



MAR ATHANASIUS COLLEGE OF ENGINEERING
KOTHAMANGALAM

ELECTRONICS & COMMUNICATION ENGINEERING DEPARTMENT

LIST OF COURSE OUTCOMES

B.TECH 2019 SCHEME

SEMESTER	SUBJECT CODE	SUBJECT NAME	CO NO:	CO DESCRIPTION
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	CYT 100	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 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	EST100	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
S1	EST120	BASICS OF CIVIL AND 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.
			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	HUT101	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
			5	Use appropriate thinking and problem solving techniques to solve new problems
			6	Understand the basics of teamwork and leadership

S1	CYL120	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
			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
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S1	ESL120	CIVIL AND 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

S2	MAT 102	VECTOR CALCULUS, DIFFERENTIAL EQUATIONS AND CALCULUS	1	Apply the concept of vector functions and learn to work with conservative vector field
			2	Apply computing integrals of scalar and vector field over surfaces in three-dimensional space.

			3	Solve homogeneous and non-homogeneous linear differential equation with constant coefficients
			4	Apply Laplace transforms to solve physical problems arising in engineering
			5	Apply Fourier transforms to solve physical 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 working of solid state lighting devices and fibre optic communication system

S2	EST110	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 and vice versa
			6	Obtain multiview projections and solid models of objects using CAD tools

S2	EST 130	BASICS OF ELECTRICAL AND 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 the working of various electronic components and their characteristics
			5	The working principle of various electronic circuits and outline the principle of an electronic instrumentation system

			6	Explain the principle of radio and cellular communication
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S2	HUN102	PROFESSIONAL COMMUNICATION	1	Develop vocabulary and language skills relevant to engineering as a profession
			2	Analyse, interpret and effectively summarize a variety of textual content
			3	Create effective technical presentations
			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	EST102	PROGRAMMING IN C	1	Analyze a computational problem and develop an algorithm/flowchart to find its solution
			2	Develop readable* C programs with branching and looping statements, which uses Arithmetic, Logical, Relational or Bitwise operators.
			3	Write readable C programs with arrays, structure or union for storing the the data to be processed

			4	Divide a given computational problem into a number of modules and develop a readable multi-function C program by using recursion if required, to find the solution to the computational problem
			5	Write readable C programs which use pointers for array processing and parameter passing
			6	Develop readable C programs with files for reading input and storing output

S2	PHL 120	ENGINEERING PHYSICS LAB	1	Apply modern instruments like CRO, strain gauge to measure the basic physical quantities viz. frequency and amplitude of a wave pattern, strain etc. Carryout measurement of wave pattern in a stretched string and the corresponding frequency values using a Melde's string apparatus.
			2	Determine the wavelength of monochromatic beam of light and thickness of micro-thin object etc. by forming Newton's rings pattern and an air wedge fringe pattern.
			3	Carryout the measurement of wavelength by diffraction of plane transmission grating and the spectra formed by a monochromatic beam of light and a laser.

			4	Determine the wavelength of a laser beam using the plane transmission grating. Measurement of numerical aperture of an optic fibre and evaluate the properties of a solar cell and LED through its I-V characteristics.
			5	Determine the velocity of ultrasonic waves in liquid using ultrasonic diffractometer. Compare the magnetic moment of various magnets and determine the magnetic flux density using deflection/vibration Magnetometer.

S2	ESL130	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
			7	Work in a team with good interpersonal skills

S3	ECT201	SOLID STATE DEVICES	1	Apply Fermi-Dirac Distribution function and Compute carrier concentration at equilibrium and the parameters associated with generation, recombination and transport mechanism
			2	Explain drift and diffusion currents in extrinsic semiconductors and Compute current density due to these effects.
			3	Define the current components and derive the current equation in a pn junction diode and bipolar junction transistor.
			4	Explain the basic MOS physics and derive the expressions for drain current in linear and saturation regions.
			5	Discuss scaling of MOSFETs and short channel effects.
S3	ECT 203	LOGIC CIRCUIT DESIGN	1	Explain the elements of digital system abstractions such as digital representations of information, digital logic and Boolean algebra
			2	Create an implementation of a combinational logic function described by a truth table using and/or/inv gates/ muxes
			3	Compare different types of logic families with respect to performance and efficiency
			4	Design a sequential logic circuit using the basic building blocks like flip-flops
			5	Design and analyze combinational and sequential logic circuits through gate level Verilog models
S3	ECT205	NETWORK THEORY	1	Apply Mesh / Node analysis or Network Theorems to obtain steady state response of the linear time invariant networks.
			2	Apply Laplace Transforms to determine the transient behaviour of RLC networks.

			3	Apply Network functions and Network Parameters to analyse the single port and two port networks.
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S3	EST 200	DESIGN AND ENGINEERING	1	Explain the different concepts and principles involved in design engineering.
			2	Apply design thinking while learning and practicing engineering.
			3	Develop innovative, reliable, sustainable and economically viable designs incorporating knowledge in engineering

S3	MCN201	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	Discuss the environmental regulations and standards
			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	ECL 201	SCIENTIFIC COMPUTING LABORATORY	1	Describe the needs and requirements of scientific computing and to familiarize one programming language for scientific computing and data visualization.
			2	Approximate an array/matrix with matrix decomposition.
			3	Implement numerical integration and differentiation.
			4	Solve ordinary differential equations for engineering applications
			5	Compute with exported data from instruments
			6	Realize how periodic functions are constituted by sinusoids

			7	Simulate random processes and understand their statistics.
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S3	ECL 203	LOGIC DESIGN LAB	1	Design and demonstrate the functioning of various combinational and sequential circuits using Ics
			2	Apply an industry compatible hardware description language to implement digital circuits
			3	Implement digital circuits on FPGA boards and connect external hardware to the boards
			4	Function effectively as an individual and in a team to accomplish the given task

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	ECT202	ANALOG CIRCUITS	1	Design analog signal processing circuits using diodes and first order RC circuit
			2	Analyse basic amplifiers using BJT and MOSFET

			3	Apply the principle of oscillator and regulated power supply circuits
S4	ECT 204	SIGNALS AND SYSTEMS	1	Apply properties of signals and systems to classify them
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			3	Describe orthogonality of signals and convolution integral.
			4	Apply transfer function to compute the LTI response to input signals.
			5	Apply sampling theorem to discretize continuous time signals
S4	ECT 206	COMPUTER ARCHITECTURE AND MICROCONTROLLERS*	1	Explain the functional units, I/O and memory management w.r.t a typical computer architecture.
			2	Distinguish between microprocessor and microcontroller.
			3	Develop simple programs using assembly language programming.
			4	Interface 8051 microcontroller with peripheral devices using ALP/Embedded C
			5	Familiarize system software and Advanced RISC Machine Architecture.
S4	MCN202	COURSE NAME 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 working of the union executive, parliament and judiciary.
			4	Understand the working of the state executive, legislature and judiciary.
			5	Utilize the special provisions and statutory institutions.
			6	Show national and patriotic spirit as responsible citizens of the country
S4	ECL 202	ANALOG CIRCUITS AND SIMULATION LAB	1	Design and demonstrate the functioning of basic analog circuits using discrete components.
			2	Design and simulate the functioning of basic analog circuits using simulation tools.
			3	Function effectively as an individual and in a team to accomplish the given task.

S4	ECL 204	MICROCONTROLLER LAB	1	Write an Assembly language program/Embedded C program for performing data manipulation.
			2	Develop ALP/Embedded C Programs to interface microcontroller with peripherals
			3	Perform programming/interfacing experiments with IDE for modern microcontrollers.