



MAR ATHANASIUS COLLEGE OF ENGINEERING
KOTHAMANGALAM

ELECTRICAL & ELECTRONICS ENGINEERING DEPARTMENT

LIST OF COURSE OUTCOME

B.TECH 2019 SCHEME

| SEMESTER | SUBJECT CODE | SUBJECT NAME | CO NO: | CO DESCRIPTION |
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| S1 | MAT 101 | LINEAR ALGEBRA AND CALCULUS | 1 | Solve systems of linear equations, diagonalize matrices and characterise quadratic forms |
| | | | 2 | Compute the partial and total derivatives and maxima and minima of multivariable functions |
| | | | 3 | Compute multiple integrals and apply them to find areas and volumes of geometrical shapes, mass and centre of gravity of plane laminas |
| | | | 4 | Perform various tests to determine whether a given series is convergent, absolutely convergent or conditionally convergent |
| | | | 5 | Determine the Taylor and Fourier series expansion of functions and learn their applications. |
| S1 | BSC CYT100 | ENGINEERING CHEMISTRY | 1 | Apply the basic concepts of electrochemistry and corrosion to explore its possible applications in various engineering fields. |
| | | | 2 | Understand various spectroscopic techniques like UV-Visible, IR, NMR and its applications. |
| | | | 3 | Apply the knowledge of analytical method for characterizing a chemical mixture or a compound. Understand the basic concept of SEM for surface |

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| | | | | characterisation of nanomaterials. |
| | | | 4 | Learn about the basics of stereochemistry and its application. Apply the knowledge of conducting polymers and advanced polymers in engineering. |
| | | | 5 | Study various types of water treatment methods to develop skills for treating wastewater. |
| S1 | EST 100 | ENGINEERING MECHANICS | 1 | Recall principles and theorems related to rigid body mechanics |
| | | | 2 | Identify and describe the components of system of forces acting on the rigid body |
| | | | 3 | Apply the conditions of equilibrium to various practical problems involving different force system. |
| | | | 4 | Choose appropriate theorems, principles or formulae to solve problems of mechanics. |
| | | | 5 | Solve problems involving rigid bodies, applying the properties of distributed areas and masses |
| | EST 120 | BASICS OF CIVIL & MECHANICAL ENGINEERING | 1 | Recall the role of civil engineer in society and to relate the various disciplines of Civil Engineering. |
| | | | 2 | Explain different types of buildings, building components, building materials and building construction |
| | | | 3 | Describe the importance, objectives and principles of surveying. |
| | | | 4 | Summarise the basic infrastructure services MEP, HVAC, elevators, escalators and ramps |
| | | | 5 | Discuss the Materials, energy systems, water management and environment for green buildings. |

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| S1 | | | 6 | Analyse thermodynamic cycles and calculate its efficiency |
| | | | 7 | Illustrate the working and features of IC Engines |
| | | | 8 | Explain the basic principles of Refrigeration and Air Conditioning |
| | | | 9 | Describe the working of hydraulic machines |
| | | | 10 | Explain the working of power transmission elements |
| | | | 11 | Describe the basic manufacturing, metal joining and machining processes |
| S1 | HUN 101 | Life skills | 1 | Define and Identify different life skills required in personal and professional life |
| | | | 2 | Develop an awareness of the self and apply well-defined techniques to cope with emotions and stress. |
| | | | 3 | Explain the basic mechanics of effective communication and demonstrate these through presentations |
| | | | 4 | Take part in group discussions and to understand the basics of teamwork and leadership |
| | | | 5 | Use appropriate thinking and problem solving techniques to solve new problems |
| S1 | CYL 120 | Engineering Chemistry Lab | 1 | Understand and practice different techniques of quantitative chemical analysis to generate experimental skills and apply these skills to various analyses |
| | | | 2 | Develop skills relevant to synthesize organic polymers and acquire the practical skill to use TLC for the identification of drugs |
| | | | 3 | Develop the ability to understand and explain the use of modern spectroscopic techniques for analysing and interpreting the IR spectra and NMR spectra of some organic compounds |

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| | | | 4 | Acquire the ability to understand, explain and use instrumental techniques for chemical analysis |
| | | | 5 | Learn to design and carry out scientific experiments as well as accurately record and analyze the results of such experiments |
| | | | 6 | Function as a member of a team, communicate effectively and engage in further learning. Also understand how chemistry addresses social, economical and environmental problems and why it is an integral part of curriculum |
| S1 | ESL 120 | Civil & Mechanical Workshop | 1 | Name different devices and tools used for civil engineering measurements |
| | | | 2 | Explain the use of various tools and devices for various field measurements |
| | | | 3 | Demonstrate the steps involved in basic civil engineering activities like plot measurement, setting out operation, evaluating the natural profile of land, plumbing and undertaking simple construction work. |
| | | | 4 | Choose materials and methods required for basic civil engineering activities like field measurements, masonry work and plumbing. |
| | | | 5 | Compare different techniques and devices used in civil engineering measurements |
| | | | 6 | Identify Basic Mechanical workshop operations in accordance with the material and objects |
| | | | 7 | Apply appropriate Tools and Instruments with respect to |

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| | | | | the mechanical workshop trades |
| | | | 8 | Apply appropriate safety measures with respect to the mechanical workshop trades |
| S2 | MAT 102 | VECTOR CALCULUS, DIFFERENTIAL EQUATIONS AND TRANSFORMS | 1 | Compute the derivatives and line integrals of vector functions and learn their applications |
| | | | 2 | Evaluate surface and volume integrals and learn their inter-relations and applications |
| | | | 3 | Solve homogeneous and non-homogeneous linear differential equation with constant coefficients. |
| | | | 4 | Compute Laplace transform and apply them to solve odes arising in engineering. |
| | | | 5 | Determine the Fourier transforms of functions and apply them to solve problems arising in engineering. |
| S2 | PHT 100 | ENGINEERING PHYSICS A | 1 | Compute the quantitative aspects of waves and oscillations in engineering systems. |
| | | | 2 | Apply the interaction of light with matter through interference, diffraction and identify these phenomena in different natural optical processes and optical instruments. |
| | | | 3 | Analyze the behaviour of matter in the atomic and subatomic level through the principles of quantum mechanics to perceive the microscopic processes in electronic devices. |
| | | | 4 | Classify the properties of magnetic materials and apply vector calculus to static magnetic fields and use Maxwell's equations to diverse engineering problems |
| | | | 5 | Analyze the principles behind various superconducting applications, explain the |

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| | | | | working of solid state lighting devices and fibre optic communication system |
| S2 | EST 110 | ENGINEERING GRAPHICS | 1 | Draw the projection of points and lines located in different quadrants |
| | | | 2 | Prepare multiview orthographic projections of objects by visualizing them in different positions |
| | | | 3 | Draw sectional views and develop surfaces of a given object |
| | | | 4 | Prepare pictorial drawings using the principles of isometric and perspective projections to visualize objects in three dimensions |
| | | | 5 | Convert 3D views to orthographic views |
| | | | 6 | Obtain multiview projections and solid models of objects using CAD tools |
| S2 | EST 130 | BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING | 1 | Apply fundamental concepts and circuit laws to solve simple DC electric circuits |
| | | | 2 | Develop and solve models of magnetic circuits |
| | | | 3 | Apply the fundamental laws of electrical engineering to solve simple ac circuits in steady state |
| | | | 4 | Describe working of a voltage amplifier |
| | | | 5 | Outline the principle of an electronic instrumentation system |
| | | | 6 | Explain the principle of radio and cellular communication |
| S2 | HUN 102 | PROFESSIONAL COMMUNICATION | 1 | Develop vocabulary and language skills relevant to engineering as a profession |
| | | | 2 | Analyze, interpret and effectively summarize a variety of textual content |
| | | | 3 | Create effective technical presentations |

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| | | | 4 | Discuss a given technical/non-technical topic in a group setting and arrive at generalizations/consensus |
| | | | 5 | Identify drawbacks in listening patterns and apply listening techniques for specific needs |
| | | | 6 | Create professional and technical documents that are clear and adhering to all the necessary conventions |
| S2 | EST 102 | PROGRAMMING IN C | 1 | Develop readable* C programs with branching and looping statements which uses Arithmetic, Logical, Relational or Bitwise operators. |
| | | | 2 | Write readable* C programs with arrays, structures or unions for storing the data to be processes. |
| | | | 3 | Divide a given computational problem into number of modules and develop a readable multi-function C program by using recursion if required, to find the solution to the computational problem. |
| | | | 4 | Write readable* C programs which use pointers for array processing and parameter passing. |
| | | | 5 | Develop readable* C programs with files for reading input and storing output. |
| S2 | PHL 120 | ENGINEERING PHYSICS LAB | 1 | Develop analytical/experimental skills and impart prerequisite hands on experience for engineering laboratories |
| | | | 2 | Understand the need for precise measurement practices for data recording |
| | | | 3 | Understand the principle, concept, working and applications of relevant technologies and comparison |

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| | | | | of results with theoretical calculations |
| | | | 4 | Analyze the techniques and skills associated with modern scientific tools such as lasers and fiber optics |
| | | | 5 | Develop basic communication skills through working in groups in performing the laboratory experiments and by interpreting the results |
| S2 | ESL 130 | ELECTRICAL & ELECTRONICS WORKSHOP | 1 | Demonstrate safety measures against electric shocks. |
| | | | 2 | Identify the tools used for electrical wiring, electrical accessories, wires, cables, batteries and standard symbols |
| | | | 3 | Develop the connection diagram, identify the suitable accessories and materials necessary for wiring simple lighting circuits for domestic buildings |
| | | | 4 | Identify and test various electronic components |
| | | | 5 | Draw circuit schematics with EDA tools |
| | | | 6 | Assemble and test electronic circuits on boards |
| S3 | MAT201 | Partial Differential Equation And Complex Analysis | 1 | Understand the concept and the solution of partial differential equation. |
| | | | 2 | Analyse and solve one dimensional wave equation and heat equation. |
| | | | 3 | Understand complex functions, its continuity differentiability with the use of Cauchy- Riemann equations. |
| | | | 4 | Evaluate complex integrals using Cauchy's integral theorem and Cauchy's integral formula, understand the series expansion of analytic function |
| | | | 5 | Understand the series expansion of complex function about a singularity |

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| | | | | and Apply residue theorem to compute several kinds of real integrals. |
| S3 | EET 201 | CIRCUITS AND NETWORKS | 1 | Explain the characteristics of management in the contemporary context (Cognitive Knowledge level: Understand). |
| S3 | | | 2 | Describe the functions of management (Cognitive Knowledge level: Understand) |
| | | | 3 | Demonstrate ability in decision making process and productivity analysis (Cognitive Knowledge level: Understand). |
| | | | 4 | Illustrate project management technique and develop a project schedule (Cognitive Knowledge level: Apply). |
| | | | 5 | Summarize the functional areas of management and Comprehend the concept of entrepreneurship and create business plans (Cognitive Knowledge level: Understand). |
| S3 | EET 203 | MEASUREMENTS AND INSTRUMENTATION | 1 | Choose appropriate instruments for the measurement of AC & DC voltage and current and analyze the factors affecting performance of measuring system. |
| | | | 2 | Explain the operating principle of power and energy measurement. |
| | | | 3 | Describe the operating principle of DC and AC bridges and understand the calibration of various meters. |
| | | | 4 | Outline the principles of operation of Magnetic measurement systems. |
| | | | 5 | Understand the operating principles of basic building |

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| | | | | blocks of digital systems, recording and display units. |
| S3 | EET 205 | ANALOG ELECTRONICS | 1 | An understanding of the basic concepts of biasing and stability factor of BJT transistors and their design |
| | | | 2 | An understanding of the basic concepts of biasing and stability factor of BJT transistors and their design |
| | | | 3 | Ability to analyze various power amplifier circuits and oscillator circuits using BJT. |
| | | | 4 | An understanding of the basic concepts of Operational Amplifier, its characteristics and applications. |
| | | | 5 | An understanding of the basic concepts of Operational Amplifier, its characteristics and applications. |
| S3 | HUT200 | PROFESSIONAL ETHICS | 1 | Understand the core values that shape the ethical behavior of a professional. |
| | | | 2 | Adopt a good character and follow an ethical life. |
| | | | 3 | Explain the role and responsibility in technological development by keeping personal ethics and legal ethics. |
| | | | 4 | Solve moral and ethical problems through exploration and assessment by established experiments. |
| | | | 5 | Apply the knowledge of human values and social values to contemporary ethical values and global issues. |
| S3 | | Sustainable Engineering | 1 | Understand the relevance and the concept of sustainability and the global initiatives in this direction |
| | | | 2 | Explain the different types of environmental pollution problems and their sustainable solutions |
| | | | 3 | Explain the environmental regulations and standards |

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| | | | 4 | Outline the concepts related to conventional and non-conventional energy |
| | | | 5 | Demonstrate the broad perspective of sustainable practices by utilizing engineering knowledge and principles |
| S3 | EEL 201 | CIRCUITS AND MEASUREMENTS LAB | 1 | Analyse voltage current relations of RLC circuits and the characteristics of various types of transducer systems. Also develop the team management and documentation capabilities. |
| | | | 2 | Verify DC network theorems by setting up various electric circuits |
| | | | 3 | Calibrate various meters used in electrical systems and measure power in a single and three phase circuits by various methods |
| | | | 4 | Determine electrical parameters using various bridges and analyse the performance of various electronic devices for an instrumentation system. |
| | | | 5 | Determine magnetic characteristics of different electrical devices |
| S3 | EEL 203 | ANALOG ELECTRONICS LAB | 1 | Understand the basic concepts of analog electronic circuits and hence to design rectifier circuits, clipping and clamping circuits |
| | | | 2 | Ability to understand and design amplifier and oscillator circuits |
| | | | 3 | Ability to design and analyze various voltage regulators and to simulate electronic circuits using PSPICE |
| | | | 4 | Gain the ability to design and implement various waveform generation linear integrated circuits using Opamp and to design and develop oscillator |

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| | | | | and precision rectifier using Opamp |
| | | | 5 | Gain the ability to design and implement multivibrator circuits using IC 555 and the Schmitt trigger circuit |
| S3 | EET 283 | INTRODUCTION TO POWER ENGINEERING (MINOR) | 1 | Illustrate various conventional sources of energy generation |
| | | | 2 | Analyse the economics of power generation and power factor improvement |
| | | | 3 | Design mechanical parameters of a transmission system. |
| | | | 4 | Design electrical parameters of a transmission system. |
| | | | 5 | Classify different types of ac and dc distribution systems. |
| S4 | MAT 204 | Probability, Random Processes and Numerical methods | 1 | Understand the concept, properties and important models of discrete random variables and, using them, analyse suitable random phenomena. |
| | | | 2 | Understand the concept, properties and important models of continuous random variables and, using them, analyse suitable random phenomena. |
| | | | 3 | Analyse random processes using autocorrelation, power spectrum and Poisson process model as appropriate. |
| | | | 4 | Compute roots of equations, evaluate definite integrals and perform interpolation on given numerical data using standard numerical techniques |
| | | | 5 | Apply standard numerical techniques for solving systems of equations, fitting curves on given numerical data and solving ordinary differential equations. |
| S4 | EET202 | DC MACHINES AND TRANSFORMERS | 1 | Ability to describe the constructional details of DC machines. |

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| | | | 2 | Ability to analyze the performance characteristics of DC generators. |
| | | | 3 | Ability to Illustrate the principle of operation of DC motors , test the DC machines to assess its performance , explain the speed control techniques of DC Motors and select appropriate motor types for different applications. |
| | | | 4 | Ability to describe the constructional details and modes of operation of single phase transformers, analyse the performance of transformers under various conditions and explain the conditions for parallel operation of transformers. |
| | | | 5 | Ability to describe the constructional details of three phase transformers and different connections of 3-phase transformers and explain the conditions for parallel operation of transformers. |
| | EET 204 | ELECTROMAGNETIC THEORY | 1 | Apply vector analysis and coordinate systems to solve static electric and magnetic field problems. |
| | | | 2 | Apply Gauss Law, Coulomb's law and Poisson's equation to determine electrostatic field parameters |
| | | | 3 | Determine magnetic fields from current distributions by applying Biot-Savart's law and Amperes Circuital law |
| | | | 4 | Apply Maxwell Equations for the solution of timevarying fields |
| | | | 5 | Analyse electromagnetic wave propagation in different media. |
| S4 | EET 206 | DIGITAL ELECTRONICS | 1 | Identify various number systems, binary codes and |

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| | | | | formulate digital functions using Boolean algebra |
| | | | 2 | Design and implement combinational logic circuits |
| | | | 3 | Design and implement sequential logic circuits |
| | | | 4 | Compare the operation of various analog to digital and digital to analog conversion circuits. |
| | | | 5 | Explain the basic concepts of programmable logic devices and VHDL. |
| S4 | EST 200 | DESIGN AND ENGINEERING | 1 | Students will be able to identify various problems, define them clearly & develop creative ideas |
| | | | 2 | Students will be aware of different processes involved in design |
| | | | 3 | Students will be capable of developing a model from the prototype |
| | | | 4 | Students will be able to design quality products by considering safety standards & minimizing wastage |
| | | | 5 | Students will be aware of the post production aspects of a product |
| S4 | MCN 202 | Constitution of India | 1 | Explain the background of the present constitution of India and features |
| | | | 2 | Utilize the fundamental rights and duties |
| | | | 3 | Understand the union executive, parliament and judiciary |
| | | | 4 | Understand the state executive, legislature and judiciary |
| | | | 5 | Utilize the special provisions and statutory institutions |
| S4 | EEL 202 | ELECTRICAL MACHINES LAB I | 1 | Capability to form an equivalent circuit of induction motors and improving the starting torque of induction motor using external rotor resistance. |

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| | | | 2 | Ability to analyze the performance of induction generator and induction motor. |
| | | | 3 | Graduates will acquire the ability to find out the regulation of alternators by direct loading, emf/ mmf method, Potier method |
| | | | 4 | Ability to synchronize and analyze the performance characteristics of alternator |
| | | | 5 | Ability to determine the voltage regulation of the given salient pole alternator |
| S4 | EEL 204 | DIGITAL ELECTRONICS LAB | 1 | Familiarisation of digital ics and Formulate digital functions using Boolean Algebra and verify experimentally. |
| | | | 2 | Design and implement combinational logic circuits. |
| | | | 3 | Design and implement sequential logic circuits. |
| | | | 4 | Design a digital circuit for practical application |
| | | | 5 | Gain the ability to implement simple circuits using a hardware description language VHDL |
| S4 | EET 284 | ENERGY SYSTEMS (MINOR) | 1 | Illustrate various conventional sources of energy generation |
| | | | 2 | Analyse the economics of power generation and power factor improvement |
| | | | 3 | Design mechanical parameters of a transmission system. |
| | | | 4 | Design electrical parameters of a transmission system. |
| | | | 5 | Classify different types of ac and dc distribution systems |
| S4 | EET 292 | NETWORK ANALYSIS AND SYNTHESIS (HONORS) | 1 | Apply network topology concepts in the formulation of electric network problems. |
| | | | 2 | Apply network topology concepts in the solution of electric network problems. |

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| | | | 3 | Apply two-port network analysis in the design and analysis of filter and attenuator networks. |
| | | | 4 | Identify the properties and characteristics of network functions, and verify the mathematical constraints for their physical realisation. |
| | | | 5 | Synthesize passive one-port networks using standard Foster and Cauer forms |