	50	50	100
08E210	Engineering Practices	0	0	2	1	100 ^{&}	-	100
08E211	Physics Laboratory	}			1.5	100 [#]	-	100
08E212	Chemistry Laboratory		0	0	3	1.5	100 [#]	-
08E200	Industrial Training – II (Study of Control Elements & Wiring)	-	-	15	8 [%]	100 ^{&}	-	100
		14	3	7 + 15	20.5+8			

CA - Continuous Assessment

FE - Final Examination

& - 40 marks for final test to be scheduled by the faculty concerned

- Continuous Assessment marks are awarded for performance in both semesters 1 & 2 with 40 marks for final test to be scheduled by the faculty concerned at the end of semester 2 covering the entire syllabus.

% - Not taken into account for minimum total credits and CGPA

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SEMESTER 3								
08E205	Electronic Devices	3	1	0	3.5	50	50	100
08O301	Transforms and Complex Analysis	3	2	0	4	50	50	100
08O302	Economics for Business Decisions	3	0	0	3	50	50	100
08E304	Mechanics for Electrical Engineers	2	0	0	2	50	50	100
08E306	DC Machines and Transformers	3	0	0	3	50	50	100
08O___	Language Elective	3	0	0	3	50	50	100
08E213	Circuits and Devices Laboratory	0	0	3	1.5	100	-	100
08E311	DC Machines and Transformers Laboratory	0	0	3	1.5	100 ^{&}	-	100
08E300	Industrial Training – III (Winding and Electronic Product Design)	-	-	15	12 [%]	100 ^{&}	-	100
		17	3	6 + 15	21.5+12			

SEMESTER 4

08E303	Digital Electronics [@]	2	2	0	3	50	50	100
08E305	Electronic Circuits	3	1	0	3.5	50	50	100
08E307	Electro Magnetic Fields	3	0	0	3	50	50	100
08E405	Induction and Synchronous Machines	3	1	0	3.5	50	50	100
08O___	Mathematics Elective I	3	1	0	3.5	50	50	100
08E310	Electronic Circuits and Digital Laboratory	0	0	3	1.5	100 ^{&}	-	100
08E411	AC Machines Laboratory	0	0	3	1.5	100 ^{&}	-	100
08E400	Industrial Training – IV (Inspection and Testing of Pumps and Motors)	-	-	15	8 [%]	100 ^{&}	-	100
		14	5	6 + 15	19.5+8			

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SEMESTER 5								
08E401	Linear Integrated Circuits @	2	2	0	3	50	50	100
08E402	Principles of Communication Engineering	2	0	0	2	50	50	100
08E403	Measurements and Instrumentation	3	0	0	3	50	50	100
08E404	C++ and Data Structures	3	1	2	4.5	50	50	100
08O___	Mathematics Elective II	3	1	0	3.5	50	50	100
08O___	Humanities Elective	3	0	0	3	50	50	100
08E410	Linear ICs and Measurements Laboratory	0	0	3	1.5	100&	-	100
08E500	Industrial Training – V (Electrical Lighting & Quality System Skill)	-	-	15	8%	100&	-	100
		16	4	5 + 15	20.5+8			

SEMESTER 6

08E505	Computer Architecture @	2	2	0	3	50	50	100
08E502	Control Systems	3	1	0	3.5	50	50	100
08E503	Microprocessors and Microcontrollers	3	1	0	3.5	50	50	100
08E601	Electrical Machine Design @	2	2	0	3	50	50	100
08E604	Generation, Transmission and Distribution	3	0	0	3	50	50	100
08E510	Microprocessors and Microcontrollers Laboratory	0	0	3	1.5	100&	-	100
08E512	Instrumentation and Control Laboratory	0	0	3	1.5	100&	-	100
08E600	Industrial Training – VI (Automation Components)	-	-	15	12%	100&	-	100
		13	6	6 + 15	19+12			

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SEMESTER 7								
08E501	Environmental Science and Engineering	3	0	0	3	50	50	100
08E504	Power Electronics	3	0	0	3	50	50	100
08E602	Operating Systems	3	0	0	3	50	50	100
08E605	Digital Signal Processing	3	0	0	3	50	50	100
08E511	Power Electronics Laboratory	0	0	3	1.5	100 ^{&}	-	100
08E611	Digital Signal Processing Laboratory	0	0	3	1.5	100 ^{&}	-	100
08E520	Mini Project I	0	0	2	1	100	-	100
08E621	Industrial Visit cum Lecture	1	0	2	2	100	-	100
08E700	Industrial Training – VII (Managerial Skills, Soft Skills and HRM, Generation of Creative & Innovative Ideas)	-	-	15	8 [%]	100 ^{&}	-	100
		13	0	10 + 15	18+8			

SEMESTER 8

08E603	Heat Engines and FM	3	0	0	3	50	50	100
08E701	Electric Drives and Control	3	0	0	3	50	50	100
08E702	Computer Aided Power System Analysis	3	0	0	3	50	50	100
08____	Elective I	3	0	0	3	50	50	100
08____	Elective II	3	0	0	3	50	50	100
08E610	Heat Engines and FM Laboratory	0	0	3	1.5	100 ^{&}	-	100
08E620	Mini Project II	0	0	2	1	100	-	100
08E800	Industrial Training – VIII (Industrial Visit and Colloquium I)	-	-	15	4 [%]	100 ^{&}	-	100
		15	0	5 + 15	17.5+4			

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SEMESTER 9								
08E703	Energy Sources and Utilization	3	1	0	3.5	50	50	100
08E704	Power Systems Protection and Switch Gears	3	0	0	3	50	50	100
08____	Elective III	3	0	0	3	50	50	100
08____	Elective IV	3	0	0	3	50	50	100
08E710	Power system Laboratory	0	0	3	1.5	100 ^{&}	-	100
08E711	Design Laboratory	0	0	3	1.5	100 ^{&}	-	100
08E720	Project Work I	0	0	6	3	100	-	100
08E900	Industrial Training – IX (Industrial Visit and Colloquium II)	-	-	15	4 [%]	100 ^{&}	-	100
		12	1	12 + 15	18.5+4			

SEMESTER 10

08____	Elective V	3	0	0	3	50	50	100
08E820	Project Work II	0	0	24	12	50	50	100
		3	0	24	15			

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ELECTIVES

MATHEMATICS (A minimum of two electives)

08O001	Applied Numerical Analysis
08O002	Business Statistics
08O003	Mathematical Modeling
08O004	Optimization Techniques
08O005	Statistics and Quality Control
08O006	Stochastic Models
08O007	Database Systems
08O008	Mathematical Modeling for Mechanical Sciences

PHYSICS

08O016	Micro Machining and Micro Sensors
08O017	Nano Science and Technology
08O018	Integrated Circuit Technology
08O019	Thin Film Technology
08O020	Laser Technology
08O021	Composite Materials
08O022	Electronic Ceramics
08O023	Plasma Technology
08O024	Computational Materials Science
08O025	Quantum Mechanics
08O026	Electro Optic Materials
08O027	Analytical Methods in Materials Science
08O028	Vacuum Science and Deposition Techniques
08O029	Semi Conducting Materials and Devices
08O030	Sensors for Engineering Applications

CHEMISTRY

08O031	Energy Storing Devices and Fuel Cells
08O032	Polymers in Electronics
08O033	Organic Electronics
08O034	Functional Coatings by Polymer Micro Encapsulation
08O035	Analytical Methods for Textiles and Textile Ancillaries
08O036	Polymers and Composites
08O037	Corrosion Science and Engineering
08O038	Chemistry of Nano materials
08O039	Polymer Chemistry and Polymer Processing
08O040	Electro Analytical Methods
08O041	Instrumental Methods of Chemical Analysis
08O042	Advanced Reaction Mechanism
08O043	Chemical Sensors and Biosensors
08O044	Computational Physical Chemistry
08O045	Molecular Spectroscopy

HUMANITIES (A minimum of one elective)

08O046	Principles of Management
08O047	Human Resource Management
08O048	Introduction to Management
08O049	Organizational Behaviour
08O050	Value Management
08O051	Human Values and Professional Ethics
08O052	Micro Economic Environment
08O053	Marketing Systems
08O054	Entrepreneurship
08O055	Analysis of Manufacturing and Service Systems
08O056	Financial and Management Accounting
08O057	Managerial Finance
08O058	Working Capital Management
08O059	Cost Management
08O060	Technology Incubators and Commercialization of Innovation

LANGUAGE (A minimum of one elective)

08O061	Professional English
08O062	Initiative to German Language
08O063	Basic French
08O064	Basic Conversational Skills in Japanese Language

DEPARTMENT ELECTIVES (A minimum of three electives #)

08E001	Computer Aided Design of Electrical Machines
08E002	PLC and Distributed Control System
08E003	High Voltage Engineering
08E004	HVDC Transmission
08E005	Special Machines and Controllers
08E006	Advanced Control Systems
08E007	Virtual Instrumentation Systems
08E008	Neural Networks and Fuzzy Systems
08E009	VLSI Design
08E010	Analog VLSI Design
08E011	Mixed Signal VLSI Design
08E012	Biomedical Instrumentation
08E013	Embedded Systems Design
08E014	Advanced Microprocessors and Microcontrollers
08E015	Personal Computer Systems
08E016	Advanced Computer Architecture
08E017	Advanced Data Structures
08E018	Database Management Systems
08E019	Computer Networks
08E020	Computer Graphics
08E021	System Software
08E022	Internet Tools and Java Programming
08E023	Software Project Management and Quality Assurance
08E024	Grid Computing
08E025	Nano Computing
08E026	Digital System Design

- A candidate may be permitted to take a maximum of two electives in lieu of department elective courses from the list of core and elective courses of other departments / branches of BE / BTech degree programmes with specific permission from the concerned Heads of the Departments.

DETAIL SYLLABI FOR INDUSTRIAL TRAINING

I. 08E100 INDUSTRY ORGANISATION STRUCTURE, SAFETY, ENVIRONMENT NEEDS

0 15 0 4

Plant layout - List of machine tools -Specifications-Operation done on each machine tool - Constructional arrangements of machine tools-various work holding and tool holding methods - Types of cutting tools used –Hand tools - Type of component and material of the component –Organizational structures – Industrial safety – Sales and marketing – Maintenance – Power distribution.

Total 210

II. 08E200 STUDY OF CONTROL ELEMENTS & WIRING

0 15 0 8

Study of important BIS – Different types of wirings: House – Industrial — Study of control elements: Switches - Relay – contactor – solid state relays – circuit breakers – Types of Cables – Accessories – Cable termination.

Total 210

III. 08E300 WINDING AND ELECTRONIC PRODUCT DESIGN

0 15 0 12

Study of different types of winding wires – Insulation materials – Stamping & Laminations – Preparation of coils – Hands on training in winding machine.

Study of different types of semiconductor devices – fabrication of simple circuits: Circuit lay out preparation – PCB fabrication – soldering – Testing.

Total 210

IV. 08E400 INSPECTION AND TESTING OF PUMPS AND MOTORS

0 15 0 8

IS specification for motors and pump sets - List of testing instrument - Functions - foot mounting motor dimensions as per IS: 1231 - Importance of name plate and identification of name plate details - Trouble shooting of induction motors - Type of routine test of induction motor as per IS : 7538 (Performance Calculations) 1) Measurement of stator resistance 2) High voltage test 3) Measurement of insulation resistance 4) Reduced voltage test 5) No load test 6) Full load test 7) Locked rotor test 8) Starting torque and starting current 9) Pull up torque 10) Pull out torque 11) Momentary over load test 12) Temperature rise test.

Study of constructional details of Servo, stepper & SR Motors

Total 210

V. 08E500 ELECTRICAL LIGHTING & QUALITY SYSTEM SKILL QUALITY SYSTEM SKILL

0 15 0 8

Design of electrical wiring diagram using ePLAN – Lighting system: commercial lighting – Consumer lighting – industrial Lighting – Road & landscape lighting – Flood lighting – LED lighting - Solar PV system installation and testing

QUALITY SYSTEM SKILL

Awareness of TQM, ISO 9000,etc. - Process capability studies – Rejection analysis – Six sigma applications – Calibration needs – Calibration authorities – Records – Charts – Applications – Form error understanding and verification- Case studies in quality systems.

Total 210

VI. 08E600 AUTOMATION COMPONENTS

0 15 0 12

SENSORS AND TRANSDUCERS LAB

Sensors lab - Study of different types of sensors: Inductive – capacitive –Photo electric – Magnetic - Encoder – Interfacing with controllers.

PLC Lab: Study of PLCs and automation components -Development of simple projects using PLC and Testing –Study of different types of Drives – Interfacing of drives with PLC.

Total 210

VII. 08E700 MANAGERIAL SKILLS, SOFT SKILLS AND HRM, GENERATION OF CREATIVE & INNOVATIVE IDEAS

0 15 0 8

Executive Skills-Group Discussions-Communication Skills-Project Report preparation methods-Focus on customer needs-Visual Management-Scheduling systems-Maintenance Management-Vendor Developments-Model Preparations-Production, Planning & Controls-Storage & Inventory Management-Supply Chain Management-Lean Methods-Wastage

Identifications-Equipment Up Time-Kaizen & Lean Practices, human Resource Management Skills-Innovation & Adaptation Skills- Creative Skills- Patent Right knowledge-Competitive Skills- Interview focusing skills- Product Development Skills- Reverse Engineering Skills- Concurrent Engineering Skills-Prototyping Skills-Costing Skills-Analyzing Skills- Marketability Analysis Skills.

Total 210

VIII. 08E800 INDUSTRIAL VISIT AND COLLOQUIUM I

0 15 0 4

Industrial profile - Product range - Catalogue - Infrastructure - Turn over - Quality system - Labor force - Industrial structure - Location - Layout - ISO 9000 - Material handling system - R & D - Product development - Manufacturing system - Advanced quality systems - Types of industry 1) Auto mobile 2) Foundry 3) Steel 4) Cement 5) Machining 6) Forging 7) Fabrication 8) Electrical. -Industry Lecture-Seminars-Quiz programmes

Total 210

IX. 08E900 INDUSTRIAL VISIT AND COLLOQUIUM II

0 15 0 4

Visiting external industries and acquiring followed - Focus on customer – Visual management – Scheduling system – Maintenance management – Model preparation – Vendor development – Production planning and control – Storage and inventory management - Supply chain management – Layout and material handling system – Orderliness – Safety and environment – Equipment uptime- Study and application of KAIZEN, Lean practices, Value engineering, Zero defects, Wastage identification, Productivity improvement, Continuous Productivity improvement – Reverse engineering – Poka-Yoke, ISO system needs, Knowledge on TQM, TPM and applications

Total 210