# Vidya Jyothi Institute of Technology

(An Autonomous Institution)

(Accredited by NAAC, Approved by AICTE New Delhi & Permanently Affiliated to JNTUH)

Aziz Nagar Gate, C.B. Post, Hyderabad-500 075

## Department of Electronics and Communication Engineering

**(Accredited by NBA)**

## R18 Regulation CO Statements

**II B.TECH- I SEM**

**A43012. COMPLEX ANALYSIS AND FOURIER TRANSFORM**

**Course Outcomes :**At the end of the course the student should be able to

| | |
|---|---|
| **C201.1** | Work with the functions of complex variables and evaluation of complexdifferentiation. |
| **C201.2** | Acquire the knowledge of complex power series and integration. |
| **C201.3** | Apply the knowledge of contour integration to evaluate real integrals in engineering problems and acquire the knowledge of evaluating of conformal mapping and bilinear transformations. |
| **C201.4** | Studying of Fourier series and defining it for various types of functions. Apply Fourier sine and cosine integral theorems for a given function f(x) evaluateFourier transforms, sine and cosine transforms. |
| **C201.5** | Work with the functions of complex variables and evaluation of complexdifferentiation. |

**A43508. OBJECT ORIENTED PROGRAMMING through JAVA**

**Course Outcomes:** At the end of the course the student should be able to

| | |
|---|---|
| **C202.1** | Able to solve real world problems using OOP techniques. |
| **C202.2** | Able to understand the use of abstract classes. |
| **C202.3** | Able to solve problems using inheritance, polymorphism. |
| **C202.4** | Able to develop multithreaded applications with synchronization. |
| **C202.5** | Able to handle run time errors while applying exception handling |

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### A43401. ELECTRONIC DEVICES AND CIRCUITS

**Course Outcomes:** At the end of the course the student should be able to

| | |
|---|---|
| **C203.1** | Demonstrate the concepts of semiconductor theory. |
| **C203.2** | Interpret the characteristics of different semiconductor devices with its applications. |
| **C203.3** | Apply different biasing techniques of transistors for amplification. |
| **C203.4** | Analyze transistor amplifiers using small signal model. |
| **C203.5** | Ability to describe the behavior of special purpose diodes. |

### A43402. PROBABILITY THEORY AND STOCHASTIC PROCESSES

**Course Outcomes**: At the end of the course the student should be able to

| | |
|---|---|
| **C204.1** | Recall the structure and organization involved in digital computer design. |
| **C204.2** | Identify the different memory and input- output system involved in system design. |
| **C204.3** | Understand the basics of computer organization |
| **C204.4** | Understand the design on program control and computer arithmetic operations. |
| **C204.5** | Comprehend the various details of multiprocessor in computer design |

### A43403. SIGNALS & SYSTEMS

**Course Outcomes:**

At the end of the course the student should be able to

| | |
|---|---|
| **C205.1** | Understand the Mathematics, operations and classification of signals and systems |
| **C205.2** | Apply the transform on standard and arbitrary signals |
| **C205.3** | Infer the signal transmission through linear systems |
| **C205.4** | Interpret the concepts of sampling and role of Z-Transform in analysis of systems. |
| **C205.5** | Understand the process of sampling and the effects of under sampling. |

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### A44405.NETWORK ANALYSIS AND TRANSMISSION LINES

**Course Outcomes**

At the end of the course the student should be able to

| | |
|---|---|
| **C206.1** | Recite basic concepts of network parameters, theorems and transmission linetheory. |
| **C206.2** | Differentiate the changes of transient networks using Laplace transform |
| **C206.3** | Compare and contrast the parameters, functions and synthesis of the network |
| **C206.4** | Apply the concepts of theorems on networks and transmission line theory to solveimpedance matching issues. |
| **C206.5** | Solve the transmission lines and matching circuits problems using Smith chart |

### A43481.ELECTRONIC DEVICES AND CIRCUITS LABORATORY

**Course Outcomes**

At the end of the course the student should be able to

| | |
|---|---|
| **C207.1** | Identify and use the basic components and instruments in electronics laboratory |
| **C207.2** | Outline the characteristics of different semiconductor devices. |
| **C207.3** | Interpret the ripple factor, regulations of rectifiers. |
| **C207.4** | Sketch the frequency response of small signal amplifiers. |
| **C207.5** | Understand the concepts of SCR & UJT and observe its characteristics. |

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### A43482.BASIC SIMULATION LABORATORY

**Course Outcomes**

At the end of the course the student should be able to

| | |
|---|---|
| **C208.1** | Evaluate the operation on signals and systems using arithmetic operations andtransforms |
| **C208.2** | Application of correlation and transforms on noise removal and signal extraction |
| **C208.3** | Compute various statistical properties of a random noise and verify whether it isstationary |
| **C208.4** | Determine the correlation & Convolution between Signals and sequences. |
| **C208.5** | Validate the properties and waveform synthesis of various transforms |

### A43MC2.GENDER SENSITIZATION

**Course Outcomes**

At the end of the course the student should be able to

| | |
|---|---|
| **C209.1** | To develop awareness about gender discrimination and take measurable steps tocounter it. |
| **C209.2** | To identify the basic dimensions of biological, sociological, psychological and legalaspects of gender. |
| **C209.3** | To acquire knowledge about gendered division of labour in relation to politics andeconomics. |
| **C209.4** | To prepare the students against gender violence. |
| **C209.5** | To prepare the students to work and live together as equals. |

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**II B.Tech II Semester**

### A44404.SWITCHING THEORY AND LOGIC DESIGN

**Course Outcomes** At the end of the course the student should be able to

| | |
|---|---|
| **C210.1** | Demonstrate the basic theorems of Boolean algebra, logic gates, combinationaland sequentialcircuits and memories. |
| **C210.2** | Analyze the combinational and sequential circuits and memories. |
| **C210.3** | Design of logic circuits |
| **C210.4** | Realization of gates using different logic families. |
| **C210.5** | Explain the design and operation of different semiconductor memories |

### A44210.ELECTRICAL TECHNOLOGY

**Course Outcomes** At the end of the course the student should be able to

| | |
|---|---|
| **C211.1** | Understand the concept of network topology |
| **C211.2** | Apply the concepts of the filters, attenuators to real-world problems. |
| **C211.3** | Able to synthesize the electrical networks using different techniques. |
| **C211.4** | Analyse the basic concepts of DC machines & AC Machines. |
| **C211.5** | Understand the basic concepts of some special machines |

### A43010.PROFESSIONAL COMMUNICATION

**Course Outcomes**

At the end of the course the student should be able to

| | |
|---|---|
| **C212.1** | Acquire enhanced personality |
| **C212.2** | Exhibit appropriate professional etiquette |
| **C212.3** | Practice team building with strong communication skills |
| **C212.4** | Develop problem solving skills and decision-making |
| **C212.5** | Demonstrate effective presentation skills |

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### A44406. ANALOG AND DIGITAL COMMUNICATIONS

**Course Outcomes** At the end of the course the student should be able to

| | |
|---|---|
| **C213.1** | Demonstrate fundamental knowledge in Elements of Analog and Digital Communication systems. |
| **C213.2** | Analyze different types of analog and digital modulation systems and calculate total power & bandwidth. |
| **C213.3** | Design an efficient Transmitter and Receiver based on SNR, bandwidthand equipment complexities. |
| **C213.4** | Formulate and solve engineering problems in the core area of analog and digital communications in developing information transmitting systems and telemetry system. |
| **C213.5** | Illustrate the impact of noise in analog communication systems and computation of Probability of error in digital modulation techniques |

### A44407. ANALOG AND PULSE CIRCUITS

**Course Outcomes** At the end of the course the student should be able to

| | |
|---|---|
| **C214.1** | Understand the concepts of amplifiers, feedback, large signal model and time basegenerators. |
| **C214.2** | Utilize the Concepts of feedback to improve the stability in amplifiers and oscillators**.** |
| **C214.3** | Analyze different multistage amplifiers, multivibrators and time base generators. |
| **C214.4** | List different classes of Power Amplifiers and tuned amplifiers useable for audio andRadio applicatios. |
| **C214.5** | Design RC and LC Oscillators for different frequencies and analyze them for frequencyand amplitude stability. |

### A44408. ELECTROMAGNETIC WAVES

**Course Outcomes** At the end of the course the student should be able to

| | |
|---|---|
| **C215.1** | Demonstrate the EM Field Characteristics – divergence and curl of fields |
| **C215.2** | Interpret the Maxwell's equations for static Electric and Magnetic fields and dynamicElectromagnetic fields |
| **C215.3** | Analyze the behavior of EM waves in different media |
| **C215.4** | Apply the knowledge of EM Wave Propagation at microwaves |
| **C215.5** | Explain the wave equations and mode analysis of rectangular and circular waveguides |

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### A44483. ANALOG AND DIGITAL COMMUNICATIONS LABORATORY

**Course Outcomes** At the end of the course the student should be able to

| | |
|---|---|
| **C216.1** | Demonstrate knowledge in different Analog and Digital Communication Systems. |
| **C216.2** | Compare the characteristics of various Analog and Digital modulation schemesand analyze their performances. |
| **C216.3** | Develop various analog and digital modulation and demodulation systems |
| **C216.4** | Explain how Pulse code modulation is applied to transform an analog signal into adigital one and transmitted through the digital communication network. |
| **C216.5** | Design the shift keying based digital modulation techniques for the transmission ofdigital information |

### A44484. ANALOG AND PULSE CIRCUITS LABORATORY

**Course Outcomes**:-At the end of the course the students is expected

| | |
|---|---|
| **C217.1** | Compare the frequency response of tuned, MOS, Darlington amplifier. |
| **C217.2** | Sketch the sustained waveforms of oscillators, multi-vibrators and sweep circuits. |
| **C217.3** | Interpret the efficiency of power amplifiers. |
| **C217.4** | Explain the characteristics of Boot strap sweep circuit, Miller sweep circuit andUJT relaxation oscillator |
| **C217.5** | Design LC Oscillators for different frequencies and analyze them for frequency andamplitude stability. |

### A44MC1. ENVIRONMENTAL SCIENCE

**Course Outcomes** At the end of the course the student should be able to

| | |
|---|---|
| **C218.1** | Define and explain the structure and functions of ecosystem, value of biodiversity, threats and conservation of biodiversity. |
| **C218.2** | Explain the limitations of the resources and impacts of over utilization of all natural resources. |
| **C218.3** | Explain the sources and effects of environmental pollutions and list the available techniques to control the pollution. |
| **C218.4** | Explain the global environmental issues like climate change, ozone hole and can explain the scope of EIA, Environmental Management Plan, environmental audit andlist the EIA methods. |
| **C218.5** | Mention the salient features of environmental acts and rules, define the sustainable goals along with measures required for the sustainability. |

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**III B.Tech I Semester**

### A45410. CONTROL SYSTEMS

**Course Outcomes** At the end of the course the student should be able to

| | |
|---|---|
| **C301.1** | Understand the modeling of linear-time-invariant systems using transfer function. |
| **C301.2** | Analyze system response and evaluate error dynamics in time domain. |
| **C301.3** | Understand the concept of stability and its assessment for linear-time invariantsystems. |
| **C301.4** | Design simple feedback controllers. |
| **C301.5** | Infer the general concept of state variable, state space and analyse the stability oflinear Time discrete systems |

### A45411. MICROPROCESSORS AND MICROCONTROLLERS

**Course Outcomes** At the end of the course the student should be able to

| | |
|---|---|
| **C302.1** | Acquire knowledge about Microprocessors, Microcontroller and its need. |
| **C302.2** | Ability to identify basic architecture of different Microprocessors & Microcontroller |
| **C302.3** | Develop systems for interfacing of different peripheral devices microprocessor &Microcontrollers |
| **C302.4** | Compose a program to interface microprocessor and microcontroller for differentapplications. |
| **C302.5** | Develop microcontroller application for different domain |

### A45412. LINEAR & DIGITAL IC APPLICATIONS

**Course Outcomes** At the end of the course the student should be able to

| | |
|---|---|
| **C303.1** | Demonstrate the functioning of OP-AMP, Special function and Digital ICs |
| **C303.2** | Analyze the operation, characteristics of OP-AMP, Special Function and Digital ICs |
| **C303.3** | Design a logic circuits using digital ICs |
| **C303.4** | Devising filters, multivibrators, waveform generators & arithmetic circuits using OP-AMP and Special Function ICs. |
| **C303.5** | Analyze and design applications like Counters Flip-flops Shift register using Digitalintegrated circuit. |

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### A45413. ANTENNA AND PROPAGATION

**Course Outcomes**

At the end of the course the student should be able to

| | |
|---|---|
| **C304.1** | Understand different antennas, field analysis and their applications to antennaelements. |
| **C304.2** | Distinguish the mechanism of radiation,different antenna characteristics,mathematical relations their estimates in practical cases. |
| **C304.3** | Analyze and design the working of different antenna's and to interpret the radiationpattern of planar arrays from the knowledge of linear arrays. |
| **C304.4** | Obtain the capability to differentiate and report the electromagnetic radiation levels inthe Atmosphere and any radio transmissions. |
| **C304.5** | Design Microwave antenna Systems from specification |

### A45414. COMPUTER ARCHITECTURE

(Professional Elective-I)

**Course Outcomes** At the end of the course the student should be able to

| | |
|---|---|
| **C305.1** | Recall the structure and organization involved in computer design. |
| **C305.2** | Identify the different memory and input- output system involved in system design. |
| **C305.3** | Analyze computer parallelism and its design on program control and computerarithmetic operations. |
| **C305.4** | Comprehend the various details of multiprocessor and multi-core processors incomputer design |
| **C305.5** | Illustrate a better way the I/O and memory organization. |

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### A45415.INFORMATION THEORY AND CODING

(Professional Elective-I)

**Course Outcomes** At the end of the course the student should be able to

| | |
|---|---|
| **C306.1** | Understand the concept of information theory, coding techniques and errors relatedto it. |
| **C306.2** | Compare the different coding techniques. |
| **C306.3** | Formulate codes using different coding techniques |
| **C306.4** | Apply different coding techniques to develop an error free communication system. |
| **C303.5** | Inspect error detection and correction in various coding technique. |

### A45416.INTRODUCTION TO MEMS

(Professional Elective-I)

**Course Outcomes** At the end of the course the student should be able to

| | |
|---|---|
| **C307.1** | Understand the basic concepts involved in the design of MEMS devices. |
| **C307.2** | Interpret the different properties of MEMS materials |
| **C307.3** | Enumerate role of MEMS devices on sensing and Actuation through differentmediums. |
| **C307.4** | Contrast the types of MEMS devices on different materials through differentmediums. |
| **C307.5** | Apply the MEMS for different applications |

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### A15419. INTRODUCTION TO MICROCONTROLLERS AND APPLICATIONS

**(Open Elective–I)**

**Course Outcomes**

At the end of the course the student should be able to

| | |
|---|---|
| **C308.1** | Interpret the internal organization of 8051 with its unique features. |
| **C308.2** | Infer and give examples about the various addressing modes, instruction formats and instructions of 8051. |
| **C308.3** | To understand the various interfacing techniques pertaining to system design. |
| **C308.4** | Construct the hardware and software interaction with each other using programming. |
| **C308.5** | Summarize the features of the advanced architecture using ARM controller. |

### SMART CITY (SC)

**Course Outcomes**

At the end of the course the student should be able to

| | |
|---|---|
| **C308.1** | Understand the necessity of smart infrastructure and to promote cities that provide quality of life to citizens. |
| **C308.2** | Explain technology-based solution on smart mobility. |
| **C308.3** | Illustrate & introduce the smart and sustainable waste and water management for smart cities. |
| **C308.4** | Evaluate economical models for smart infrastructure solution. |
| **C308.5** | Create healthy and waste ridden environment. |

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### ELEMENTS OF MECHANICAL ENGINEERING (EME)

**Course Outcomes**

At the end of the course the student should be able to

| | |
|---|---|
| **C308.1** | Understand the basic concepts of mechanical engineering. |
| **C308.2** | Applying principles of engineering mechanics in mechanism and machines |
| **C308.3** | Develop manufacturing methods to produce engineering components. |
| **C308.4** | Evaluating alternative designs for the engineering components |
| **C308.5** | Comparingvarious standards relevant to automobiles. |

### PRODUCT ENGINEERING (PE)

**Course Outcomes**

At the end of the course the student should be able to

| | |
|---|---|
| **C308.1** | Identifying scheduling techniques for project management. |
| **C308.2** | Designing the products and their life cycles. |
| **C308.3** | Generating the products with different material requirements. |
| **C308.4** | Conceptualization the products with their drawings for standardization. |
| **C308.5** | Evaluating the life of the products by conducting various tests. |

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### JAVA PROGRAMMING(OPEN ELECTIVE)

**Course Outcomes**

At the end of the course the student should be able to

| | |
|---|---|
| **C308.1** | Apply OOP concepts in Java Programming |
| **C308.2** | Analyze the concepts of JAVA programming for problem solving |
| **C308.3** | Evaluate the concepts ofpackages and interfaces in java |
| **C308.4** | Analyze the usage of Exception Handling and Multithreading in complex Java programs |
| **C308.5** | Create GUI Applications and Applets |

### OPERATING SYSTEMS(OPEN ELECTIVE)

**Course Outcomes**

At the end of the course the student should be able to

| | |
|---|---|
| **C308.1** | Understand the functions of Operating Systems. |
| **C308.2** | Evaluate various process scheduling algorithms. |
| **C308.3** | Analyze various memory allocation techniques for effective utilization of memory. |
| **C308.4** | Evaluate various file concepts for effective storage. |
| **C308.5** | Analyze the concepts of deadlocks. |

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### TOTAL QUALITY MANAGEMENT (TQM)

**Course Outcomes**

At the end of the course the student should be able to

| | |
|---|---|
| **C308.1** | To explore the quality framework in production and operational aspects. |
| **C308.2** | To evaluate the role of quality in product design and analysis. |
| **C308.3** | To analyze quality in process improvement and modern production management tools. |
| **C308.4** | To understand the role of TQM tools and techniques in elimination of wastages and reduction of defects |
| **C308.5** | To analyze the requirements of quality management system. |

### REMOTE SENSING& GIS(RS&GIS)

**Course Outcomes**

At the end of the course the student should be able to

| | |
|---|---|
| **C308.1** | Select the type of remote sensing technique / data for required purpose. |
| **C308.2** | Identify the earth surface features from satellite images. |
| **C308.3** | Analyze the energy interactions in the atmosphere and earth surface features. |
| **C308.4** | Prepare thematic maps. |
| **C308.5** | Interpretations of satellite data for various applications. |

### A15420. BASIC ELECTRONICS AND INSTRUMENTATION

**(Open Elective-I)**

**Course Outcomes**

At the end of the course the student should be able to

| | |
|---|---|
| **C308.1** | Summarize the concepts of different semiconductor devices with its characteristics. |
| **C308.2** | Describe the fundamental concepts and basic principle of meters. |
| **C308.3** | To classify the types of transducer with its methodology of data collection. |
| **C308.4** | Categorize different transducers and their working principles |
| **C308.5** | Explain different bridges and understand how different physical parameters can be acquired. |

### A45485.MICRO PROCESSORS AND MICRO CONTROLLERS LABORATORY

**Course Outcomes** At the end of the course the student should be able to

| | |
|---|---|
| **C309.1** | Apply the fundamentals of assembly level programming of microprocessors andmicrocontrollers. |
| **C309.2** | Build a program on a microprocessor using instruction set of 8086 and 8051. |
| **C309.3** | Evaluate Assembly language program for 8086 and 8051 microcontroller tointerface peripheral devices for simple applications |
| **C309.4** | Develop assembly language programs for various applications using 8051microcontroller |
| **C309.5** | Understand the development of prototype using combination of hardware andsoftware |

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### A45486.LINEAR & DIGITAL IC APPLICATIONS LABORATORY

**Course Outcomes** At the end of the course the student should be able to

| | |
|---|---|
| **C310.1** | Study the applications of IC's such as 741,555 and 723 |
| **C310.2** | Design and construct thecombinational and sequential circuits using digital IC's |
| **C310.3** | Understand and design the adder and subtractor digital circuits. |
| **C310.4** | Design and verify the Multiplexr |
| **C310.5** | Understand the basics of Op-Amp and to Design, Analyze Adder subtractor andcomparator |

### A45TP2.PERSONALITY DEVELOPMENT AND BEHAVIOURAL SKILLS

**Course Outcomes** At the end of the course the student should be able to

| | |
|---|---|
| **C311.1** | Practice optimistic attitude for an efficient, socially viable and multi-facetedpersonality. |
| **C311.2** | Demonstrate functions of non-verbal communication in formal context. |
| **C311.3** | Build effective individual & team dynamics for professional accomplishments. |
| **C311.4** | Analyze appropriate strategic Interpersonal Skills for productive workplace relationships. |
| **C311.5** | Correspond in multiple contexts, for varied audiences, across genres and modalities. |

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**III YEAR II SEMESTER**

### A46018.MANAGERIAL ECONOMICS & AND FINANCIAL ANALYSIS

**Course Outcomes** At the end of the course the student should be able to

| | |
|---|---|
| **C312.1** | Understand the importance of certain basic issues governing the businessoperations namely demand and supply, production function, cost analysis. |
| **C312.2** | Apply managerial tools and techniques in obtaining optimal solutions for businessproblems. |
| **C312.3** | Differentiate the various forms of business organizations. |
| **C312.4** | Evaluate and interpret the financial statements of companies using ratios. |
| **C312.5** | Apply the methods of capital budgeting in effective investment decision making. |

### A46419.DIGITAL SIGNAL PROCESSING

**Course Outcomes** At the end of the course the student should be able to

| | |
|---|---|
| **C313.1** | Define the concepts of Fourier transforms, digital filters with their effect of errors. |
| **C313.2** | Illustrate speed and memory requirements of Fourier transforms on signals. |
| **C313.3** | Relate the effects of finite word length on systems. |
| **C313.4** | Formulate frequency filtering, impulse response filters with its structure. |
| **C313.5** | Ability to understand various applications of DSP such as multi rate signalprocessing, telecommunication |

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## Department of Electronics and Communication Engineering

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## R18 Regulation CO Statements

### A46420. MICROWAVE ENGINEERING

**Course Outcomes**

At the end of the course the student should be able to

| | |
|---|---|
| **C314.1** | Understands the application of 3-D coordinate geometry, calculus and vectorgeometry to analyze the EM wave transmission at microwave frequencies. |
| **C314.2** | Analyze the problem within the Microwave Transmission line by considering theparameters at transmitter and receiver. |
| **C314.3** | Design the microwave components and different transmission lines with the givencharacteristics at microwave frequencies. |
| **C314.4** | Apply the knowledge of microwave components and devices in RADARcommunication and satellite communication. |
| **C314.5** | Able to discriminate different Radars, find applications and use of its supportingsystems |

### A46421. DATA COMMUNICATION AND NETWORKS

**Course Outcomes**

At the end of the course the student should be able to

| | |
|---|---|
| **C315.1** | Demonstrate concepts of various types of computer networks, TCP/IP and OSImodels. |
| **C315.2** | Analyze different LLC multiplexing mechanisms, node-to-node flow and errorcontrol |
| **C315.3** | Analyze different MAC mechanisms (Aloha, Slotted Aloha, TDMA, FDMA) andunderstand their pros and cons. |
| **C315.4** | Identify and design the different types of network devices and shortest path in agiven network & Enable to interconnect various heterogeneous networks. |
| **C315.5** | Implement a peer to peer file sharing application utilizing application layerprotocols and transportation layer protocol. |

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### A46422.DIGITAL SIGNAL PROCESSORS AND ARCHITECTURES
**(Professional Elective-2)**

| | |
|---|---|
| **C316.1** | Understand signal processing principles, interfacing strategies and the differentarchitectural features of DSP processors. |
| **C316.2** | Differentiate the architectural features of various DSP processors. |
| **C316.3** | Illustrate the methodology of writing programs for TMS32OC54xx. |
| **C316.4** | Explain the system development using DSP Processors for various applications. |
| **C316.5** | Able to introduce architectural features of analog devices family of DSP devices i.e.ADSP2100, ADSP 2181 and black fin processor |

### A46423.MODELING AND SIMULATION USING MATLAB
**(Professional Elective-2)**

| | |
|---|---|
| **C317.1** | Develop codes on various domains of Electronics and Communication Engineering |
| **C317.2** | Handle the advanced commands in appropriate fields of engineering |
| **C317.3** | Visualize the impact of parameters during simulation |
| **C317.4** | Cater the industrial needs pertaining to the semiconductor technologies. |
| **C317.5** | Students will be able to implement simulation models using the tool Simulink |

### A46424.OPTICAL COMMUNICATIONS
**(Professional Elective-2)**

**Course Outcomes:** Upon successful completion of this course, students have the ability to

| | |
|---|---|
| **C318.1** | Gain Knowledge in optical communication, components, Mode theory, sources &detectors and Losses in optical fibers. |
| **C318.2** | Analyze single & multimode fibers and analog & digital links. |
| **C318.3** | Design and develop Optical sources, Detectors and links |
| **C318.4** | Develop Multi-Channel Optical Systems |
| **C318.5** | Discuss the elements of WDM networks and its potential applications. |

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**ENVIRONMENT POLLUTION & CONTROL METHODS** (EPCM)

**Course Outcomes** At the end of the course the student should be able to

| | |
|---|---|
| **C319.1** | Understanding about the various air pollutants and effect on environment. |
| **C319.2** | Analyze quality of air in the form of air quality index and dispersion modeling. |
| **C319.3** | Determine sampling and measurements of air Pollutants. |
| **C319.4** | Analysis and measurement of soil contamination. |
| **C319.5** | Predict types of noise and problems arise due to noise pollution. |

**GREEN BUILDING TECHNOLOGIES** (GBT)

**Course Outcomes**

At the end of the course the student should be able to

| | |
|---|---|
| **C319.1** | Understand the Green building concept and focus on approaches that make building sustainable. |
| **C319.2** | Illustrate Green building assessment and accreditation system. |
| **C319.3** | Able to apply low energy building strategies. |
| **C319.4** | Designing green building and improve sustainability ofinfrastructure. |
| **C319.5** | Classify the economic benefits of green buildings. |

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**BASIC AUTOMOBILE ENGINEERING**(BAE)

**Course Outcomes**

At the end of the course the student should be able to

| | |
|---|---|
| **C319.1** | Understanding the basic structure of an automobile. |
| **C319.2** | Evaluating different cooling and lubrication systems of an automobile. |
| **C319.3** | Analyzing the electrical systems in tandem with ignition systems. |
| **C319.4** | Comparing the various transmission systems for their effectiveness. |
| **C319.5** | Understanding and there by implement the subsystems in the automobile for its low emission. |

**MATERIAL SCIENCE ENGINEERING**(MSE)

**Course Outcomes**

At the end of the course the student should be able to

| | |
|---|---|
| **C319.1** | Understanding the crystal structures and necessity of alloys. |
| **C319.2** | Classifying the ferrous materials and their heat treatment process. |
| **C319.3** | Evaluating the non ferrous materials and their applications in Engineering usage. |
| **C319.4** | Applying the composite materials as an efficient substitute. |
| **C319.5** | Implementing the principles of nano science and their by producing materials. |

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### DATA BASE MANAGEMENT SYSTEMS

**Course Outcomes**

At the end of the course the student should be able to

| | |
|---|---|
| **C319.1** | Understand the Database Management systems concepts |
| **C319.2** | Analyze Entity-Relationship Model for enterprise level databases |
| **C319.3** | Develop a database and formulate the complex SQL queries |
| **C319.4** | Evaluate various Relational Formal Query Languages |
| **C319.5** | Analyze various Normal forms to carry out Schema refinement |

### Software Engineering (Open Elective)

**Course Outcomes**

At the end of the course the student should be able to

| | |
|---|---|
| **C319.1** | Understand various process models |
| **C319.2** | Apply requirement engineering process for a project. |
| **C319.3** | Analyze the design engineering and architectural design |
| **C319.4** | Evaluate various testing techniques |
| **C319.5** | Evaluate various metrics for process and products |

## R18 Regulation CO Statements

**FINANCIAL INSTITUTIONS AND MARKETS** (FIM)

**Course Outcomes**

At the end of the course the student should be able to

| | |
|---|---|
| **C319.1** | Understand object oriented software development process |
| **C319.2** | Gain exposure to object oriented methodologies & UML diagrams |
| **C319.3** | Use object oriented behavioral modeling analysis for project |
| **C319.4** | Apply object oriented Architectural modeling analysis for project |
| **C319.5** | Construct for developing structural design of a given project by using |

**A16428. FUNDAMENTALS OF EMBEDDED SYSTEMS**

**(Open Elective-II)**

**Course Outcomes**

At the end of the course the student should be able to

| | |
|---|---|
| **C319.1** | Contrast the basics of embedded system with its application |
| **C319.2** | Illustrate the components required for embedded system design. |
| **C319.3** | Summarize the different development tool for embedded system |
| **C319.4** | Relate the concepts of RTOS in real time programming |
| **C319.5** | Outline the features of advanced buses for distributed data transfer in system design. |

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### A16429. PRINCIPLES OF COMMUNICATIONS

**(Open Elective-II)**

**Course Outcomes**

At the end of the course the student should be able to

| | |
|---|---|
| **C319.1** | Understanding the fundamentals of communications |
| **C319.2** | Summarize the different modulation techniques involved in analog and digital Communication. |
| **C319.3** | Identify the applications of various wired and wireless communications in real time. |
| **C319.4** | Elaborate the fundamentals of satellite and optical communications. |
| **C319.5** | Understand various Networking Concepts. |

### A46487.DIGITAL SIGNAL PROCESSING LABORATORY

**Course Outcomes:**

Student will be able to

| | |
|---|---|
| **C320.1** | Formulate programs for performing time & frequency operation on signals andsystems. |
| **C320.2** | Design and implement impulse response filters and Multirate system for a givensequence |
| **C320.3** | Analyze and Observe Magnitude and phase characteristics (Frequency responseCharacteristics) of digital IIR-Butterworth, Chebyshev filters |
| **C320.4** | Analyze and Observe Magnitude and phase characteristics (Frequency responseCharacteristics) of digital FIR filters using window techniques |
| **C320.5** | Develop various DSP Algorithms using MATLAB Software package |

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### A46088.ADVANCED COMMUNICATION SKILLS LAB

**COURSE OUTCOMES**

At the end of the course the student should be able to

| | |
|---|---|
| **C321.1** | Develop sound communication skills in various situations with the help of enrichedvocabulary. |
| **C321.2** | Practice reading techniques for a faster and better comprehension. |
| **C321.3** | Exhibit strong writing skills to express ideas effectively. |
| **C321.4** | Demonstrate effective presentation skills. |
| **C321.5** | Use appropriate verbal and non-verbal skills for a successful career |

### A46TP2.QUANTITATIVE METHODS & LOGICAL REASONING

**Outcomes:**

Upon successful completion of this course, students will be able to:

| | |
|---|---|
| **C322.1** | To perform well in various competitive exams and placement drives. |
| **C322.2** | To solve basic and complex mathematical problems in short time. |
| **C322.3** | To become strong in Quantitative Aptitude and Reasoning which can be applied forGRE, GATE, GMAT or CAT exam also. |
| **C322.4** | To develop problem solving skills and analytical abilities, which play a great role incorporate and industry set up. |
| **C322.5** | To perform well in various competitive exams and placement drives. |

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**IV YEAR I SEMESTER**

**A47427. EMBEDDED SYSTEM DESIGN**

**Outcomes:** Upon successful completion of

| | | |
|---|---|---|
| **C404.1** | Expected to understand the selection procedure of Processors in the embeddeddomain. | |
| **C404.2** | Design Procedure for Embedded Firmware. | |
| **C404.3** | Expected to visualize the role of Real time Operating Systems in EmbeddedSystems | |
| **C404.4** | Expected to evaluate the Correlation between task synchronization and latencyissues | |
| **C404.5** | To Enumerate the need for Task Communications in a Multiprocessor Environment | |

**A47428. VLSI DEISGN**

**Course Outcomes**

Upon successful completion of this course, students will be capable to:

| | |
|---|---|
| **C402.1** | Enumerate different steps involved in Integrated Circuits technology for MOS transistor and explain the primary and secondary effects of MOSFET and BICMOS. |
| **C402.2** | Summarize the fabrication process involved in VLSI circuits |
| **C402.3** | Outline the design process involved in VLSI design flow for design of MOStransistors. |
| **C402.4** | Understand and apply the concepts of memories in design. |
| **C402.5** | Design digital circuits using Verilog HDL. |

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**A47449. DIGITAL IMAGE PROCESSING**
**(Professional Elective-3)**

**COURSE OUTCOMES:**

At the end of the course the student should be able to

| | |
|---|---|
| **C403.1** | State the Digital Image Fundamentals and operation associated with various stagesof image processing. |
| **C403.2** | Illustrate the mathematics involved in various stages of image processing. |
| **C403.3** | Demonstrate the operations various stages of image processing. |
| **C403.4** | Contrast the different types of operation and its impact on images. |
| **C403.5** | Understand the anatomy of image compression in Image Transmission |

**A47430.CELLULAR AND MOBILE COMMUNICATIONS**
**(Professional Elective-3)**

Course Outcomes

At the end of the course the students should be able to

| | |
|---|---|
| **C404.1** | Understand the principles of mobile communications, radio models, Antennas forMobile communication, Equalization and applications. |
| **C404.2** | Interpret the propagation models of Mobile and its effect on Antenna, Diversity andapplications. |
| **C404.3** | Relate the concepts of propagation models with channel interference |
| **C404.4** | Explain the propagation models, channel interference, antenna design for the recentmobile systems |
| **C404.5** | Recite the Handoff and Dropped calls in Cellular mobile communications |

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### A47431.RADAR ENGINEERING
### (Professional Elective-3)

**Course Outcomes:** The students will be able

| | |
|---|---|
| **C405.1** | Understand the concepts of radar fundamentals, noise analysis and evaluation ofradar. |
| **C405.2** | Differentiate various types of radar transmitters and receivers. |
| **C405.3** | Relate the different types of radar transmitter and receiver. |
| **C405.4** | Categorize the type of radar system and noise analysis based on applications. |
| **C405.5** | **C**orrelate the different methods of Radar Reception and Receivers |

### A47432.BIOMEDICAL INSTRUMENTATION
### (Professional Elective-4)

Course Outcomes: Students can able to

| | |
|---|---|
| **C406.1** | Summarize the requirement of biomedical instrumentation and adversity involved inhuman measurement. |
| **C406.2** | Understand the concept of Bio Potentials in a Human Body |
| **C406.3** | Utilize the concept of electrode and its responses used in real time. |
| **C406.4** | Outline the divergent responses involved in cardiovascular and respiratory system. |
| **C406.5** | Compare the various processes involved in bio telemetry. |

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## R18 Regulation CO Statements

### A47433.SATELLITE COMMUNICATIONS

**(Professional Elective-4)**

**COURSE OUTCOMES: At the end of the course, the student should be able to:**

| | |
|---|---|
| **C407.1** | Demonstrate the historical background, basic concepts and frequency allocations forsatellite communications. |
| **C407.2** | Compare and contrast between various multiple access systems for satellitecommunication system. |
| **C407.3** | Understand the propagation effects of signal in Satellite transmission |
| **C407.4** | Design of satellite links for specified CNR. |
| **C407.5** | Visualize satellite subsystems like telemetry, tracking, command and monitor powersystems etc. |

### A47434.TELECOMMUNICATION SWITCHING SYSTEMS AND NETWORKS

**(Professional Elective-4)**

**OUTCOMES:** At the end of the course, the student should be able to:

| | |
|---|---|
| **C408.1** | Understand different switching system methodologies, network traffic, networks andits applications. |
| **C408.2** | Explain different signaling methods used in Telecommunication Networks. |
| **C408.3** | Enumerate traffic in telecommunications network |
| **C408.4** | Relate different data communication networks. |
| **C408.5** | Demonstrate the applications of modern telecommunication concepts. |

### A47488.EMBEDDED& VLSI LABORATORY

**COURSE OUTCOMES:**

**At the end of the course, the student should be able to:**

| | |
|---|---|
| **C409.1** | Code the ARM cortex M0+ processor instruction set. |
| **C409.2** | Articulate the concept of interfacing I/O devices with FRDM kit. |
| **C409.3** | Synthesize a Verilog code for digital circuits |
| **C409.4** | Devise the digital circuit in CPLD/FPGA |
| **C409.5** | Formulate a system design using Embedded and VLSI technologies |

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### A47484.ANTENNA AND MICROWAVE ENGINEERING LABORATORY

**COURSE OUTCOMES:** At the end of the course, the student should be able to:

| | |
|---|---|
| **C410.1** | Contrast the different ways of measuring antenna parameters. |
| **C410.2** | Differentiate the different Radiation pattern of the antennas |
| **C410.3** | Study the characteristics of various microwave components |
| **C410.4** | Articulate the performance of Microwave components |
| **C410.5** | Formulate a antenna design using Antenna and Microwave technologies |

### MAINTENANCE AND SAFETY ENGINEERING(MSE)

**COURSE OUTCOMES:** At the end of the course, the student should be able to:

| | |
|---|---|
| **C411.1** | Understanding the need for maintenance of a machine in an industry. |
| **C411.2** | Identifying various maintenance policies. |
| **C411.3** | Analyzing the cost and time concepts while implementing the maintenance. |
| **C411.4** | Evaluating the quality concepts for safety and maintenance of an equipment |
| **C411.5** | Appreciating the terms reliability and maintainability with reference the maintenance of an equipment. |

### Information Systems for Engineers(ISE)(Open Elective)

**COURSE OUTCOMES:** At the end of the course, the student should be able to:

| | |
|---|---|
| **C411.1** | Understand the concepts of Information Systems. |
| **C411.2** | Evaluate the design, development and security of Information Systems |
| **C411.3** | Analyze the various modules in social issues while using Information Systems. |
| **C411.4** | Analyze the issues in data security |
| **C411.5** | Analyse the concept of ethics in information systems. |

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**Web Design (Open Elective)**

**COURSE OUTCOMES:** At the end of the course, the student should be able to**:**

| | |
|---|---|
| **C411.1** | Create static web pages using HTML |
| **C411.2** | Design styles for HTML web pages |
| **C411.3** | Create interactive web pages using Javascript |
| **C411.4** | Develop web applications using server side scripting language-PHP |
| **C411.5** | Develop and analyze web applications with Java Server Pages |

**A47MP1.INDUSTRY ORIENTED MINI PROJECT**

| | |
|---|---|
| **C412.1** | Understand the working environment of an Industry |
| **C412.2** | Create an avenue in the industry in terms of a mini project |
| **C412.3** | Predict a timeline for the project |
| **C412.4** | Evaluate the requirements of the projects in terms of different subsystems |
| **C412.5** | Create a dissemination report for the mini project |

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### IV B.TECH-II SEM

### A48438. ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

**Course Outcomes** The student will be able

| | |
|---|---|
| **C413.1** | Acquire knowledge in Characteristics of Instruments, measurement on non-electricalquantities |
| **C413.2** | Analyze the performance of various measuring systems based on the response tothe given inputs. |
| **C413.3** | Design electronic instrumentation systems according the required specifications |
| **413.4** | Apply different principles to measure a quantity and to provide wide range ofsolutions for the problems in real time world |
| **C413.5** | Recite the acquisition of Non Electrical quantities in a system |

### A48439. WIRELESS COMMUNICATIONS AND NETWORKS

**Course Outcomes** Students will be able

| | |
|---|---|
| **C414.1** | Infer the basic concepts of different Access techniques, data service, technology andstandards associated with wireless communication networks |
| **C414.2** | Distinguish the multiple access techniques, standards, Technology used in wirelessCommunication and networks |
| **C414.3** | Interpret the recent wireless standards on communications and networks. |
| **C414.4** | Appraise the various wireless networks in communication systems. |
| **C414.5** | Distinguish the different wireless networks |

### A48TS1. TECHNICAL SEMINAR

**Course Outcomes**: At the end of the course the student should be able to

| | |
|---|---|
| **C415.1** | Synthesizing information on any one specialized topic from text books, peer revisedjournals, hand books and other technical resources. |
| **C415.2** | Accumulate information regarding the topic |
| **C415.3** | Create a presentation to disseminate the accumulated data as presentation |
| **C415.4** | Generation a technical seminar report comprising of all relevant information withstipulated standards. |
| **C415.5** | Evaluate the intensity of topic in real time |

## R18 Regulation CO Statements

### A48CVV. COMPREHENSIVE VIVA VOCE

**Course Outcomes:** At the end of the course the student should be able to

| | |
|---|---|
| **C416.1** | Remember the basics of Electronics and communication Engineering |
| **C416.2** | Understand the different methods of analyzing the circuits |
| **C416.3** | Recite the importance of Electronics and communication in terms of application |
| **C416.4** | Recap the knowledge of the subjects through modern applications |
| **C416.5** | Comprehensive understanding of the subject |

### A48MP2. MAJOR PROJECT

**Course Outcomes**: At the end of the course the student should be able to

| | |
|---|---|
| **C417.1** | Understand the basics of project management |
| **C417.2** | Identify an area of project work through extensive literature survey |
| **C417.3** | Formulation of Ideas from the survey |
| **C417.4** | Presentation of ideas in terms of presentation |
| **C417.5** | Create a dissemination report for the project done |

**In- Charge** **HoD**