

M.E. COMMUNICATIONS SYSTEM (TWO YEARS PROGRAMME)

Semester- I **ECCSPC11: Advanced Digital Communication Techniques**

Course outcomes:

At the end of the course, the students will be able to:

- CO1. To demonstrate various digital modulation techniques.
- CO2. To design basic and advanced coding for a digital communication system
- CO3. To use base band signal conditioning methods involved for exploiting channel.
- CO4. To Understand clearly about equalization fundamentals
- CO5. To Understand the basic concepts and characteristics of Turbo Coding

Semester - I **ECCSPC12: Advanced Digital Signal Processing**

Course outcomes:

At the end of the course, the students will be able to:

- CO1. Have broad knowledge in Random Processes in signal Processing
- CO2. Acquire in-depth treatment on methods and techniques in discrete-time signal transforms, digital filter design, optimal filtering power spectrum estimation, multi-rate digital signal processing.
- CO3. Estimate the spectrum using parametric methods and non parametric methods and prediction using wiener FIR & IIR filters.
- CO4. Analyse adaptive filtering techniques using LMS algorithm and to study the applications of adaptive filtering.
- CO 5. Understand clearly about multi rate signal processing fundamentals.

Semester- I **ECCSMC15: Research Methodology and IPR**

Course outcomes:

At the end of this course, students will be able to

- CO1. Understand and Analyze research related problem.
- CO2. Follow research ethics
- CO3. Understanding that when IPR would take such important place in growth of individuals & nation, it is needless to emphasize the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular.
- CO 4. Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.

Semester- I **ECCSCP16: Advanced Digital Communication Techniques Lab**

Course outcomes:

At the end of this course, students will be able to

- CO1. Able to learn about signal processing concepts.
- CO2. Able to understand the practical implementation issues, such as Error control coding, source coding.
- CO3. Learn about design and simulation of modulation and coding techniques using software.
- CO4. Know about Turbo Coding and Huffman Coding
- CO5. Understanding of application of OFDM for communication systems.

Semester- I **ECCSCP17: Advanced Digital Signal Processing Lab**

Course outcomes:

At the end of this course, students will be able to

- CO1. Ability to design LMS and RLS adaptive filters for signal enhancement, channel equalization.
- CO2. The ability to analyze speech signal using of Linear Prediction.
- CO3. Able to extract features speech using MFC.
- CO4. Able to generate binary sequence for digital applications.
- CO5. Able to handle the noise in any system.

Semester- II ECCSPC21 ADVANCED RADIATION SYSTEMS

Course outcomes:

On completing this course the students should be able to:

- CO1. Understand the basic concepts and characteristics of antennas in the transmit and receive mode.
- CO2. Understand the concept of standard antennas, its type and to understand the vitality and design of reflectors in microwave communication.
- CO3. Design and analyze frequency independent antenna, Travelling Wave antennas, microstrip patch antennas, V-antenna, Reflector antenna.
- CO4. Analyze and design aperture antennas such as horns, slots, and microstrip patches, smart and plasma antennas.
- CO5. Design and analyze reflector antennas using geometrical optics or physical optics techniques and to learn its significance through a thorough study of its applications.

Semester- II ECCSPC22:ADVANCED WIRELESS COMMUNICATION ENGINEERING

Course outcomes:

On completing this course the students should be able to:

- CO1. Diverse knowledge in wireless communication.
- CO2. Understanding of basic Channel Capacity
- CO3. Knowledge in Multiple Input Multiple Output Concepts
- CO4. Knowledge in multipath channel modelling
- CO5. Familiarity in Diversity Analysis

Semester- II ECCSCP26: ADVANCED RADIATION SYSTEMS LAB

Course outcomes:

At the end of this course, students will be able to

- CO1. Determine specifications, design, construct and test antenna.
- CO2. Explore and use tools for designing, analyzing and testing antennas. These tools include
- CO3. Antenna design and analysis software, network analyzers, spectrum analyzers, and antenna pattern measurement techniques

Semester- II ECCSCP27: INDUSTRIAL TRAINING AND SEMINAR / MINI PROJECT

Course outcomes:

At the end of this course, students will be able to

- CO1. Analyze a given Communication Engineering problem and to identify and implement appropriate problem solving methodology to propose a meaningful solution.
- CO2. Understand of contemporary / emerging technology for various processes and systems.
- CO3. Share knowledge effectively in oral and written form and formulate documents.
- CO4. Acquire the ability to work in the actual environment and to use the technical resources.
- CO5. Analyse any short coming while implementing a technical problem and to handle the same.

Semester- III ECCSPV33 : PROJECT WORK AND VIVA-VOCE PHASE-I

Course outcomes:

On completion of this course the students will be able to

CO1. Prepare the final report of project work in standard format for satisfactory completion of the work.

CO2. Ability to synthesize knowledge and skills previously gained and applied to an indepth study and execution of new technical problem.

CO3. Capable to select from different methodologies, methods and forms of analysis to produce a suitable research design, and justify their design.

CO4. Ability to present the findings of their technical solution in a written report.

CO5. Presenting the work in International/ National conference or reputed journals.

Semester- IV ECCSPV41 PROJECT WORK AND VIVA-VOCE PHASE – II

Course Outcomes

After the completion of the course, the students will be able to

CO1. Conduct independent empirical research to evaluate and present their results responsibly and critically.

CO2. Maintain the ethical standards of scientific research and to follow the basic principles in an academic community that requires constant learning and knowledge updation.

CO3. Capable to select from different methodologies, methods and forms of analysis to produce a suitable research design, and justify their design.

CO4. Ability to present the findings of their technical solution in a written report.

CO5. Presenting the work in International/ National conference or reputed journals.

PROGRAM ELECTIVES

ECCSPESC: RF ENGINEEING

Course Outcomes:

On completion of this course, the students will be able to

CO1. Understand the basic concepts of RF wireless communications, three terminal devices design and it's challenges.

CO2. Acquire the detail view of communication protocol and design of RF application to industry and passive component design

CO3. Analyze and design various transmitters and receivers

CO4. Understand the basics of radio system design and applications

CO5. Gain Knowledge in RF system design.

ECCSPESC: OPTICAL NETWORKS

Course Outcomes:

On completion of this course the students will be able to

CO1. To get an in-depth understanding, in terms of architecture, protocols and applications, of major optical networking technologies.

CO2. Able to solve numerical or analytical problems pertaining to the optical networking technologies

CO3. To understand the necessary background to perform projects involving optical networks.

CO4. To impart knowledge in virtual topology design

CO5. To have knowledge on latest methods in Optical Internet Networks.

ECCSPESC: WIRELESS SENSOR NETWORKS

Course Outcomes:

On completion of this course the students will be able to

CO1. Understand the concepts of wireless communication.

CO2. Acquire knowledge about the various propagation methods and Channel models.

CO3. Have an enhanced understanding of various transceivers and its multiple access

schemes.

CO4. Gain knowledge in Energy Management Technology

CO5. Understand the fundamentals of Security in WSN.

ECCSPESC: SPEECH PROCESSING

Course Outcomes:

On completion of this course, the students will be able to

CO1. Understand speech processing fundamentals.

CO2. Understand algorithms of speech processing and synthesis.

CO3. Represent various speech signals, coding and recognition techniques

CO4. Generate coding for Speech Processing.

CO5. Use speech processing in current applications.

ECCSPESC: SPREAD SPECTRUM COMMUNICATION

Course Outcomes:

On completion of this course, the students will be able to

CO1. Describe the types and advantages of spread spectrum modulation formats.

CO2. Perform analysis on the performance of spread spectrum modulation formats.

CO3. Describe the differences and benefits of different types of spreading codes.

CO4. Analyze the performance of spread spectrum systems in the presence of interference.

CO5. Analyze the performance of spreading code acquisition and tracking circuits.

ECCSPESC: MICROVAWE ANTENNA AND INTEGRATED CIRCUITS

Course Outcomes:

At the end, the student would be able to

CO1. Understand signal propagation at Radio frequencies

CO2. Acquire the knowledge about the Microstrip antennas

CO3. Get the foundation about solid state active devices

CO4. Gain Knowledge in MICS

CO5. Gather Practical Applications of MICs.

ECCSPESC: RF MEMS FOR WIRELESS COMMUNICATION SYSTEMS

Course Outcomes:

At the end, the student would be able to

CO1. Familiarize with Microsystems fabrication process and Micromachining.

CO2. Understand physical aspects of RF circuit design.

CO3. Acquire knowledge on RF MEMS circuit elements such as switches, resonators, antennas etc.,

CO4. Design Practical RF MEMS devices.

CO5. Design MEMS based circuits.

ECCSPESC: OFDM FOR WIRELESS COMMUNICATION

Course Outcomes:

On completion of this course the students will be able to

CO1. Describe the principles of OFDM and its Implementation.

CO2. Implement the coding and interleaving procedure to mitigate the channel effects.

CO3. Analyze synchronization techniques, channel estimation techniques and PAPR reduction techniques in OFDM.

- CO4. Describe multiple accesses in OFDM and various applications of OFDM.
CO5. Implement the coding for latest Applications.

ECCSPESC: MOBILE AD HOC NETWORKS

Course Outcomes:

On completion of this course the students will be able to

- CO1. Understand the basics of mobile ADHOC networks
CO2. Got the knowledge of MAC and network protocols
CO3. Realize the need for security and challenges
CO4. Understand the role of cross layer design in enhancing the network performance.
CO5. Know the Integration of ad hoc network with other wired and wireless networks.

ECCSPESC: HIGH SPEED NETWORKS

Course Outcomes:

On completion of this course the students will be able to

- CO1. Understand various High speed networks.
CO2. Understand ATM Protocol architecture and Traffic Management.
CO3. Understand clearly the working of MPLS
CO4. Acquire the basics of Advanced Network Concepts and Recent trends in High Speed Networks.
CO5. Gather Ideas in latest research areas in MPLS.

ECCSPESC: VIRTUAL PRIVATE NETWORKS

Course Outcomes:

On completion of this course the students will be able to

- CO1. Understand the types of VPN and tunneling protocols for security.
CO2. Familiarize about network security in many layers and network management.
CO3. Acquire knowledge on VPN protocols and MPLS VPN.
CO4. Collect designs and applications of VPN
CO5. To have knowledge in network management.

ECCSPESC: ELECTROMAGNETIC INTERFERENCE AND COMPATIBILITY

Course Outcomes:

- CO1. Analyze Electromagnetic interference effects in PCBs
CO2. Propose solutions for minimizing EMI in PCBs
CO3. Analyze Electromagnetic environment, EMI coupling, standards and measurement
CO4. Understand the concepts of control techniques.

ECCSPESC: ADVANCED ELECTROMAGNETIC THEORY

Course Outcomes:

On completion of this course the students will be able to

- CO1. Understand clearly about the transmission lines and wave guides
CO2. Familiarize about the theory of micro strips and strip lines
CO3. Understand broadly about surface waveguides and microwave cavities
CO4. Understand the microwave cavities.
CO5. Know about the orthogonal properties and its uses in Waveguides.

ECCSPESC: RF COMMUNICATION

Course Outcomes:

On completion of this course, the students will be able to

- CO1. Understand the basic concepts of RF wireless communications
- CO2. Acquire the detail view of communication protocol
- CO3. Analyze and design various transmitters and receivers
- CO4. Understand the basics of radio system design and applications
- CO5. To Gain knowledge in Ultra Wide Band technology and its applications.

ECCSPESC: ADVANCED DIGITAL IMAGE PROCESSING**Course Outcomes:**

On completion of the course, the students will be able to

- CO1. To understand image formation and the role human visual system play in perception of gray and color image data.
- CO2. To apply image processing techniques in both the spatial and frequency domains.
- CO3. To design image analysis techniques in the form of image segmentation and to evaluate the methodologies for segmentation.
- CO4. To understand the concepts of image registration and image fusion.
- CO5. To have knowledge in developing coding for 3D images based on its applications.

ECCSPESC: DIGITAL VIDEO PROCESSING**Course Outcomes:**

On completing this course the students should be able to:

- CO1. Understand the basic concepts and characteristics of video processing.
- CO2. Understand the concepts of motion estimation and basics of video coding.
- CO3. Analyze the error control in video communications and its applications.
- CO4. Understand the basics of video compression and its applications in the wireless networks.
- CO5. Gain knowledge in the applications of video processing in the wireless networks.

ECCSPESC: WIRELESS COMMUNICATION NETWORKS**Course Outcomes:**

On completion of this course, the students will be able to

- CO1. Analyze the design considerations of wireless MAC layer.
- CO2. Formulate wireless network planning and operation techniques.
- CO3. Discuss various WLAN and WWAN standards.
- CO4. Analyze the design considerations of wireless networks.
- CO5. Compare various wireless networks based on its performance.

ECCSPESC: VLSI FOR WIRELESS COMMUNICATION**Course Outcomes:**

Upon completion of the course the students will be able to

- CO1. Know the basics of MOSFET and BJT design.
- CO2. Understand the types of mixtures and its characteristics.
- CO3. Understand frequency synthesizers and sub systems.
- CO4. Understand the hardware implementation in wireless systems.
- CO5. Understand the next generation CDMA and its applications.

ECCSPESC: FPGA BASED WIRELESS COMMUNICATION SYSTEM DESIGN

Course Outcomes:

On completion of the course the students will be able to

CO1. Familiarize about the FPGA architecture and the programming technologies.

CO2. Understand syntax and semantics of Verilog HDL.

CO3. Evaluate the performance using simulation and testing of systems

CO4. Acquire the concept behind software radio and the design of digital signal processing blocks.

CO5. Collect ideas on the applications of FPGA on communication system.

ECCSPESC: ERROR CONTROL CODING**Course Outcomes:**

After completing this course the students should be able to:

CO1. Understand Block Codes and Maximum Likelihood Decoding.

CO2. Understand Decoding Tables, Hamming Weight and Distance and Error Correction vs Detection.

CO3. Understand Generator Matrix, Parity-Check Matrix and Error-Correcting Capability of a Linear Code.

CO4. Understand Binary Cyclic Codes, encoding with (n-k)-Stage Shift Register and Syndrome Calculations and Error Detection.

CO5. Understand BCH Codes and the encoding / decoding techniques.

CO6. Understand Burst Error Codes and its applications.

OPEN ELECTIVES**ECCSOESC: BUSINESS ANALYTICS****Course Outcomes:**

CO1. Students will demonstrate knowledge of data analytics.

CO2. Students will demonstrate the ability of think critically in making decisions based on data and deep analytics.

CO3. Students will demonstrate the ability to use technical skills in predicative and prescriptive modeling to support business decision-making.

CO4. Students will demonstrate the ability to translate data into clear, actionable insights.

CO5. To become familiar with processes needed to develop, report, and analyze business data.

ECCSOESC: INDUSTRIAL SAFETY**Course Outcomes:**

CO1. Understanding of Safety principles.

CO2. Ability to do Hazard analysis.

CO3. Ability to do event tree and fault tree analysis.

CO4. Maintenance of mechanical and electrical instruments

CO5. Understanding the concept and Importance of repair recycle.

ECCSOESC: OPERATIONS RESEARCH**Course Outcomes:**

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

CO1. Students should able to apply the dynamic programming to solve problems of discrete and continuous variables.

CO2. Students should able to apply the concept of non-linear programming

CO3. Students should able to carry out sensitivity analysis

CO4. Student should able to model the real world problem and simulate it.

ECCSOESC: COST MANAGEMENT OF ENGINEERING PROJECTS

Course Outcomes:

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

CO1. Understand cost accounting knowledge, such as terminology and fundamental principles and methods.

CO2. Apply course material to new situations.

CO3. Solve problems and make decisions based on the results of the solutions to the problems.

ECCSOESC: COMPOSITE MATERIALS

Course Outcomes:

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

CO1. Explain the mechanical behaviour of layered composites compared to isotropic materials.

CO2. Apply constitutive equations of composite materials and understand mechanical behaviour at micro and macro levels.

CO3. Determine stresses and strains relation in composite materials.

ECCSOESC: WASTE TO ENERGY

Course Outcomes:

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

CO1. Apply the knowledge about the operations of waste to energy plants.

CO2. Analyze the various aspects of waste to energy management systems.

CO3. Carryout Techno-economic feasibility for waste to energy plants.

CO4. Apply the knowledge in planning and operations of waste to energy plants.

ECCSOESC: WIRELESS INTELLIGENT NETWORK

Course Outcomes:

On completion of this course the students will be able to

CO1. Acquire knowledge about fundamentals of mobile communication

CO2. Understand the basic concepts in wireless intelligent networks

CO3. Acquire the concepts in WIN capabilities, services and architecture

CO4. Collect ideas on latest applications of wireless communication.

ECCSOESC: SYSTEM MANAGEMENT AND SECURITY

Course Outcomes:

On completion of this course the students will be able to

CO1. To understand about the various models for defining the systems.

CO2. To understand the concepts and terminology associated with SNMP.

CO3. Acquired the concepts and architecture behind standards based network management.

CO4. To analyze the different encryption methods and security based mechanisms

CO5. To gain knowledge in Digital Immune systems.

ECCSOESC: EMBEDDED SYSTEM DESIGN

Course Outcomes:

On completion of the course the students will be able to

- CO1. Understand the issues and challenges in embedded system design.
- CO2. Acquired the concepts of embedded processor architecture and memory models.
- CO3. Analyze the software platform for implementing the embedded system
- CO4. Get ideas in different types of peripherals and bus devices.
- CO5. Understand the Special considerations in an RTOS and CPU management.

ECCSOESC: MULTIMEDIA COMMUNICATION

Course Outcomes:

On completion of this course, the students will be able to

- CO1. Understand clearly about the fundamentals of image processing
- CO2. Gain knowledge of image enhancement techniques and the image compression procedures.
- CO3. Understand about VOIP technology
- CO4. Understand the concepts of multimedia networking.

ECCSOESC: SOFT COMPUTING TECHNIQUES

Course Outcomes:

At the end of the course the students can able to

- CO1. Learn about soft computing techniques and their applications.
- CO2. Analyze various neural network architecture.
- CO3. Define the fuzzy systems
- CO4. Analyze the genetic algorithms and their applications.
- CO5. Know various Optimization Techniques applied to various applications.

ECCSOESC: CLOUD COMPUTING

Course Outcomes:

Upon Completion of the course, the students will be able to

- CO1. Understand clearly about the introduction of cloud computing
- CO2. Acquired knowledge about its services
- CO3. Design and development of simple cloud service.
- CO4. Implement Practical applications using cloud
- CO5. Gain knowledge on some key challenges and issues around cloud computing.

ECCSOESC: CRYPTOGRAPHY SYSTEMS

Course Outcomes:

On completion of this course the students will be able to

- CO1. To implement the use of developments in cryptography systems for effective data transfer.
- CO2. To work with the principles of cryptography and network security.
- CO3. To design an extensive coverage of the techniques and methods needed for the proper functioning of the ciphers.
- CO4. To understand the concept of the construction and cryptanalysis of block ciphers, stream ciphers and hash functions.

AUDIT COURSES

ECCSACSC: ENGLISH FOR RESEARCH WRITING

Course Outcomes:

At the end of the course students will be able to

- CO1. Understand that how to improve your writing skills and level of readability
- CO2. Learn about what to write in each section
- CO3. Understand the skills needed when writing a Title
- CO4. Ensure the good quality of paper at very first-time submission.

ECCSACSC: DISASTER MANAGEMENT**Course Outcomes:**

At the end of the course students will be able to

- CO1. Demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response.
- CO2. Evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives.
- CO3. Understand the standards of humanitarian response and practical relevance in specific types of disasters and conflict situations.
- CO4. Understand the strengths and weaknesses of disaster management approaches, planning and programming in different countries, particularly their home country or the countries they work in.

ECCSACSC: SANSKRIT FOR TECHNICAL KNOWLEDGE**Course Outcomes:**

Students will be able to

- CO1. Understanding basic Sanskrit language.
- CO2. Ancient Sanskrit literature about science & technology can be understood
- CO3. Being a logical language will help to develop logic in students.

ECCSACSC: VALUE EDUCATION**Course Outcomes:**

Students will be able to

- CO1. Knowledge of self-development
- CO2. Learn the importance of Human values
- CO3. Developing the overall personality.

ECCSACSC: CONSTITUTION OF INDIA**Course Outcomes:**

Students will be able to

- CO1. Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
- CO2. Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.
- CO3. Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.
- CO4. Discuss the passage of the Hindu Code Bill of 1956.

ECCSACSC: PEDAGOGY STUDIES**Course Outcomes:**

At the end of the course students will be able to understand:

CO1. What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries?

CO2. What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners?

CO3. How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy.

ECCSACSC: STRESS MANAGEMENT BY YOGA

Course Outcomes:

Students will be able to:

CO1. Develop healthy mind in a healthy body thus improving social health also.

CO2. Improve efficiency.

ECCSACSC: PERSONALITY DEVELOPMENT THROUGH LIFE ENLIGHTENMENT SKILLS

Course Outcomes:

Students will be able to

CO1. Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life.

CO2. The person who has studied Geeta will lead the nation and mankind to peace and prosperity

CO3. Study of Neetishatakam will help in developing versatile personality of students.