

PRATHYUSHA ENGINEERING COLLEGE
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING (R-2013)

| S.N O | COURS E CODE | COURSE NAME | CO1 | CO2 | CO3 | CO4 | CO5 |
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| Odd Semester | | I SEMESTER | | | | | |
| 1 | HS6151 | Technical English – I | To read articles of a general kind in magazines and newspapers | To participate effectively in informal conversations | To introduce themselves and their friends and express opinions in English | To comprehend conversations and short talks delivered in English | To write short essays of a general kind and personal letters and emails in English |
| 2 | MA615 1 | Mathematics – I | To use differentiation to solve maxima and minima problems | To use integration methods to do multiple integrals | To evaluate integrals using substitution techniques, partial fractions and integration by parts | To determine convergence/divergence of improper integrals and evaluate convergent improper integrals | To apply various techniques in solving differential equations |
| 3 | PH6151 | Engineering Physics – I | To analyse the properties of matter and its applications | The analyse the properties of waves and optical devices and their applications in fibre optics | To analyse the thermal properties of materials and their applications in expansion joints and heat exchangers | To analyse the characteristics of advanced physics concepts of quantum theory and its applications in tunneling microscopes | To analyse the characterists of basics of crystals their structures and different crystal growth techniques |

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| 4 | CY6151 | Engineering Chemistry – I | To analyse the boiler water requirements, related problems and water treatment techniques | To understand the phase rule and its application | To analyse the properties and applications of engineering materials | To use the calorific value calculations, manufacture of solid, liquid and gaseous fuels | To understand the generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells. |
| 5 | GE6151 | Computer Programming | To write algorithmic problem solving | To read and write C programs using condition and loops | To write programs using functions | To write programs in data structures - lists, Array, Stack. | To write programs perform input and output operation with files |
| 6 | GE6152 | Engineering Graphics | To understand the standards of Engineering graphics | To perform freehand sketching of basic geometrical constructions and multiple views of objects | To project orthographic projections of lines and plane surfaces | To draw projections and development of surfaces | To visualize and to project isometric and perspective sections of simple solids |
| 7 | GE6161 | Computer Practices Laboratory | To write, test and debug C programs. | To implement C programs with conditional and loops. | To develop C programs with functions. | To develop programs using Python lists, tuples and dictionaries. | To read and write data from/to files |
| 8 | GE6162 | Engineering Practices Laboratory | To perform basic carpentry | To perform basic welding, foundry, | To perform the basic electrical appliances work | To perform basic measurement using electronic | To design circuits in PCB using soldering. |

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| | | | works. | smithy and machine operations. | and measure electrical quantities. | equipment. | |
| 9 | GE6163 | Physics and Chemistry Laboratory - I | To analyse the influence of optical properties in engineering applications. | To analyse the influence of thermal properties in engineering applications. | To analyse the influence of elastic properties in engineering applications. | To determine the water quality parameters through volumetric and instrumental analysis. | To determine the molecular weight of a polymer by viscometry method. |
| S.N O | COURS E CODE | COURSE NAME | CO1 | CO2 | CO3 | CO4 | CO5 |
| Even Semester | | II SEMESTER | | | | | |
| 1 | HS6251 | Technical English – II | To read technical texts and write area-specific texts effortlessly | To listen and comprehend lectures and talks in their area of specialisation successfully | To speak appropriately and effectively in varied formal and informal contexts | To listening to a document and make notes | To acquire the skill group discussion and write job applications |
| 2 | MA6251 | Mathematics – II | To determine eigen values and eigen vectors | To determine the gradient, divergence and curl of a vector point function and related identities | To evaluate line, surface and volume integrals using Gauss, Stokes and Green's theorem | To determine analytic functions, conformal mapping and complex integration | To determine Laplace transform and inverse transform |

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| 3 | PH6251 | Engineering Physics – II | To analyse the characteristics of classical and quantum electron theories and energy band structures | To analyse the semiconductor characteristics and its applications in various devices | To analyse the characteristics of magnetic and dielectric properties of materials | To analyse the functions of optical materials for optoelectronics | To analyse the characteristics of quantum structures |
| 4 | CY6251 | Engineering Chemistry – II | To make the students conversant with boiler feed water requirements, related problems and water treatment techniques. | Principles of electrochemical reactions, redox reactions in corrosion of materials and methods for corrosion prevention and protection of materials. | Principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells. | Preparation, properties and applications of engineering materials. | Types of fuels, calorific value calculations, manufacture of solid, liquid and gaseous fuels. |
| 5 | EC6201 | Electronic Devices | To analyse the characteristics of semiconductor diodes | To analyse the characteristics of BJT | To analyse the characteristics of FET | To analyse the characteristics of special semiconductor devices | To analyse the characteristics of power devices and display devices |
| 6 | EE6201 | Circuit Theory | To analyse the characteristics of networks topology | To analyse and apply network theorems for DC and AC | To analyse the resonance and coupled circuits | To analyse the transient response of RC, RL and RLC circuits | To analyse the two port networks using Z, Y, H parameters |

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| | | | | circuits | | | |
| 7 | GE6262 | Physics and Chemistry Laboratory - II | To analyse the influence of elastic properties in engineering applications. | To analyse the influence of thermal properties in engineering applications. | To analyse the influence of water conservation in engineering applications. | To determine the water quality parameters through volumetric and instrumental analysis. | To determine the corrosion measurement and cement analysis |
| 8 | EC6211 | Circuits and Devices Laboratory | To analyse the characteristics of diode, BJT and FET. | To analyse the characteristics of SCR, clipper, clamper circuits. | To analyse the characteristics of Rectifier circuits. | To analyse the verify different theorems. | To analyse the working of RL, RC and RLC circuits. |
| S.NO | COURSE CODE | COURSE NAME | CO1 | CO2 | CO3 | CO4 | CO5 |
| Odd Semester | | III SEMESTER | | | | | |
| 1 | MA6351 | Linear Algebra and Partial Differential Equations | Solve the basic objects associated with the vector spaces and linear transformations | Apply the concepts on eigen values and eigen vectors of a linear transformation of a matrix | Analyse the basic concepts of inner product spaces and Least square approximation | Evaluate the PDE and the various solution produces for first order PDE | Analyse the Fourier series concepts to apply for solving Initial boundary value problems. |
| 2 | EC6301 | Object oriented Programming and Data Structures | Design problem solution using basic concept | Apply the concept of function,pointers, | Impliment and suggest appropriate linear and non | Apply,design and analysis varieuse graph concept to give soluion for real | Apply the concept of different sorting technique for real |

| | | | in c | structure, storage class and preprocessor | linear data structure operation using C | time application | time application |
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| 3 | EC6304 | Electronic Circuits -I | Design of different types of biasing circuit for BJT and MOSFET | Design and analysis of BJT amplifier circuits | Design and analysis of MOSFET amplifier circuits | Evaluate the performance of low frequency and high frequency amplifier circuits | Design of rectifier circuits and power supply circuits |
| 4 | EC6303 | SIGNALS AND SYSTEMS | Ability to determine given signals are causal, non-causal, systems are linear/non-linear. | Capable to determine the frequency response using Laplace transform and Frequency transform. | Design of LTI-CT systems | Able to analyse DT signal using DTFT and Z-Transform. | Design of LTI DT systems |
| 5 | EC6302 | DIGITAL ELECTRONICS | Analyse different methods used for simplification of boolean expression | Design various combinational digital circuits using logic gates | Analysis and design procedures for synchronous sequential circuits | Analysis and design procedures for asynchronous sequential circuits | Design semiconductor memories using various techniques |
| 6 | EC6405 | Control Systems Engineering | Identify the various control system components and their | Analyze the various time domain specifications | Analyze the various frequency plots and systems | Apply the concepts of various system stability criterions | Design the various transfer functions of digital control systems |

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| | | | representations | | | | |
| 7 | EC8381 | Fundamentals of Data Structures in C Laboratory | Design and implementation of basic concepts in C. | Design and implementation of stack, queue using array. | Design and implementation of stack, queue using linked list. | Design and implementation of Binary Search Tree. | Design and implementation of Quick sort. |
| 8 | EC6311 | Analog and Digital Circuits Laboratory | Analyse the frequency response of different amplifiers using BJT and FET. | Analyse the frequency response of amplifiers using SPICE. | Design and implementation of code converters, Adder/Subtractor, Multiplexer/De-Multiplexer, Encoder/Decoder. | Design and implementation of counters. | Design and implementation of shift registers. |
| 9 | EC6312 | OOPS and Data Structures lab | To acquire the skill to listen and respond appropriately. | To participate in group discussions. | To make effective presentations. | To participate confidently and appropriately in formal conversations. | To participate confidently and appropriately in informal conversations. |

IV SEMESTER

| S.NO | COURSE CODE | COURSE NAME | CO1 | CO2 | CO3 | CO4 | CO5 |
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| 1 | MA6451 | Probability and Random Processes | · Understand the fundamental knowledge of the concepts | · Understand the basic concepts of one and two dimensional | · Apply the concept random processes in engineering disciplines. | · Understand and apply the concept of correlation and spectral densities. | · The students will have an exposure of various distribution |

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| | | | of probability and have knowledge of standard distributions which can describe real life phenomenon. | random variables and apply in engineering applications. | | | functions and help in acquiring skills in handling situations involving more than one variable. Able to analyze the response of random inputs to linear time invariant systems. |
| 2 | EC6401 | ElectronicCircuits II | Analyze different types of amplifier, oscillator and multivibrator circuits | · Design BJT amplifier and oscillator circuits | · Analyze transistorized amplifier and oscillator circuits | · Design and analyze feedback amplifiers | Design LC and RC oscillators, tuned amplifiers, wave shaping circuits, multivibrators, power amplifier and DC convertors. |
| 3 | EC6402 | CommunicationTheory | · Design AM communication systems | Design Angle modulated communication systems | · Apply the concepts of Random Process to the design of Communication systems | · Analyze the noise performance of AM and FM systems | Gain knowledge in sampling and quantization |
| 4 | EC6403 | ElectromagneticFields | Analyze the requisite of vectors in Electromagnetics | Explain the concepts and solve simple problems requiring estimation of | Explain the concepts and solve simple problems requiring estimation of | Describe coupling between electric and magnetic fields through Maxwells equation | Infer electromagnetic wave propagation in lossy and lossless media |

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| | | | | Electric fields | Electric fields | | |
| 5 | EC6404 | LinearIntegratedCircuits | · Design linear and non linear applications of OP – AMPS | · Design applications using analog multiplier and PLL | Design ADC and DAC using OP – AMPS | · Generate waveforms using OP – AMP Circuits | Analyze special function ICs |
| 6 | EC6405 | Control System Engineering | Identify the various control system components and their representations | Analyze the various time domain specifications | Analyze the various frequency lpts and systems | Apply the concepts of various system stability criterions | Design the various transfer functions of digital control systems |
| 7 | EC8461 | Circuits Design and Simulation Laboratory | To analyse the different types of feedback amplifiers | To design oscillators, tuned amplifier circuits. | To design wave-shaping circuits and multivibrator circuits. | To design and simulate feedback amplifiers, oscillators and tuned amplifiers using SPICE tool. | To design and simulate wave shaping and multivibrator circuits using SPICE tool. |
| 8 | EC8462 | LinearIntegratedCircuitsLaboratory | To design amplifiers, oscillators, D-A converters using operational amplifiers. | To design and analyse frequency response of filters using op-amp. | To analyse the working of PLL | To design DC power supply using ICs. | To analyse the performance of filters, multivibrators, A/D converter and analog multiplier using SPICE. |

V SEMESTER

| S.NO | COURSE CODE | COURSE NAME | CO1 | CO2 | CO3 | CO4 | CO5 |
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| 1 | EC6501 | DIGITAL COMMUNICATION | Ability to represent signal as basis function and convert analog signals to digital signals | Ability to use source and channel coding in the design of a digital communication system. | Ability to evaluate the performance of digital communication system using different modulation schemes. | Ability to design matched and correlation receivers for a digital communication system. | |
| 2 | EC6502 | PRINCIPLES OF DIGITAL SIGNAL PROCESSING | Apply DFT for the analysis of digital signals and systems | Design of IIR filters using Impulse invariant method and Bilinear Transformation | Design of FIR filters using Fourier Series method, Windowing technique and Frequency Sampling Technique | Analyze the Characteristics of finite precision representation on digital filters | Design of multirate filters and adaptive filters |
| 3 | EC6503 | TRANSMISSION LINES AND WAVEGUIDES | Explain the propagation of signal through transmission lines | Analyse signal propagation at radio frequencies | Utilise smith chart to solve transmission lines and impedance matching problems | Design various passive filters | Elaborate radio propagation in guided system and determining the field configuration |
| 4 | EC6504 | MICROPROCESSOR AND MICROCONTROLLER | Understand and execute programs based on 8086 | · Design Memory Interfacing circuits. | Understand and Analyse various architecture | · Design and interface I/O circuits. | · Design and implement 8051 microcontroller based systems. |

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| | | | microprocessor. | | | | |
| 5 | GE6351 | ENVIRONMENTAL SCIENCE AND ENGINEERING | Environmental Pollution or problems cannot be solved by mere laws. Public participation is an important aspect which serves the environmental Protection. One will obtain knowledge on the following after completing the course. | · Public awareness of environmental is at infant stage. | Ignorance and incomplete knowledge has lead to misconceptions | · Development and improvement in std. of living has lead to serious environmental disasters | |
| 6 | EC6511 | Digital Signal Processing Laboratory | To develop basic signal processing operations. | To demonstrate the implementation of DSP systems. | To analyze the architecture of DSP processor. | To design and implement the FIR and IIR filters in DSP processor for performing filtering operation over real-time signals. | To design DSP system for different applications of DSP. |

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| 7 | EC6512 | Communication Systems Laboratory | To analyse the effects of sampling and TDM. | To implement AM and FM modulation and demodulation. | To implement PCM and DM modulation. | To simulate and analyse Digital modulation schemes. | To simulate and analyse Error control coding schemes. |
| 8 | EC6513 | Microprocessor and Microcontroller Laboratory | To develop ALP program for fixed and floating point arithmetic operations using 8086. | To develop ALP program to interface different I/Os with processor. | To generate waveforms using microprocessors. | To write ALP program for arithmetic operations using 8051. | To compare simulator and emulator. |

VI SEMESTER

| S.NO | COURSE CODE | COURSE NAME | CO1 | CO2 | CO3 | CO4 | CO5 |
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| 1 | EC6001 | Medical Electronics | Interpret and analyze various recording methods and computer aided devices for biomedical applications. | Demonstrate measuring of basic medical parameters | Interpret the various assist devices used in hospitals such as pacemakers, defibrillators, dialyzers and ventilators. | Apply safety standards and select disposal methods and procedures for electrical diagnostic equipment. | Analyze the current trends in medical instrumentation |
| 2 | EC6601 | VLSI Design | Design & analyze of CMOS transistor & | Design of different types of combinational | Analyze & Design the sequential circuit using | Design of various Components of building blocks | Analyze the architecture of ASICs & FPGA building blocks |

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| | | | its scaling | logic circuits and power dissipation analyzes | different methodology | | |
| 3 | CS6303 | Computer Architecture | To understand the basic structures and instruction formats of digital computer | To understand the concepts of fixed and floating point arithmetic operations | To design and implement the schemes of control unit and pipeline performance | To discuss the various memory interfacing and organization of multiple processors | To discuss the parallel processing technique and unconventional architectures |
| 4 | MG685 1 | Principles of Management | To identify and analyze the function of management in global and economic trends | To analyze and evaluate the steps involved in planning and decision making as a team work | To evaluate the need for organizing activity as life long process. | To identify the process of recruitment, leadership for effective communication | To evaluate and analyze the need for quality controlling in various application area. |
| 5 | CS6551 | Computer Networks | Identify the components required to build different types of networks with each functionality, different error schemes and flow control mechanisms used in link | Choose the required transmission medium for various specific applications with its required protocols | Trace the flow of information from one to another node in the network. | Identify solution for each functionality at Transport layer to maintain the QoS in data transmission. | Understand the traditional applications with its Functionalities and protocols involved in these applications. |

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| | | | layer services. | | | | |
| 6 | EC6602 | Antenna & Wave propagation | Explain the propagation of signal through transmission lines | Analyse signal propagation at radio frequencies | Explain the various types of antennas and wave propagation. | Write about the radiation from a current element. | Analyze the antenna arrays, aperture antennas and special antennas such as frequency independent and broad band |
| 7 | EC6611 | Computer Networks Lab | To communicate between two desktop computers. | To implement the different protocols. | To program using sockets. | To implement various network topology. | To implement and compare the various routing algorithms. |
| 8 | EC6612 | VLSI Design Lab | To develop program using HDL code for basic and advanced digital integrated circuit. | To analyse the principles of VLSI circuit design in digital and analog domain. | To import the logic modules into FPGA boards. | To synthesize place and route the digital IPs. | To design, simulate and extract the layouts of digital and analog IC blocks using EDA tools. |

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| 9 | GE6674 | Communication and Soft Skills - Laboratory Based | To be totally learner-centric with minimum teacher intervention as the course revolves around practice. | Suitable audio/video samples from Podcast/YouTube to be used for illustrative purposes. | Portfolio approach for writing to be followed. Learners are to be encouraged to blog, tweet, text and email employing appropriate language. | GD/Interview/Role Play/Debate could be conducted off the laboratory (in a regular classroom) but learners are to be exposed to telephonic interview and video conferencing. | Learners are to be assigned to read/write/listen/view materials outside the classroom as well for gaining proficiency and better participation in the class. |
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| ODD SEMESTER | | VII SEMESTER | | | | | |
| 1 | EC6701 | RF & Microwave Engineering | Analyze 2 port network and the basics of Scattering parameter with S matrix formulation | Analyze the RF transistor Amplifier and design the different matching Network. | Acquire knowledge about various components of Microwave | Analyze the characteristics of Cavity Resonator, Reflex Klystron, and Magnetron Oscillator. | Measurement and Analyze the microwave signals with its parameter. |
| 2 | EC6702 | Optical Communication and Networks | Discuss the various optical fiber modes and configurations | To Analyze various signal degradation factors associated with optical fiber. | Explain the various optical sources and optical detectors and their use in the optical communication system | Analyze the digital transmission and its associated parameters on system performance | To study the optical Networks and its performance such as SONET/SDH and optical CDMA |

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| 3 | EC6703 | Embedded Systems and Real Time Systems | Interpret the concepts of embedded computing and ARM processor. | Examine the designing in embedded computing. | Explain the process involved in embedded design and RTOS. | Apply the systems design techniques to develop software programming for embedded systems. | Design real time applications model using embedded systems concepts. |
| 4 | EC6004 | SATELLITE COMMUNICATION | Identify the principles, concepts and operation of satellite communication systems by designing orbits taking into consideration the influential factors. | Analyse the signal propagation effects, rain fading, perform interference calculations and design link budget expressions. | Identify and formulate modulation techniques and error correction codes for satellite communication using software tools. | Use software tools to simulate and analyse the performance of satellite communication systems, and use real satellite up/down links (subject to the availability of satellite links) to conduct link experiments | Analyse, identify and design the multiple access techniques to be employed for various satellite communication systems and its applications. |
| 5 | EC6011 | ELECTROMAGNETIC INTERFERENCE AND COMPATIBILITY | The students would gain enough knowledge to understand concept of EMI related to product design | Analyse the different EM coupling principles and its impact on performance of electronic system | Analyse EMI concepts on Susceptibility and immunity | Analyse the present leading edge industry standards in different countries. | Gain broad knowledge on EM radiation measurement techniques. |

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| 6 | EC6015 | RADAR AND NAVIGATIONAL AIDS | Analyze various types of radar equipment and measurement systems. | Understand the operation of Moving Target Indicator and pulse Doppler radar and calculate range and location of the target | Analyze features of Radar transmitters and receivers and design amplifiers using modern tools. | Distinguish different navigation systems and analyse the performance of the navigational systems | Compare Navigation aids, conduct experiments for direction finding and range of travel of aircrafts using modern tools. |
| 7 | EC6711 | EMBEDDED LABORATORY | To develop programs in ARM processor for different applications. | To interface memory, A/D and D/A convertors with ARM system. | To analyse the performance of interrupt. | To develop program for interfacing keyboard and display. | To develop program for interfacing motor and sensor. |
| 8 | EC6712 | Optical and Microwave Laboratory | Analyze the performance of simple optical link. | Test microwave and optical components. | Analyse the mode characteristics of fiber | Analyse the radiation of pattern of antenna. | Analyze about the characteristics and measurements in optical fiber |

| Even Semester | | VIII SEMESTER | | | | | |
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| 1 | GE 6757 | TOTAL QUALITY MANAGEMENT | Apply the knowledge of TQM relevant to both manufacturing and service industry including IT | Design the tools and techniques for quality management. | Analyze various quality management teamwork. | Apply the knowledge on various ISO standards and quality system. | Design the organization for performance excellence by analyzing issues and evaluating functional areas. |

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| | | | sector. | | | | |
| 2 | GE6075 | PROFESSIONAL ETHICS IN ENGINEERING | The students should be able to apply human values and morals in life | To discuss the ethical issues related to Engineering | The students should be able to apply Engineering ethics in society | To realize the responsibilities and rights in the society | To discuss the global issues in ethics |
| 3 | EC6801 | WIRELESS COMMUNICATION | Characterize a wireless channel and evolve the system design specifications | Design a cellular system based on resource availability and traffic demands | Identify suitable signaling and multipath mitigation techniques for the wireless channel and system under consideration. | Analyse various Modulation techniques for fading channels | Analyse various multiplexing techniques based on channels and transmitter-receiver diversity |
| 4 | EC6802 | WIRELESS NETWORKS | Analyze & review the different WLAN technologies architecture & their layers. | Design an appropriate routing protocols for MANET | To analyze the performance of radio network components | To analyze the performance of different architecture in WWAN | Implement different types of applications for smart phones & mobiles devices with latest network strategies. |

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| 5 | EC6811 | PROJECT WORK | Identification of domain, Literature review and formulation of the problem | Analyse the data collected using specific modern engineering tools to interpret the results and provide valid conclusions | Examine the analysed result towards social relevance of its applications | Visually represent the results in the form of graphs and compare with existing systems | Identify future enhancements in broader context of technology |
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