

COURSE OUTCOMES
Electrical & Electronics Engineering



GIT

Revision: 2021

| S.No. | Semester | Name of the Course | Course Outcomes (COs) |
|-------|----------|---|---|
| 1 | I | CO101- COMMUNICATION SKILLS IN ENGLISH | CO101:1- The learners listen to, identify and comprehend them an idea and supporting details of the listening passage |
| | | | CO101:2- The learners apply different language functions and communicate effectively. |
| | | | CO101:3- The learners read, comprehend and analyze the ideas and concepts contained in articles, technical writings and narratives and express them in their own Words |
| | | | CO101:4- The learners apply the different techniques of writing and compose documents like reports, emails and so on |

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|-------|----------|----------------------|---|
| 2 | I | CO102- MATHEMATICS 1 | CO102:1- Make use of complex numbers to solve mathematical problems. Extend the use of different forms of equations of straight lines in co-ordinate Geometry |
| | | | CO102:2- Solve mathematical problems related to trigonometry |
| | | | CO102:3- Utilize the concepts related to limits and derivatives to solve problems |
| | | | CO102:4- Apply the concepts of differentiation of composite function, parametric equation, implicit function and successive differentiation to solve |

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|------|----------|--------------------------|---|
| 3 | I | CO103- APPLIED PHYSICS 1 | CO103:1- Apply laws of mechanics in rocket propulsion and recoil of gun. |
| | | | CO103:2- Apply concepts of circular motion and rotational motion |
| | | | CO103:3- Make use the concepts of energy, power, work, temperature and friction to solve problems |
| | | | CO103:4- Use the theorems of fluid dynamics in atomiser and airfoil |

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| 4 | I | CO104- APPLIED CHEMISTRY | CO104:1- Explain atomic structure and chemical bonding. |
| | | | CO104:2- Apply the fundamentals of analytical chemistry to solve the engineering problems and understand appropriate water treatment methods. |
| | | | CO104:3- Explain various engineering materials for domestic and industrial applications |
| | | | CO104:4- Apply the concept of Electrochemistry and corrosion to solve engineering problems. |

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| 5 | I | CO105- ENGINEERING GRAPHICS | CO105:1- Illustrate basic elements of Drawing |
| | | | CO105:2- Construct Projections of points and lines |
| | | | CO105:3- Build Orthographic projections and Sectional views of object |
| | | | CO105:4- Develop Isometric Projections |

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|-------|----------|------------------------------|--|
| 6 | I | CO106- APPLIED CHEMISTRY LAB | CO106:1- To quantitatively analyse solutions accurately. |
| | | | CO106:2- To standardise EDTA and analyse the hardness of Water |
| | | | CO106:3- To determine the pH of solutions using different techniques |
| | | | CO106:4- To apply the principles of electrochemistry in quantitative analysis. |

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| 7 | I | CO107- INTRODUCTION TO IT SYSTEMS LAB | CO107:1- Utilize the basic functions and features of Computer, operating system and internet applications |
| | | | CO107:2- make use of stand-alone and cloud-based office tools to prepare documents, spreadsheets and presentation |
| | | | CO107:3- Develop algorithms and flowcharts for solving simple problems |
| | | | CO107:4- Develop Python programs to solve simple problems |

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|-------|----------|-------------------------------|---|
| 8 | I | CO108- SPORTS AND YOGA | CO108:1- Apply warming up and warming down exercises in daily physical fitness activities |
| | | | CO108:2- Apply stretching, rotation, and flexibility exercises in daily physical fitness activities |
| | | | CO108:3- Make use of acquired yoga asana skills and pranayama methods in daily lifestyle. |
| | | | CO108:4- utilize the acquired weight training skills for the development of muscular strength. Utilize the acquired skills in playing sports and games |

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| 9 | II | CO109- MATHEMATICS II | CO109:1- Make use of determinants and matrices in finding the solutions of a linear system. |
| | | | CO109:2- Identify the concept of scalar and vector quantities and apply it in engineering problems. |
| | | | CO109:3- Build the concept of integration as the inverse operation of differentiation. |
| | | | CO109:4- Apply integration techniques to solve different engineering problems and differential equations. |

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| 10 | II | CO110- APPLIED PHYSICS II | CO110:1- Calculate the characteristics of waves |
| | | | CO110:2- Compute the power of lens |
| | | | CO110:3- Convert galvanometer into ammeter and voltmeter |
| | | | CO110:4- Explain the basic principles of semiconductor physics, photoelectric effect, laser action and nano science |

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| 11 | II | CO111- ENVIRONMENTAL SCIENCE | CO111:1- Explain the ecosystem and terminology involved in it |
| | | | CO111:2- Explain air, water, soil and noise pollution, and control measures and acts. |
| | | | CO111:3- Explain air, water, soil and noise pollution, and control measures and acts. |
| | | | CO111:4- Explain solid waste management, ISO 14000 & environmental management and conduct a case study on any one environmental problem / application of sustainable energy resources |

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| 12 | II | CO112- FUNDAMENTALS OF ELECTRICAL AND ELECTRONICS ENGINEERING | CO112:1- Identify various combinations of resistors and basic terms in ac systems |
| | | | CO112:2- Solve various powers in ac circuits and calculate the monthly electricity bill. |
| | | | CO112:3- Identify various types of passive components, their colour coding and applications |
| | | | CO112:4- Summarize the working and applications of diodes, transistors and logic gates |

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| 13 | II | CO113- ELEMENTARY CONCEPTS OF ELECTRICAL SYSTEMS | CO113:1- Choose various residential electrical appliances for energy conservation. |
| | | | CO113:2- Summarize the luminous, heating and chemical effects of electric current. |
| | | | CO113:3- Classify the storage batteries and electrical engineering materials. |
| | | | CO113:4- Identify the basic concepts of electromagnetism and electrostatics. |

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| 14 | II | CO114- COMMUNICATIONSKILLS IN ENGLISH LAB | CO114:1- Use words, phrases and sentences accurately and with correct pronunciation in real life situations |
| | | | CO114:2- Listens to and comprehends the substance and central idea of simple narratives and descriptions |
| | | | CO114:3- Use apt language functions while making statements, asking questions, giving instructions, and reporting events. |
| | | | CO114:4- Narrate simple experiences and series of events to convey its essence and intention and present ideas coherently, confidently and with clarity in debates, discussions and interviews. |

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| 15 | II | CO115- APPLIED PHYSICS LAB | CO115:1- Select appropriate measuring tools and make measurements with accuracy and precision |
| | | | CO115:2- Apply and illustrate the concepts of mechanics and properties of matter through experiments |
| | | | CO115:3- Experiment with lens, prism and glass slab to realize the basic laws of ray optics |
| | | | CO115:4- Make use of v- i characteristics of conductors and semiconductors to determine the resistance of materials |

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| 16 | II | CO116- FUNDAMENTALS OF ELECTRICAL AND ELECTRONICS ENGINEERING LAB | CO116:1- Make use of various meters to measure basic parameters of an electric circuit |
| | | | CO116:2- Identify various methods to measure power and energy in electric circuit |
| | | | CO116:3- Identify different types of components and electronic equipments used for conducting experiments. |
| | | | CO116:4- Experiment with different rectifier circuits, regulated power supply and logic gates |

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| 17 | II | CO117- ENGINEERING GRAPHICS USING CAD SOFTWARE | CO117:1- Identify the tools in cad software |
| | | | CO117:2- Develop and draw figures using cad software |
| | | | CO117:3- Sketch and practice isometric drawings using cad software |
| | | | CO117:4- Construct two dimensional figures using cad software. |

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|-------|----------|---|--|
| 18 | II | CO118- ENGINEERING WORKSHOP PRACTISE | CO118:1- Identify the safety precautions, tools and devices required to make carpentry joints |
| | | | CO118:2- Make use of various tools, machines, instruments and power tools used in the fitting shop to make fitting joints |
| | | | CO118:3- Make use of various tools, machines, instruments and power tools used in the welding shop to make welding joint. |
| | | | CO118:4- Utilize different sheet metal tools and measuring instruments to make sheet metal joints. |
| | | | CO118:5- Make use of various tools and accessories to practice electrical wiring, motor connection and soldering |

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|-------|----------|----------------------------|--|
| 19 | III | CO201- SUMMER INTERNSHIP 1 | CO 201:1- Demonstrate the importance of teamwork in engineering |
| | | | CO 201:2- Demonstrate sustainable engineering practices for the benefit of the society |
| | | | CO 201:3- Demonstrate the ability of learning current technological trends. |
| | | | CO201:4- Assimilate engineering responsibilities and professional ethics |

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| 20 | III | CO202- ANALOG AND DIGITAL CIRCUITS | CO 202:1- Classify amplifiers and oscillators |
| | | | CO 202:2- Explain operational amplifiers and applications |
| | | | CO 202:3- Apply K- Map to simplify Boolean expressions |
| | | | CO202:4- Explain the various combinational, sequential and data conversion circuits |

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| 21 | III | CO203- DC MACHINES AND TRACTION MOTORS | CO 203:1- Identify the construction and operation of dc generator |
| | | | CO 203:2- Identify the electrical characteristics and uses of dc generators |
| | | | CO 203:3- Select dc motor for specific applications based on performance characteristics |
| | | | CO203:4- Choose various methods of speed control of dc motors and traction motors. |

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|-------|----------|--|---|
| 22 | III | CO204- FUNDAMENTALS OF ELECTRIC CIRCUITS | CO 204:1- Apply various network theorems to compute circuit parameters |
| | | | CO 204:2- Solve circuit parameters in series circuits for different loads |
| | | | CO 204:3- Solve the circuit parameters in a series-parallel circuits |
| | | | CO204:4- Identify various three-phase interconnections and powers in balanced systems |

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| 23 | III | CO205- ELECTRICAL AND ELECTRONIC MEASURING INSTRUMENTS | CO 205:1- Identify different types of electrical measuring instruments and their operation. |
| | | | CO 205:2- Summarize appropriate methods for measurement of various electrical quantities |
| | | | CO 205:3- Summarize the working of digital and special purpose meters for electrical measurements |
| | | | CO205:4- Explain process control instruments and their applications |

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| 24 | III | CO206- MECHANICAL ENGINEERING | CO 206:1- Identify various fluid properties and distinguish the pressure measurement techniques. |
| | | | CO 206:2- Identify the ways to find out the losses in pipe flow. |
| | | | CO 206:3- Identify the ways to find out the losses in pipe flow. |
| | | | CO206:4- Explain the construction and working of steam boilers, Steam turbines and Internal combustion Engines |

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| 25 | III | CO207- DC MACHINES LAB | CO 207:1- Identify the construction of DC machines and develop magnetic curves. |
| | | | CO 207:2- Develop the performance characteristics of various types of DC generators. |
| | | | CO 207:3- Apply various speed control techniques in dc motors to plot the speed curve and testing of dc machines. |
| | | | CO207:4- Develop the performance characteristics of various types of DC motors. |

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| 26 | III | CO208- ELECTRICAL MEASUREMENTS LAB | CO 208:1- Identify the functions of various types of electrical measuring instruments |
| | | | CO 208:2- Develop electric circuits for verifying different network theorems. |
| | | | CO 208:3- Apply standard procedures for the measurement of resistance, inductance and capacitance |
| | | | CO208:4- Apply various methods for power measurements in AC circuits and examine the calibration of meters. |

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| 27 | III | CO209- ELECTRICAL WORKSHOP PRACTISE | CO 209:1- Identify various wiring systems and the usage of appropriate accessories for electrification |
| | | | CO 209:2- Develop and practice electrical wiring installation for illumination schemes as per IS standard for residential units. |
| | | | CO 209:3- Identify the tests conducted on newly constructed wiring installations and diagnose the faults in installation |
| | | | CO209:4- Select and apply proper earthing for building electrification as per IS3043. |

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| 28 | III | CO210- MECHANICAL ENGINEERING LAB | CO 210:1- Develop experimental setup to understand the applications of Bernoulli's theorem. |
| | | | CO 210:2- Make use of pipe friction apparatus to calculate different parameters such as coefficient of friction, major and minor losses. |
| | | | CO 210:3- Apply performance tests on hydraulic turbines and pumps to plot characteristics curves. |
| | | | CO210:4- Experiment with petrol and diesel engines to test their performance. |

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| 29 | IV | CO211- POWER ELECTRONICS DEVICES AND CIRCUITS | CO 211:1- Select appropriate power semiconductor device for a particular application |
| | | | CO 211:2- Summarize the principle and operation of controlled rectifiers |
| | | | CO 211:3- Summarize the principle and operation of dc and ac converters |
| | | | CO211:4- Summarize various inverters and electric drives |

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| 30 | IV | CO212- ELECTRICAL INSTALLATION DESIGN AND ESTIMATION | CO 212:1- Prepare estimations for electrification of domestic installations |
| | | | CO 212:2- Prepare lighting design schemes for non-industrial installations |
| | | | CO 212:3- Prepare design schemes and estimations for Industrial installations. |
| | | | CO212:4- Prepare layout and estimations for the erection of distribution lines and substations |

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| 31 | IV | CO213- INDUCTION MACHINES | CO 213:1- Develop the equivalent circuit of a single phase transformer |
| | | | CO 213:2- Apply various tests to pre-determine and determine the performance of a transformer |
| | | | CO 213:3- Identify various torques and power stages in three phase induction motor. |
| | | | CO213:4- Construct circle diagram to pre-determine the performance of three phase induction motors and choose various methods for speed control |

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| 32 | IV | CO214- COMMUNITY SKILLS IN INDIAN KNOWLEDGE SYSTEM. | CO 214:1- Identify knowledge, skills, and practices followed traditionally |
| | | | CO 214:2- Explain process, methods and implements followed traditionally. |
| | | | CO 214:3- Identify improvements in process and tools to enhance productivity and living standards of the community. |
| | | | CO214:4- Make use of socially relevant technologies in the field of water, waste, energy management for the community. |

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|-------|----------|------------------------|---|
| 33 | IV | CO215- ELECTRONICS LAB | CO 215:1- Experiment with various analog circuits using transistors |
| | | | CO 215:2- Develop various analog circuits using op-amps |
| | | | CO 215:3- Construct various sequential and combinational digital circuits. |
| | | | CO215:4- Develop various triggering circuits for SCR and observe waveforms. |

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|-------|----------|-------------------------------|---|
| 34 | IV | CO216- INDUCTION MACHINES LAB | CO 216:1- Identify the parts, collect nameplate data, polarity and connections of transformers. |
| | | | CO 216:2- Identify the losses and develop the performance characteristics of transformers. |
| | | | CO 216:3- Identify the nameplate data, parts, polarity, different connections and classification of three phase induction motors |
| | | | CO216:4- Develop the performance characteristics of three phase squirrel cage and slip-ring induction motors, and calculate the losses. |

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|-------|----------|---|--|
| 35 | IV | CO217- DOMESTIC APPLIANCES REPAIR AND MAINTENANCE WORKSHOP | CO 217:1- Identify various components and recognize possible faults of domestic electric heating appliances |
| | | | CO 217:2- Identify various parts of ceiling fan and grinding appliances |
| | | | CO 217:3 Identify various parts of washing machines and electric pump set |
| | | | CO217:4- Identify the procedure for installation of SMPS, inverter and UPS |

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|-------|----------|--|---|
| 36 | IV | CO218- PROFESSIONAL PRACTICE LABORATORY | CO 218:1- Interpret the normal operation of the electric transmission and distribution systems |
| | | | CO 218:2- Discover and maintain the functioning of the low voltage AC distribution system and repair faulty machines |
| | | | CO 218:3- Apply energy conservation techniques in electrical installations |
| | | | CO218:4- Prepare, estimate and implement the electrical installation works. |

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|-------|----------|----------------------|---|
| 37 | IV | CO219- MINOR PROJECT | CO 219:1- Apply housekeeping standards as part of lean manufacturing for workplace maintenance. |
| | | | CO 219:2-Plan procedures for maintenance and preventive maintenance of equipment, tools, machineries, etc. |
| | | | CO 219:3- Choose methods for calibration of measuring and test equipment. |
| | | | CO219:4- Make use of skills acquired to solve problems of social significance or to simplifying day to day tasks. |

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| 38 | V | CO 301- SUMMER INTERNSHIP II | CO 301:1- Apply theoretical concepts gathered from the classroom to practices followed in industry. |
| | | | CO 301:2-Identify industrial norms on safety, duties, responsibilities, and ethics of an engineer. |
| | | | CO 301:3- Identify the social, economic and administrative factors that influence the working environment of industrial organizations. |
| | | | CO 301:4- Develop experience in writing Technical reports/projects. |
| | | | CO 301:5- Demonstrate the ability of learning current technological trends. |

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|-------|----------|---|---|
| 39 | V | CO 302- INDUSTRIAL MANAGEMENT AND SAFETY | CO 302:1- Describe the fundamental principles, approaches and functions of management |
| | | | CO 302:2- Explain the concept of quality and material management |
| | | | CO 302:3- Apply project management techniques and quantitative techniques in management. |
| | | | CO 302:4- Recognize the importance and features of industrial safety |

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| 40 | V | CO 303- SYNCHRONOUS MACHINES AND FHP MOTORS | CO 303:1- Develop the EMF equation of a synchronous generator and explain its performances |
| | | | CO 303:2- Apply different methods to pre-determine the voltage regulation and illustrate the parallel operation of synchronous generators. |
| | | | CO 303:3- Illustrate the performance of synchronous motors. |
| | | | CO 303:4- Summarize the working and applications of different fractional horsepower motors. |

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|-------|----------|--|---|
| 41 | V | CO 304- ELECTRICITY GENERATION, TRANSMISSION AND DISTRIBUTION | CO 304:1- Identify the operation of various generating systems and calculate the quantity of electricity generated |
| | | | CO 304:2- Choose methods to improve power factor and list various tariffs |
| | | | CO 304:3- Identify various power transmission schemes and calculation of sag on conductors |
| | | | CO 304:4- Summarize various electrical power distribution systems |

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|-------|----------|--|---|
| 42 | V | CO 305- INDUSTRIAL DRIVES AND CONTROL | CO 305:1- Classify electric drives and explain control methods for dc drives. |
| | | | CO 305:2- Explain AC motor drives and illustrate their speed control |
| | | | CO 305:3- Identify the selection of motor drives and their industrial applications. |
| | | | CO 305:4- Identify the characteristics of electric traction drive systems and mechanics of train motion. |

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|-------|----------|----------------------------------|---|
| 43 | V | CO 306- SYNCHRONOUS MACHINES LAB | CO 306:1- Identify the parts, nameplate data of synchronous generator. |
| | | | CO 306:2- Develop the performance characteristics of synchronous generator. |
| | | | CO 306:3- Apply various methods to synchronize three phase alternators to busbar. |
| | | | CO 306:4- Develop performance characteristics of synchronous motor |

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| 44 | V | CO 307- INDUSTRIAL ELECTRICAL ENGINEERING LAB | CO 307:1-.Demonstrate and perform Industrial and panel wiring with its maintenance |
| | | | CO 307:2- Identify the cable sizes and perform conduit and cable works |
| | | | CO 307:3- Demonstrate the maintenance of single phase and 3 phase induction motors and develop different types of starters |
| | | | CO 307:4- Apply day to day routine maintenance of DG Sets |

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| 45 | V | CO 308- APPLIED ELECTRONICS LABORATORY | CO 308:1 -.Develop various op - amp circuits using IC 741C |
| | | | CO 308:2 - Identify various power semiconductor devices and plot the V-I characteristics of SCR |
| | | | CO 308:3 - Build controlled rectifier circuits using SCR and set up a triac firing circuit. |
| | | | CO 308:4 - Construct various industrial control circuits using power semiconductor devices. |

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| 46 | V | CO 309- SEMINAR | CO 309:1 -.Demonstrate presentation skills. |
| | | | CO 309:2 - Develop technical paper using open-source tools. |
| | | | CO 309:3 - Ability to assimilate advancements in engineering technology/commercial practice/management |

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| 47 | VI | CO 310- ENTREPRENEURSHIP AND STARTUP | CO 310:1- Explain the Dynamic Role of an Entrepreneur in Organizing and Managing a Small Business. |
| | | | CO 310:2- Illustrate 'Idea to Startup' entrepreneurial culture through Design Thinking, Technology based Business Innovations and Solution to Social Problems |
| | | | CO 310:3- Manage Startup, Funding and Protection of Ideas. |
| | | | CO 310:4- Assess the Challenges and Exit Strategies of Startups |

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| 48 | VI | CO 311- MICROCONTROLLER AND PLC | CO 311:1- Summarize the architecture. of 8051 microcontroller. |
| | | | CO 311:2- Develop programs to interface the 8051 microcontroller with internal and external peripherals. |
| | | | CO 311:3- Illustrate the features, architecture and applications of Programmable logic controllers. |
| | | | CO 311:4- Build up programs to interface the Programmable logic controller with internal and external peripherals. |

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|-------|----------|--|---|
| 49 | VI | CO 312- ENERGY CONSERVATION AND MANAGEMENT | CO 312:1- Explain various renewable energy sources and its importance |
| | | | CO 312:2- Summarize various energy management techniques |
| | | | CO 312:3- Explain various practices for energy conservation in buildings. |
| | | | CO 312:4- Summarize the concept of energy audit in electrical systems.. |

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| 50 | VI | CO 313- INDIAN CONSTITUTION | CO 313:1- Describe the evolution and spirit of the constitution and its basic principles. |
| | | | CO 313:2- Summarize the rights and duties of a responsible citizen |
| | | | CO 313:3- Outline the various organs of government and its powers and functions. |
| | | | CO 313:4- Assimilate the ways and means in which constitutional and statutory bodies influence the everyday life of a citizen. |

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| 51 | VI | CO 314- ELECTRICAL COMPUTER AIDED DRAFTING LAB (ECAD LAB) | CO 314:1-.Identify electrical symbols, draw control & power circuits of induction motor starters using drafting software. |
| | | | CO 314:2- Construct sectional view of electrical machineries and its winding diagrams using drafting software. |
| | | | CO 314:3- Draw wiring schemes for industrial installations and panel board wiring diagram as per standards using drafting software. |
| | | | CO 314:4- Draw the single line layout of substations using drafting software. |

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| 52 | VI | CO 315- INDUSTRIAL AUTOMATION LAB | CO 315:1-.Develop simple assembly language programs for 8051 microcontroller |
| | | | CO 315:2- Develop assembly language programs to interface the microcontroller with the peripherals. |
| | | | CO 315:3- Develop simple ladder programs for a standard PLC |
| | | | CO 315:4- Develop ladder programs for various applications and interface I/O devices with the PLC modules. |

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| 53 | VI | CO 316- MODELLING AND SIMULATION LAB | CO 316:1-.Develop simulations to demonstrate basic electrical circuits. |
| | | | CO 316:2- Develop simulations to demonstrate basic electronic circuits. |
| | | | CO 316:3- Build simulation models for power electronic circuits |
| | | | CO 316:4- Construct simulation models to implement various combinational logic circuits |

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|-------|----------|----------------------|--|
| 54 | VI | CO 317-MAJOR PROJECT | CO 317:1-Apply technical knowledge in developing engineering products to simplify day to day conveniences. |
| | | | CO 317:2- Demonstrate capability of self-education and clearly understand the value of achieving perfection in project implementation & completion. |
| | | | CO 317:3- Demonstrate the importance of teamwork and a multi-disciplinary approach. |
| | | | CO 317:4- Demonstrate professionalism with ethics; present effective communication skills and relate engineering issues to broader societal context. |
| | | | CO 317:5- Develop technical documentation and user manual of engineering products. |
| | | | CO 317:6- Identify and analyze problems of the society and arrive at appropriate solutions. |