

St Thomas Institute for Science and Technology
Department of Electrical and Electronics Engineering
Course Outcome

Program : B.Tech Electrical and Electronics Engineering
Syllabus : 2024

Semester	3
Course Name	MATHEMATICS FOR ELECTRICAL SCIENCE AND PHYSICAL SCIENCE – 3
Course Code	GYMAT301
Course Outcome	
SI No	Outcomes
CO1	Determine the Fourier transforms of functions and apply them to solve problems arising in engineering.
CO2	Understand the analyticity of complex functions and apply it in conformal mapping.
CO3	Compute complex integrals using Cauchy's integral theorem and Cauchy's integral formula.
CO 4	Understand the series expansion of complex function about a singularity and apply residue theorem to compute real integrals.

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Semester	3
Course Name	CIRCUITS & NETWORKS
Course Code	PCEET302
Course Outcome	
SI No	Outcomes
CO1	Apply circuit theorems to solve complex DC and AC electric networks
CO2	Apply transformation from time domain to s-domain, solve dynamic electric circuits.
CO3	Solve series and parallel resonant circuits
CO4	Analyse three-phase networks in star and delta configurations under balanced and unbalanced conditions.
CO5	Describe two-port networks in terms of various parameters.
CO6	Explain the steady-state behaviour of coupled circuits with sinusoidal excitation

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Semester	3
Course Name	DC MACHINES & TRANSFORMERS
Course Code	PCEET303
Course Outcome	
SI No	Outcomes
CO1	Describe the constructional details of DC machines
CO2	Analyse the performance DC generator under various load conditions.
CO3	Analyse the performance DC motor under various load conditions
CO4	Analyse the performance of 1-phase transformer and auto-transformer under various load conditions.
CO5	Describe the constructional details and operation of 3-phase transformers.

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Semester	3
Course Name	ANALOG ELECTRONICS
Course Code	PBEET304
Course Outcome	
SI No	Outcomes
CO1	Design BJT and FET amplifier circuits
CO2	Design Oscillator circuits
CO3	Design and develop various OP AMP application circuits
CO4	Implementation of active filters
CO5	Implement an electronic hardware circuit for the solution of a real time problem

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Semester	3
Course Name	INTRODUCTION TO ARTIFICIAL INTELLIGENCE AND DATA SCIENCE
Course Code	GNEST305
Course Outcome	
SI No	Outcomes
CO1	Apply the concept of machine learning algorithms including neural networks and supervised/unsupervised learning techniques for engineering applications.
CO2	Apply advanced mathematical concepts such as matrix operations, singular values, and principal component analysis to analyze and solve engineering problems.
CO3	Analyze and interpret data using statistical methods including descriptive statistics, correlation, and regression analysis to derive meaningful insights and make informed decisions.
CO4	Integrate statistical approaches and machine learning techniques to ensure practically feasible solutions in engineering contexts

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Semester	3
Course Name	ECONOMICS FOR ENGINEERS
Course Code	UCHUT346
Course Outcome	
SI No	Outcomes
CO1	Understand the fundamentals of various economic issues using laws and learn the concepts of demand, supply, elasticity and production function.
CO2	Develop decision making capability by applying concepts relating to costs and revenue, and acquire knowledge regarding the functioning of firms in different market situations.
CO3	Outline the macroeconomic principles of monetary and fiscal systems, national income and stock market.
CO4	Make use of the possibilities of value analysis and engineering, and solve simple business problems using break even analysis, cost benefit analysis and capital budgeting techniques.

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Semester	3/4
Course Name	ENGINEERING ETHICS AND SUSTAINABLE DEVELOPMENT
Course Code	UCHUT347
Course Outcome	
SI No	Outcomes
CO1	Develop the ability to apply the principles of engineering ethics in their professional life.
CO2	Develop the ability to exercise gender-sensitive practices in their professional lives
CO3	Develop the ability to explore contemporary environmental issues and sustainable practices.
CO4	Develop the ability to analyse the role of engineers in promoting sustainability and climate resilience.
CO5	Develop interest and skills in addressing pertinent environmental and climate-related challenges through a sustainable engineering approach.

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Semester	3
Course Name	CIRCUITS AND MEASUREMENTS LAB
Course Code	PCEEL307
Course Outcome	
SI No	Outcomes
CO1	Analyse voltage current phasor relations of RLC circuits
CO2	Verify DC network theorems by setting up various electric circuits
CO3	Measure power in single and three phase circuits by various methods
CO4	Determine the calibration characteristics of various meters used in electrical systems
CO5	Determine magnetic characteristics of different electrical devices
CO6	Analyse the characteristics of various types of transducer systems
CO7	Determine electrical parameters using various bridges
CO8	Develop simulation models of electric circuits using modern simulation tools.

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Semester	3
Course Name	ANALOG ELECTRONICS LAB
Course Code	PCEEL308
Course Outcome	
SI No	Outcomes
CO1	Use the various electronic instruments and for conducting experiments.
CO2	Design and develop various electronic circuits using diodes and Zener diodes.
CO3	Design and implement amplifier and oscillator circuits using BJT and JFET.
CO4	Design and implement basic circuits using IC (OPAMP and 555 timers).
CO5	Simulate electronic circuits using any circuit simulation software.
CO6	Use PCB layout software for circuit design

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Semester	4
Course Name	MATHEMATICS FOR ELECTRICAL SCIENCE– 4
Course Code	GBMAT401
Course Outcome	
SI No	Outcomes
CO1	Understand the concept, properties and important models of discrete random variables and to apply in suitable random phenomena.
CO2	Understand the concept, properties and important models of continuous random variables and to apply in suitable random phenomena.
CO3	Estimate population parameters, assess their certainty with confidence intervals, and test hypotheses about population means and proportions using z-tests and the one-sample t-test.
CO4	Analyze random processes by classifying them, describing their properties, utilizing autocorrelation functions, and understanding their applications in areas like signal processing and communication systems.

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Semester	4
Course Name	SYNCHRONOUS & INDUCTION MACHINES
Course Code	PCEET402
Course Outcome	
SI No	Outcomes
CO1	Describe the constructional details and analyse the performance of synchronous generators under various load conditions.
CO2	Analyse the performance of synchronous motors under various load conditions
CO3	Describe the constructional details and analyse the steady-state performance of induction motors under various load conditions
CO4	Analyse the various starting, braking and speed control methods of 3-phase induction motors.
CO5	Explain the construction details and working of various types of single-phase induction motors.

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Semester	4
Course Name	POWER ELECTRONICS AND DRIVES
Course Code	PCEET403
Course Outcome	
SI No	Outcomes
CO1	Understand the operation of modern power semiconductor devices, its characteristics and select suitable gate driver circuits & heatsinks
CO2	Understand the features of phase-controlled rectifiers, AC voltage Controllers & Switching Regulators and analyse the operation
CO3	Understand the features of different types of switch mode DC-AC Inverters and analyse the operation
CO4	Understand the need for improved efficiency, improved reliability, improved load & source waveforms and improved utility interface
CO5	Understand the features of adjustable speed drives and analyse the Basic drive schemes for DC motors and Induction Motors

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Semester	4
Course Name	DIGITAL ELECTRONICS
Course Code	PBEET404
Course Outcome	
SI No	Outcomes
CO1	Identify various number systems, binary codes and formulate digital functions using Boolean algebra.
CO2	Design combinational logic circuits.
CO3	Design sequential logic circuits.
CO4	Describe the operation of various analog to digital and digital to analog conversion circuits.
CO5	Explain the basic concepts of programming using Verilog HDL
CO6	Design and realize medium complexity hardware circuits.

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Semester	4
Course Name	DC MACHINES & TRANSFORMERS LAB
Course Code	PCEEL407
Course Outcome	
Sl No	Outcomes
CO1	Analyze the performance of DC generators by conducting load/no-load tests
CO2	Sketch the performance characteristics of DC shunt and series motors
CO3	Investigate the losses and efficiency in DC machines by conducting no-load tests
CO4	Examine the performance of individual and parallel connected single-phase transformers by conducting load/no-load tests
CO5	Determine the voltage regulation and efficiency of 3-phase transformer by conducting no-load tests.

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Semester	4
Course Name	POWER ELECTRONICS AND DRIVES LAB
Course Code	PCEEL408
Course Outcome	
SI No	Outcomes
CO1	Understand the operation of modern power semiconductor devices, its characteristics and Design & Select suitable gate driver circuits & heatsinks
CO2	Understand the features of phase-controlled rectifiers, AC voltage Controllers & Switching Regulators and Analyse the operation
CO3	Understand the features of different types of switch mode DC-AC Inverters and Analyse the operation
CO4	Understand the need for improved efficiency, improved reliability, improved load & source waveforms and improved utility interface
CO5	Understand the features of adjustable speed drives and Analyse the basic drive schemes for DC motors and Induction Motors

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Semester	5
Course Name	POWER GENERATION, TRANSMISSION AND PROTECTION
Course Code	PCEET501
Course Outcome	
SI No	Outcomes
CO1	Learn different types of power generating systems and schedule generation appropriate for a given area.
CO2	Evaluate the electrical performance of any transmission line.
CO3	Compute various physical characteristics of overhead and underground transmission systems.
CO4	Demonstrate the working of relays and switch gear for protection schemes.
CO5	Design a simple ac electrical distribution system as per the standards.

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Semester	5
Course Name	ELECTROMAGNETIC THEORY
Course Code	PCEET502
Course Outcome	
SI No	Outcomes
CO1	Apply vector calculus in Electricity and Magnetism.
CO2	Compute electric and magnetic fields in different media
CO3	Deduce the Maxwell-Heaviside Equations from the basic laws of electricity and magnetism
CO4	Predict the production of electromagnetic waves with electric and magnetic fields
CO5	Demonstrate the propagation of electromagnetic excitations in transmission lines

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Semester	5
Course Name	SIGNALS AND SYSTEMS
Course Code	PCEET503
Course Outcome	
SI No	Outcomes
CO1	To represent continuous and discrete time signals in time domain and perform various mathematical operations
CO2	To represent continuous time signals and systems in frequency domain
CO3	To represent discrete time signals and systems in Z-domain.
CO4	To analyse the stability of continuous time dynamical systems

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Semester	5
Course Name	MICROPROCESSORS AND EMBEDDED SYSTEMS
Course Code	PBEET504
Course Outcome	
SI No	Outcomes
CO1	Describe the architecture of 8085 microprocessor and 8085 Assembly language programming.
CO2	Understand the need for interrupts, Subroutines, timing diagram of 8085 microprocessor and interfacing
CO3	Understand and gain the basic idea about the embedded system and selection of processors.
CO4	Able to gain working level knowledge about a Arduino Uno based system architecture and Arduino IDE K2
CO5	Write Programs using Embedded C and implement an application using Arduino UNO board.
CO6	Understand the RISC Architecture and Apply the knowledge for solving the real life problems using ARM - Arduino DUE board based embedded system.

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Semester	5
Course Name	AC MACHINES LAB
Course Code	PCEEL507
Course Outcome	
SI No	Outcomes
CO1	Analyze the performance of 3-phase squirrel cage and slip ring induction motor at different loads.
CO2	Analyze the performance of line excited induction machine working in motoring and generating modes
CO3	Apply V/f control techniques for the speed control of 3-phase induction motors
CO4	Determine the voltage regulation of 3-phase cylindrical rotor type and salient pole type synchronous generators
CO5	Construct V and inverter V curves of synchronous machines at constant load.
CO6	Compute the efficiency of single-phase induction motor at a specified load.

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Semester	5
Course Name	MICROPROCESSORS AND EMBEDDED SYSTEMS LAB
Course Code	PCEEL508
Course Outcome	
SI No	Outcomes
CO1	Develop and execute ALP programs for solving arithmetic and logical problems using microcontroller
CO2	Develop embedded C programming using instruction sets of 8051
CO3	Examine circuits for interfacing processor with various peripheral devices
CO4	Design a microcontroller based system with the help of various interfacing devices
CO5	Design an Arduino based system with the help of various interfacing devices

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Semester	6
Course Name	CONTROL SYSTEMS
Course Code	PCEET601
Course Outcome	
SI No	Outcomes
CO1	Analyse the time domain responses of linear systems and predict and diagnose transient response parameters of the system for standard input functions.
CO2	Analyse dynamics systems for their performance and stability using Root locus
CO3	Apply frequency domain tools to analyse the performance of linear dynamic systems
CO4	Represent and analyse dynamic systems using state-space.

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Semester	6
Course Name	ELECTRICAL SYSTEM DESIGN AND ESTIMATION
Course Code	PCEET602
Course Outcome	
SI No	Outcomes
CO1	Understand the Indian standards and code of practice for efficient and effective energy usage with various electrical system design components.
CO2	Design electrical wiring for residential and commercial consumers as per IS codes and NEC and integration of PV systems
CO3	Design electrical installation for industrial consumers and high rise buildings.
CO4	Analyse electrical system conditioning equipment and power backups.
CO5	Design various earthing methods and protection

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Semester	6
Course Name	CONTROL SYSTEM LAB
Course Code	PCEEL607
Course Outcome	
SI No	Outcomes
CO1	Identify and conduct suitable experiments to determine the parameters to model a physical system.
CO2	Conduct suitable experiments and determine the performance specifications.
CO3	Analyse a linear continuous time system model using simulation tools.
CO4	Design suitable controllers/compensators to meet the performance requirements using simulation tools.

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Semester	6
Course Name	POWER SYSTEM LAB
Course Code	PCEEL609
Course Outcome	
SI No	Outcomes
CO1	Develop mathematical models and conduct steady state and transient analysis of power system networks using standard / dedicated software.
CO2	Conduct appropriate tests for any power system component as per standards to analyse their performance.