# Branch: Electrical and Electronics Engineering
**Programme Educational Objectives (PEOs)**


## Lakshmi Narain College of Technology, Indore

Estd. 2004

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## Programme Educational Objectives (PEOs)

**PEO 1.** Core Knowledge - Electrical and Electronics engineering graduates will have the knowledge of both Electrical core subjects with knowledge of current technology based on power electronics applications. They should attain this knowledge and learn other Engineering skills, Humanities, social science, management and conceptual and practical understanding of core electrical engineering fields with project development.

**PEO 2**. Employment/ Continuing Education - Electrical and Electronics Engineering graduates will have the knowledge of Industry-based technical skills to succeed in entry level engineering positions at various industries and excel in academics by pursuing higher education. The students must be able to pursue the higher education with a focus on research in the field of electrical and electronics engineering.

**PEO 3.** Professional Competency - Electrical and Electronics engineering graduates must be able to apply the knowledge they have earned in the current areas such as renewable energy generation such as solar and wind power generation. In addition to this the students will have the ability to communicate effectively in English, to accumulate and disseminate the knowledge and to work effectively in a team with a sense of social awareness.

## Programme Outcomes (POs)

**PO1.**Provide a comprehensive introduction to the issues of Electrical and Electronics Engineering

**PO2.**Utilize qualitative and quantitative methods to investigate and solve critical problems.

**PO3.**Enable you to engage in a critical engagement with contemporary discourses in sustainability and the social responsibility of organizations that will promote a personal and professional reflection on leading change in the electrical engineering sector

**PO4.**To prepare them for global competence for career options in education, research, industries, consultancy, environmental journalism etc.

**PO5.**Develop relevant management and organization knowledge, both academic and professional, in line with postgraduate standards/benchmarks.

# Course Outcomes

| BTech Electrical and Electronics Engineering |
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| **ES301 Energy & Environmental Engineering** |
| The objective of this Course is to provide an introduction to energy systems and renewable energy resources, with a scientific examination of the energy field and an emphasis on alternative energy sources and their technology and application. |
| **EX302 Signals and Systems** |
| Student after successful completion of course must possess an Understanding of various signals and systems properties and be able to identify whether a given system exhibits these properties and its implication for practical systems. |
| **EX303 Electrical Measurements and Instruments** |
| After successful completion of course, Students are expected to possess an in-depth understanding and Knowledge of the concepts and principles of measurement of electrical and non electrical viz. physical quantities and instruments. |
| **EX304 Network Analysis** |
| This Course introduces examination of electrical & electronic circuit analysis & synthesis tools & techniques such as the Laplace transform, nodal analysis & two port network theory.<br>Student after successful completion of course must be able to apply the Thévenin, Norton, nodal and mesh analysis to express complex circuits in their simpler equivalent forms and to apply linearity and superposition concepts to analyze RL, RC, and RLC circuits in time and frequency domains and also to analyze resonant circuits both in time and frequency domains. |
| **EX305 Analog Electronics** |
| After successful completion of course, Students are expected to able in applying theory and realize analog filter circuits, Understand the circuit operation of the 555 timer IC and regulator IC and identifying the faulty components within a circuit. |
| **BT401 Mathematics-III** |
| To introduce effective mathematical tools for the Numerical Solutions algebraic and transcendental equations. ¬ To enable young technocrats to acquire mathematical knowledge to understand Laplace transformation, Inverse Laplace transformation and Fourier Transform which are used in various branches of engineering. ¬ To acquaint the student with mathematical tools available in Statistics needed in various field of science and engineering. |
| **EX402 Electrical Machine-I** |
| To get basic as well practical hands on Electrical Machines i.e. Transformer , Induction machines, Special Machines |
| **EX 403 Digital Electronics Logic Design** |
| To Impart the knowledge of all the logic gates, Design of BCD to Excess-3 codeconverter , Implementation of NAND & NOR as Universalgate, Design of RS, JK, T& D Flipflop, Multiplexer /Demultipexer based boolean function , Design of combinational circuit forthe (i) Halfadder (ii) Fulladder (iii) Half subtractor (iv) Fullsubtractor, Design various A-D & D-Aconvertors, Verify the truth table of SR flip flop, Verify BCD to seven segment decoder. |
| **EX 404 Power System-I** |

- Measure and evaluate different power systemtechnologies through knowledge of the physical function of the devices,
- Make critical comparisons of different energy generation systems,
- Communicate technological and socio-economic issues around electrical power systems in a concise and an accessible way.

**EX 405 Control System**

**Learning outcomes:**

To Understand the basic as well as practical concept of 1. Time response of second order system. 2. Characteristics of Synchros. 3. Effect of feedback on servomotors. 4. Determination of transfer function of A-C servomotor 5. Determination of transfer function of D-C motor. 6. Formulation of PI & PD controller and study of closed loop responses of 1st and 2nd order dynamic systems. 7. State space model for classical transfer function using MATLAB. 8. Simulation of transfer function using operational amplifier. 9. Design problem: Compensating Networks of lead and lag. 10. Temperature controller using PID.

**EX501 Electrical Machine-II**

**Learning outcomes:**

To Understand the basic as well as practical concept of 1. magnetisation characteristic of a separately excited DC generator 2. To perform load test on DC generators. 3. To perform load test on DC series and shunt motor 4. To perform Swinburn's test on a DC machine and find out its efficiency under full load condition. 5. To conduct Hopkinson's test on a pair of DC shunt machine. 6. To perform OCC and SCC test on an alternator and determine its regulation. 7. To determine regulation of alternator using mmf and zpf methods. 8. To synchronise alternator with infinite bus bar. 9. To plot V and inverted V curves for a synchronous motor 10. To find Xdand Xqof salient pole synchronous machine by slip test. 11. To Determine negative sequence and zero sequence reactance of an alternator. 12. To determine subtransient direct axis and quadrature axis synchronous reactances of salient pole machine.

**EX 502 Power Electronics**

**Learning outcomes:**

Students will be able to understand the concept of 1- VI Characteristics Of SCR 2- VI Characteristics Of DIAC 3- VI Characteristics Of BJT 4- Characteristics Of TRIAC 5- VI Characteristics Of MOSFET 6- Transfer Characteristics Of MOSFET 7- Output Characteristics Of IGBT 8- Transfer Characteristics Of IGBT 9- 9 - Single Phase SCR Half Controlled Converter With R Load 10- 1ϕ Scr Fully Controlled Converter With R-Load 11- Study Of 3ϕ SCR Half Controlled Converter 12- Study Of 3ϕ SCR Fully Controlled Converter 13- Study Of Classes Of Commutation A,B,C,D,E,F.

**EX- 503 Electrical Power Generation & Economy**

**Learning outcomes:**

- Understanding of Introduction: Energy sources and their availability, Principle types of power plants, their special features and applications, Present status and future trends.

**EX- 504 (A) Industrial Electronics**

**Learning outcomes:**

- Identification of energy conservation opportunities in various industrial processes
- Gain knowledge on tools and techniques employed in energy auditing

- Power supply, rectifiers (half wave, full wave), performance parameters of power supplies, filters (capacitor,inductor, inductor-capacitor, pi filter), bleeder resistor, voltage multipliers .Regulated power supplies (series and shunt voltage regulators, fixed and adjustable voltage regulators,current regulator), switched regulator (SMPS), comparison of linear and switched power supply, switchmode converter (flyback, buck, boost, buk-boost, cuk converters).

**EX-601 Power System-II**

**Learning outcomes:**

- Discuss current and future energy sources and the environmental impact of the sustainable energy sector
- Problems associated with modern interconnected power Systems, deregulation, power systems restructuring, distributed generation, congestion, available transfer capacities, pricing of energy and transmission services.

**EX-602 Microprocessor & Micro-controller**

**Learning outcomes: To gain the knowledge about-**

Introduction to 16-bit 8086 microprocessors, architecture of 8086, Pin Configuration, mode, timing diagram, Memory interfacing,

Programs for 16 bit arithmetic operations for 8086 (using Various Addressing Modes). 2. Program for sorting an array for 8086. 3. Program for searching for a number or character in a string for 8086 4. Program for string manipulations for 8086. 5. Program for digital clock design using 8086. 6. Interfacing ADC and DAC to 8086. 7. Parallel communication between two microprocessors using 8255. 8. Serial communication between two microprocessor kits using 8251.

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**EX- 603 Utilization of Electrical Engineering**

**Learning outcomes:**

- Understand the principles of Illumination Engineering Nature of light, units, sensitivity of the eye, luminous efficiency, glare. Production of Light; Incandescent lamps
- Heating, Welding And Electrolysis
- Traction Special features of Traction motors, selection of Traction Motor, Different system of electric traction.
- Electric Drives Individual and collective drives- electrical braking, plugging, rheostatic and regenerative braking l

**EX- 604 Electronic Instrumentation**

**Learning outcomes:**

- Have a broad understanding of Introduction to CRO, Different parts of CRO, Its Block diagram, Electrostatic focusing, Electrostatic deflection, Have a high-level understanding of Use of Bridges for measurement of inductance, Capacitance & Q factor Maxwells bridge, Maxwells inductance capacitance bridge,

**EX-608 Minor Project-II**

**Learning outcomes:**

- The Minor Project Work provides students an opportunity to do something on their own and under the supervision of a guide. Each student shall work on an approved project, which may involve fabrication, design or investigation of a technical problem that may take design, experimental or analytical character or combine element of these areas. The project work

involves sufficient work so that students get acquainted with different aspects of manufacture, design or analysis. The students also have to keep in mind that in final semester they would be required to implement whatever has been planned in the Minor Project in this semester. It is possible that a work, which involves greater efforts and time may be taken up at this stage and finally completed in final semester, but partial completion report should be submitted in this semester and also evaluated by an external examiner.

**EX-701 Power System Protection**

**Learning outcomes:**

- Faults in power systems, single line diagram, equivalent impedance diagram, per unit reactances.
- Relays General considerations, sensing of faults, construction of electro-magnetic attraction and induction types relays, Buchholz and negative sequence relay, concept of reset.
- Protection Types & detection of faults and their effects, alternator protection scheme (stator, rotor, reverse power protection etc.).

**EX- 702 Power Electronics Application to Power System**

**Learning outcomes:**

Steady state and dynamic problems in AC systems: Flexible AC transmission systems (FACTS), Principles of series and shunt compensation

Modelling and Analysis of FACTS controllers: Control strategies to improve system stability, Power Quality problems in distribution systems

Harmonics: Harmonics creating loads, modelling, harmonic propagation, Series and parallel resonances, harmonic power flow, Mitigation of harmonics, filters, passive filters.

**EX- 703 Energy Audit & Management**

**Learning outcomes:**

- Students will be able to use the Thermal systems, Boilers, Furnaces and Thermic Fluid heaters- efficiency computation and energy conservation
- Introduction to energy & power scenario of world, National Energy consumption data, environmental aspects associated with energy utilization;
- Students will be able to carry out Energy conservation in major utilities; pumps, fans, blowers, compressed air systems, Refrigeration& Air Conditioning systems, Cooling Towers, DG sets.

**EX-706 Major Project-I**

**Learning outcomes:**

The objectives of the course 'Major Project-I' are To provide students with a comprehensive experience for applying the knowledge gained so far by studying various courses. To develop an inquiring aptitude and build confidence among students by working on solutions of small industrial problems. To give students an opportunity to do something creative and to assimilate real life work situation in institution. To adapt students for latest developments and to handle independently new situations. To develop good expressions power and presentation abilities in students. The focus of the Major Project is on preparing a working system or some design or understanding of a complex system using system analysis tools and submit it the same in the

form of a write-up i.e. detail project report. The student should select some real life problems for their project and maintain proper documentation of different stages of project such as need analysis, market analysis, concept evaluation, requirement specification, objectives, work plan, analysis, design, implementation and test plan. Each student is required to prepare a project report and present the same at the final examination with a demonstration of the working system (if any).