Hope Foundation’s

International Institute of Information Technology

P-14, Rajiv Gandhi Info Park, Phase 1, Hinjawadi, Pune 411057

Department of Electronics and Telecommunication

**Course Outcomes (COs)**

**SE (Electronics and Telecommunication) – 2019 Pattern**

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| CourseCode | Name ofSubject/Course | Course Outcomes (Cos) |
| 207005 | Engineering Mathematics - III | * Solve higher order linear differential equation using appropriate techniques for modelling, analyzing of electrical circuits and control systems.
* Apply concept of Fourier transform & Z-transform and its applications to continuous & discrete systems, signal & image processing and communication systems.
* Obtain Interpolating polynomials, numerically differentiate and integrate functions, numerical solutions of differential equations using single step and multi-step iterative methods used in modern scientific computing.
* Perform vector differentiation & integration, analyze the vector fields and apply to electro-magnetic fields & wave theory.
* Analyze Complex functions, Conformal mappings,

Contour integration applicable to electrostatics, digital filters, signal and image processing. |
| 204181 | Electronic Circuits | * Assimilate the physics, characteristics and parameters of MOSFET towards its application as amplifier.
* Design MOSFET amplifiers, with and without feedback, & MOSFET oscillators, for given specifications.
* Analyze and assess the performance of linear and switching regulators, with their variants, towards applications in regulated power supplies.
* Explain internal schematic of Op-Amp and define its performance parameters.
* Design, Build and test Op-amp based analog signal processing and conditioning circuits towards various real time applications.
* Understand and compare the principles of various data

conversion techniques and PLL with their applications. |

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| 204182 | Digital Circuits | * Identify and prevent various hazards and timing problems in a digital design.
* Use the basic logic gates and various reduction techniques of digital logic circuit.
* Analyze, design and implement combinational logic circuits.
* Analyze, design and implement sequential circuits.
* Differentiate between Mealy and Moore machines.
* Analyze digital system design using PLD.
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| 204183 | Electrical Circuits | * Analyze the simple DC and AC circuit with circuit simplification techniques.
* Formulate and analyze driven and source free RL and RC circuits.
* Formulate & determine network parameters for given network and analyze the given network using Laplace Transform to find the network transfer function.
* Explain construction, working and applications of DC Machines / Single Phase & Three Phase AC Motors.
* Explain construction, working and applications of special purpose motors & understand motors used in electrical vehicles.
* Analyze and select a suitable motor for different

applications. |
| 204184 | Data Structures | * Solve mathematical problems using C programming language.
* Implement sorting and searching algorithms and calculate their complexity.
* Develop applications of stack and queue using array.
* Demonstrate applicability of Linked List.
* Demonstrate applicability of nonlinear data structures - Binary Tree with respect to its time complexity.
* Apply the knowledge of graph for solving the problems

of spanning tree and shortest path algorithm. |
| 204191 | Signals & Systems | * Identify, classify basic signals and perform operations on signals.
* Identify, Classify the systems based on their properties in terms of input output relation and in terms of impulse response and will be able to determine the convolution between to signals.
* Analyze and resolve the signals in frequency domain using Fourier series and Fourier Transform.
* Resolve the signals in complex frequency domain using Laplace Transform, and will be able to apply and analyze the LTI systems using Laplace Transforms.
* Define and describe the probability, random variables and random signals. Compute the probability of a given event, model, compute the CDF and PDF.
* Compute the mean, mean square, variance and
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|  |  | standard deviation for given random variables usingPDF. |
| 204192 | Control Systems | * Determine and use models of physical systems in forms suitable for use in the analysis and design of control systems.
* Determine the (absolute) stability of a closed-loop control system.
* Perform time domain analysis of control systems required for stability analysis.
* Perform frequency domain analysis of control systems required for stability analysis.
* Apply root-locus, Frequency Plots technique to analyze control systems.
* Express and solve system equations in state variable form.
* Differentiate between various digital controllers and understand the role of the controllers in Industrial automation.
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| 204193 | Principles of Communication Systems | * To compute & compare the bandwidth and transmission power requirements by analyzing time and frequency domain spectra of signal required for modulation schemes under study.
* Describe and analyze the techniques of generation, transmission and reception of Amplitude Modulation Systems.
* Explain generation and detection of FM systems and compare with AM systems.
* Exhibit the importance of Sampling Theorem and correlate with Pulse Modulation technique (PAM, PWM, and PPM).
* Characterize the quantization process and elaborate digital representation techniques (PCM, DPCM, DM and ADM).
* Illustrate waveform coding, multiplexing and

synchronization techniques and articulate their importance in baseband digital transmission. |
| 204194 | Object Oriented Programming | * Describe the principles of object-oriented programming.
* Apply the concepts of data encapsulation, inheritance in C++.
* Understand Operator overloading and friend functions in C++.
* Apply the concepts of classes, methods inheritance and polymorphism to write programs C++.
* Apply Templates, Namespaces and Exception Handling concepts to write programs in C++.
* Describe and use of File handling in C++.
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| 204199 | Employability SkillsDevelopment | * Define personal and career goals using introspective

skills and SWOC assessment. Outline and evaluate |

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|  |  | short-term and long-term goals.* Develop effective communication skills (listening, reading, writing, and speaking), self- management attributes, problem solving abilities and team working & building capabilities in order to fetch employment opportunities and further succeed in the workplace.
* Be a part of a multi-cultural professional environment and work effectively by enhancing inter-personal relationships, conflict management and leadership skills.
* Comprehend the importance of professional ethics, etiquettes & morals and demonstrate sensitivity towards it throughout certified career.
* Develop practically deployable skill set involving critical thinking, effective presentations and leadership qualities to hone the opportunities of employability and

excel in the professional environment. |
| 204200 | Project Based Learning | * Identify the real-world problem (possibly of interdisciplinary nature) through a rigorous literature survey and formulate / set relevant aim and objectives.
* Contribute to society through proposed solution by strictly following professional ethics and safety measures.
* Propose a suitable solution based on the fundamentals of electronics and communication engineering by possibly the integration of previously acquired knowledge.
* Analyze the results and arrive at valid conclusion.
* Use of technology in proposed work and demonstrate learning in oral and written form.
* Develop ability to work as an individual and as a team

member. |
| **SEMESTER II** |
| 204191 | Signals & Systems | * Identify, classify basic signals and perform operations on signals.
* "Identify, Classify the systems based on their properties in terms of input output relation and in terms of impulse response and will be able to determine the convolution between to signals."
* Analyze and resolve the signals in frequency domain using Fourier series and Fourier Transform.
* "Resolve the signals in complex frequency domain using Laplace Transform, and will be able to apply and analyze the LTI systems using Laplace Transforms. "
* "Define and Describe the probability, random variables and random signals. Compute the probability of a given event, model, compute the CDF and PDF. "
* "Compute the mean, mean square, variance and standard deviation for given random variables using PDF."
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| 204192 | Control Systems | * Determine and use models of physical systems in forms suitable for use in the analysis and design of control systems.
* Perform time domain analysis of control systems required for stability analysis.
* Apply root locus and Routh Hurwitz criteria to determine the stability of a closed-loop control system.
* Perform frequency domain analysis of control systems required for stability analysis.
* Express and solve system equations in state variable form.
* Differentiate between digital controllers and understand their role in industrial automation.
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| 204193 | Principal of Communication Systems | * To compute & compare the bandwidth and transmission power requirements by analyzing time and frequency domain spectra of signal required for modulation schemes under study.
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* Characterize the quantization process and elaborate digital representation techniques (PCM, DPCM, DM and ADM).
* Illustrate waveform coding, multiplexing and synchronization techniques and articulate their importance in baseband digital transmission.
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| 204194 | Object Oriented Programming | * Apply the concepts of object-oriented programming to write programs in C++' and learn concepts of operator overloading.
* Design simple programs using classes and objects in C++.
* Design and implement C++ programs for complex problems, making good use of the features of the language such as classes, inheritance and templates
* "Able to Understand and Apply the concepts of constructors &destructors in program design"
* Understand exceptional handling concepts using try and catch.
* Use the concepts in C++ to for file handling operations.
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| 204195 | Signals & Control System Lab | * Write a program to generate and plot the basic signals in time domain using any simulation tool.
* Write a code for verifying the sampling and aliasing components of any arbitrary signal. Implement computing the system response for any arbitrary input with the help of systems impulse response.
* Carryout a spectral analysis using Fourier transform on any speech or audio signals and verify the results with the manual computation.
* Solve the examples on block diagram reduction techniques, signal flow graph, and find the transfer function of the electrical and mechanical systems.
* Implement the first & second order systems and observe the system response for step input. Also verify the systems stability.
* Write a code to implement the stability techniques; Root locus, Bode plot, Nyquist plot and comment on Gain Margin, Phase Margin and Stability of the systems observations.
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| 204196 | Principle of Communication Systems Lab | * To compute & compare the bandwidth and transmission power requirements by analyzing time and frequency domain spectra of signal required for modulation schemes under study.
* Describe and analyze the techniques of generation, transmission and reception of Amplitude Modulation Systems.
* Explain generation and detection of FM systems and compare with AM systems.
* Exhibit the importance of Sampling Theorem and correlate with Pulse Modulation technique (PAM, PWM, and PPM).
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* Design simple programs using classes and objects in C++.
* Design and implement C++ programs for complex problems, making good use of the features of the language such as classes, inheritance and templates
* "Able to Understand and Apply the concepts of constructors &destructors in program design. "
* Understand exceptional handling concepts using try and catch.
* Use the concepts in C++ to for file handling operations.
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| 204198 | Data Analytics Lab | * Install Python Jupyter and write programs using NumPy, Pandas, Matplotlib and Scikit-learn
* Write programs to visualize output using various graphs and plots
* Illustrate decision making from raw data available.
* Demonstrate quantitative research using statistical operations.
* Analyze data set to summarize main characteristics and infer based on correlation.
* Point out exact relationship between variables and predict the result.
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| 204199 | Employability Skill Development | * Define personal and career goals using introspective skills and SWOC assessment. Outline and evaluate short-term and long-term goals.
* Develop empathy and emotional intelligence to be able to enhance professional relationships especially in an ethnic and culturally diverse environment
* Develop effective communication skills (listening, reading, writing, and speaking), self- management attributes, problem solving abilities and team working & building capabilities in order to fetch employment opportunities and further succeed in the workplace.
* Be a part of a multi-cultural professional environment and work effectively by enhancing inter-personal relationships, conflict management and leadership skills.
* Comprehend the importance of professional ethics, etiquette & morals and demonstrate sensitivity towards it throughout certified career.
* Develop practically deployable skill sets involving critical thinking, effective presentations and leadership qualities to hone the opportunities of employability and excel in the professional environment.
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