

M.E. PROCESS CONTROL AND INSTRUMENTATION

SEMESTER I EIPCPC11 PROCESS DYNAMICS AND CONTROL

COURSE OUTCOMES

At the completion of this course, students will be able to:

1. Understand basic principles and importance of process control in industrial process plants.
2. Acquire knowledge of dynamic modelling and system behaviour.
3. Understand the need for mathematical basis for the design of control systems.
4. Design and implementation of advanced controllers.
5. Understand the concept of MIMO process.

SEMESTER I EIPCPC12 INDUSTRIAL INSTRUMENTATION

COURSE OUTCOMES

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

1. Apply knowledge on measurement and calibration principles of basic industrial process variables to ensure proper functioning of industrial systems.
2. Appropriately select and mount the instruments for a particular process.
3. Execute instrumentation requirements in various process industries such as Thermal power plant and Nuclear power plant and Petro Chemical/ Refinery.
4. Identify hazardous area and ensure safety measures by evaluating risk levels and features.
5. Design and implement a safety instrumentation system.

SEMESTER I EIPCMC15 RESEARCH METHODOLOGY AND IPR

COURSE OUTCOMES

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

1. Understand research problem formulation.
2. Follow research ethics.
3. Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity.
4. 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.
5. 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 EIPCCP16 PROCESS CONTROL & INSTRUMENTATION LAB

COURSE OUTCOMES

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

1. Identify the types of control valve for a particular process number to determine the characteristics of level and flow transmitter and identify the error if any.
2. Model and design controllers for different processes.
3. Design and implement advanced control techniques.
4. Develop and program with TUTSIM and MATLAB software for process control applications.
5. Do the modeling of a real time process.

SEMESTER I EIPCCP17 INSTRUMENTATION SYSTEM DESIGN LAB

COURSE OUTCOMES

At the end of the practical course the students will be able to

1. Design and implement the electronic PID controller with auto manual switch.
2. Design PLC based annunciator circuit and logic gates based alarm circuits.
3. Design PID controller with anti- reset windup schemes and design of practical forms of process processes.
4. Design and implement cold junction compensation schemes.
5. Design orifice for flow process and size A control valve for a particular application.

SEMESTER II EIPPC21 INDUSTRIAL DATA COMMUNICATION AND CONTROL

COURSE OUTCOMES

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

1. Understand the basic principle and modes of digital data transmission and communication.
2. Understand the various types of buses and devices used for data communication in industry.
3. Implement the automation concepts in a process industry with DCS and PLC.
4. Understand different networking topologies for data communication in process industries.
5. Use HART and Fieldbus protocols for process industries.

SEMESTER II EIPCC22 SYSTEM IDENTIFICATION AND MODELLING

COURSE OUTCOMES

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

1. Identify a suitable continuous time domain identification method for the taken up process.
2. Select a particular state space model based on specific control engineering problem.
3. Understand and implement the various complexity estimation methods, offline and online, open and closed loop estimation methods for modelling and estimating a process.
4. Gain an idea for Robust parameter estimation.
5. Select a specific identification method with an approximately equal complexity for the case studies.

SEMESTER II EIPCCP26 INDUSTRIAL AUTOMATION LAB

COURSE OUTCOMES

At the end of the practical course the students will be able to

1. Model and design digital controllers for different processes.
2. Apply artificial intelligence algorithm for process control.
3. Get hands on experience on PLC interfacing and troubleshooting.
4. Demonstrate his/her ability to develop code in LabView and SCADA software for process control applications.
5. Understand the features of DCS with real-time interface.

SEMESTER II EIPCTS27 INTERNSHIP AND SEMINAR

COURSE OUTCOMES

At the end of the training the students will be able to

1. Face the challenges related to work environment.
2. Manage the issues arising during the execution of projects related to process control and instrumentation.

SEMESTER III EIPCPV33 PROJECT WORK & VIVA-VOCE PHASE-I

COURSE OUTCOMES

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

1. Take up any challenging practical problems and find solution
2. Learn to adapt systematic and step-by-step problem solving methodology.

SEMESTER IV EIPCPV41 PROJECT WORK & VIVA-VOCE PHASE-II

COURSE OUTCOMES

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

1. Take up any challenging practical problems and find solution.
2. Learn to adapt systematic and step-by-step problem solving methodology.

PE - PROGRAM ELECTIVES

EIPCPEXX INSTRUMENTATION SYSTEM DESIGN

COURSE OUTCOMES

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

1. Carryout orifice and control valve sizing for liquid/steam services.
2. Design signal conditioning circuits for temperature sensors, V/I , I/V P/I and I/P converters.
3. Design transmitters.
4. Design, fabricate and test PID controllers and alarm circuits.
5. Design microprocessor based data acquisition system.

EIPCPEXX ADVANCED INSTRUMENTATION SYSTEM

COURSE OUTCOMES

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

1. Select fiber optic sensors and Design a fiber optic based instrumentation system for the measurement of industrial process variables.
2. Apply the principle of Lasers and develop laser based measuring instrumentation system.
3. Develop ultrasonic instrumentation system for measurement and analysis.
4. Design systems applying virtual instrumentation principles.
5. Handle smart instruments and HART transmitters.

EIPCPEXX INSTRUMENTATION IN PETROCHEMICAL INDUSTRY

COURSE OUTCOMES

After completing this course the student will:

1. Gain basic knowledge about the methodologies applied for recovery and processing of petroleum.
2. Be familiar with different unit operations involved in Petroleum industry.
3. Have a general understanding of the production routes for important petrochemicals.
4. Be able to describe the control of Important processes like FCCU, Catalytic Reformer and Alkylation.
5. Be able to classify the hazardous zones and gain knowledge about the techniques used to reduce the explosion hazards.

EIPCPEXX THERMAL POWER PLANT INSTRUMENTATION

COURSE OUTCOMES

1. The student will be equipped with the basic knowledge of function of different systems in Thermal power plant.

2. The student knows the procedural steps to obtain the mathematical model of various units in Thermal power plant.
3. Will be able to explain conventional and advanced control concepts and implementation in various processes.
4. Will get idea on the parameters to be monitored, measured and controlled in steam turbines calculation and optimization of Boiler efficiency by including various losses in thermal power plant.
5. Understand important control circuits in boiler and interlock in boiler operations.

EIPCPEXX VIRTUAL INSTRUMENTATION

COURSE OUTCOMES

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

1. Develop software program in VI
2. Experiment with plug-in DAQ interfaces for prototypemeasurement systems.
3. Implement basis concepts incorporating various VI Toolsets based on the application in Virtual Instruments.
4. Get the knowledge of Smart Sensors.
5. Get knowledge about VI for real time systems, embedded controller, HMI/SCADA software and Active X programming.

EIPCPEXX AUTOMOTIVE INSTRUMENTATION

COURSE OUTCOMES

After learning this course, the students should be able to:

1. Evaluate the sensor and measuring system of automobile.
2. Design the basic modeling and control scheme for automotive systems.
3. Acquire knowledge of various automotive standards and Protocols.
4. understand the current trend in the role of electronics and softwares in automobiles.
5. Apply electronics for body dashboard and Anti Lock Braking systems.

EIPCPC22 ADVANCED PROCESS CONTROL

COURSE OUTCOMES

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

1. Able to analyse system behavior.
2. Able to understand and design MPC for a given process.
3. Ability to design robust control system.
4. Able to understand the concept of H_2 and H_∞ controller.
5. Able to understand and design a Multi-Input Multi-Output system.

EIPCPEXX ADAPTIVE CONTROL

COURSE OUTCOMES

At the end of the course the student will able to

1. Design gain scheduling and the model reference adaptive systems.
2. Design different types of deterministic self tuning regulator.
3. Design different types of stochastic self tuning regulator.
4. Design robust self tuning regulator.
5. Understand practical aspects of adaptive control schemes for industrial processes.

EIPCPEXX OPTIMAL CONTROL

COURSE OUTCOMES

After completion of this paper the student will

1. Understand the optimal control problem formulation and its selection of performance measures.
2. Recognize and recall the fundamentals of calculus of variation.
3. Implement optimal control concept for minimum time and minimum control effort problems.
4. Apply Matrix Ricatti Equation for real world problem.
5. Understand the concepts of dynamic programming and to find numerical solution of two-point boundary value problem.

EIPCPEXX ROBUST CONTROL

COURSE OUTCOMES

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

1. Understand the fundamentals of robustness.
2. Understand the application of robust control in MIMO system.
3. Analyze the stability of robust system.
4. Design and analyze robust control system.
5. Understand the concepts of H- α control and μ synthesis.

EIPCPEXX NON LINEAR SYSTEM THEORY

COURSE OUTCOMES

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

1. Understand the basics of nonlinear systems.
2. Construct the phase plane of systems
3. Derive the describing function.
4. Understand the stability analysis of nonlinear systems.
5. Implement modelling of nonlinear systems and feedback linearization design.

EIPCPEXX STATISTICAL PROCESS CONTROL

COURSE OUTCOMES

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

1. Analyse quality control in industries.
2. Understand SPC and its design tools.
3. Construct control charts.
4. Understand the concept of variable and attribute charts.
5. Understand process monitoring and control techniques.

EIPCPEXX ADVANCED DIGITAL SIGNAL PROCESSING

Course OutComes

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

1. Analyse the functions and characteristics of different op-amps.
2. Familiarize with various estimation techniques.
3. Able to realize systems using different realization algorithms.
4. Able to analyze and implement different types of adaptive filters.
5. Familiarize with multirate wavelet transform and its implementation.

EIPCPEXX MACHINE LEARNING TECHNIQUES

COURSE OUTCOMES

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

1. Demonstrate the underpinning knowledge on machine learning.
2. Apply various linear models for different class of predictions.
3. Formulate machine learning problems using tree and ensemble models.
4. Apply unsupervised learning algorithm for a typical problem.
5. Develop reinforcement learning model for process control applications.

EIPCPEXX ROBOTICS AND AUTOMATION

COURSE OUTCOMES

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

1. Expertise in fundamentals, Classification and issues related to end effectors and sensors of Robotics.
2. Program, Propose and synthesize control law for a given application.
3. Acquire knowledge about different types of automation.
4. Have knowledge about different types of robots safety issues and their applications of robots.
5. Have knowledge about various control methods of robots.

EIPCPEXX ARTIFICIAL INTELLIGENCE FOR PROCESS CONTROL

COURSE OUTCOMES

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

1. Understand the basics of ANN and derive different algorithms.
2. Understand the concept of neurocontroller and its application to process control.
3. Understand the concept of fuzzy logic control and its application to process control.
4. Understand the concept of GA to optimization problem.
5. Understand the concept of hybrid control schemes and its application to process control.

EIPCPEXX REAL TIME EMBEDDED SYSTEM

COURSE OUTCOMES

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

1. Understand the fundamental of RTS and its application areas.
2. Understand the embedded system concepts for RTS.
3. Understand the software development environment for specific application.
4. Design RTOS with embedded system.
5. Understand the concept behind the applications as case studies.

OE - OPEN ELECTIVES

EIPCOEXX INDUSTRIAL DRIVES AND CONTROL

COURSE OUTCOMES

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

1. Get a thorough understanding of motor-load system dynamics and stability, modern drive system objectives and fundamentals of DC and AC motors.
2. Model both DC and AC motors in various conventional methods.
3. Design and analyze both converter and chopper driven DC drives.
4. Understand conventional control techniques of AC drives and will have the ability to design and analyze such system.
5. Get a detailed knowledge on advanced high performance control strategies for AC drives and emerging technologies in electric drives.

EIPCPEXX DIGITAL CONTROL

COURSE OUTCOMES

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

1. Analyse digital systems in time domain
2. Analyse digital systems in frequency domain
3. Model and analyse digital systems in state space representation
4. Design controllers for digital systems in state space representation
5. Understand the concept of stability in discrete domain.

EIPCOEXX WIRELESS SENSOR NETWORKS

COURSE OUTCOMES

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

1. Understand the challenges in wireless sensor networks and various components involved in it.
2. Analyze WSN with respect to various performance parameters in the protocol stack.
3. Understand MAC algorithms and Network protocols used for specific WSN applications.
4. Understand the concept of network layer design issues related to higher layers.
5. Design and develop a WSN for a given application.

EIPCOEXX DIGITAL IMAGE PROCESSING

Course Outcomes

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

1. Analyze the basics of image processing.
2. Familiarize with image enhancement techniques.
3. Compress an image using various compression techniques.
4. Restore an image from its degraded version.
5. Construct projections using transforms.

EIPCOEXX MULTI SENSOR DATA FUSION

COURSE OUTCOMES

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

1. Understand the importance of using data fusion in multi-sensor systems.
2. Understand simple approaches to data fusion for enhancing sensor reliability.
3. Derive and apply the Kalman filter to data fusion problems.
4. Understand the importance of sensor management and data association.
5. Apply advanced filtering schemes for optimal sensor fusion

EIPCACXX SANSKRIT FOR TECHNICAL KNOWLEDGE

COURSE OUTCOMES

Students will be able to

1. Understanding basic Sanskrit language.
2. Ancient Sanskrit literature about science & technology can be understood.
3. Being a global language, will help to develop logic in students.

EIPCACXX VALUE EDUCATION

COURSE OUTCOMES

Students will be able to

1. Get the knowledge of self-development.
2. Learn the importance of Human values.

3. Develop the overall personality.

EIPCACXX CONSTITUTION OF INDIA

COURSE OUTCOMES

Students will be able to:

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

EIPCACXX PEDAGOGY STUDIES

COURSE OUTCOMES

Students will be able to understand:

1. What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries.
2. What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners.
3. How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy.

EIPCACXX STRESS MANAGEMENT BY YOGA

COURSE OUTCOMES

Students will be able to:

1. Develop healthy mind in a healthy body thus improving social health also Improve efficiency.

EIPCACXX PERSONALITY DEVELOPMENT THROUGH LIFE ENLIGHTENMENT SKILLS

COURSE OUTCOMES

Students will be able to:

1. Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life.
2. The person who has studied Geeta will lead the nation and mankind to peace and prosperity.
3. Study of Neetishatakam will help in developing versatile personality of students.

M.E., Rehabilitative Instrumentation Engineering (Two Year) Programme

Semester-I **EIRIPC11 Medical Physiology**

Course Outcomes

By successfully completing this course, students will be able to:

1. Describe and explain specific parts and key terms applied in anatomy and physiology.
2. Describe important physiological mechanisms involved in cell, tissue, and organ.
3. Understand organisation and functions of each organs and systems in human body.
4. Correlate the knowledge of medicine and engineering for the development of various instruments.
5. Understand the diseases associated with various parts of the body.

Semester-I **EIRIPC12 Impairment Engineering**

Course Outcomes

By the end of this course the student will be able

1. To design rehabilitation aid and apply them with confidence, to help the challenged people.
2. To build foundation for learners enabling the learners to pursue higher studies with specialization in Rehabilitation Engineering.
3. To design rehabilitation aids and its understanding.
4. To have a thorough understanding of aids which can be useful with the societal needs.
5. To apply and test the developed products and and automate it.

Semester-I **EIRIMC15 Research Methodology and IPR**

Course Outcomes

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

1. Understand research problem formulation.
2. Follow research ethics
3. Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity.
4. Understanding that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular.
5. 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 **EIRICP16 Biosignal and Image Processing Lab**

Course Outcomes

- 1) Students can learn different physiological signals and Images.
- 2) Students will be benefited by carrying out the experiments with real medical Images.
- 3) Students will be able know different abnormalities and analyse with the Images.
- 4) Students can face the society with challenging ideas by using various Image processing Techniques and work with the same knowledge in the Hospitals.

Semester-I **EIRICP17 Biosensors and Transducers Lab**

Course Outcomes

- 1) Students can learn different physiological signals and sensors.

- 2) Students will be benefited by carrying out the experiments with real subjects.
- 3) Students will be able know different abnormalities and simulate using the available equipments.
- 4) Students can face the society with challenging ideas by using various sensors and same can be troubleshooted in the hospitals.

Semester-II **EIRIPC21 Modelling and Control of Biological Systems**

Course Outcomes

Students will be able to

1. Understand the concepts of modeling.
2. Design control strategies for various organ functioning.
3. Analyse the causes for malfunctioning of organs.
4. Analyse and do research in the micro level for diagnosing the diseases.
5. Theoretically diagnose the kind of diseases for their understanding from the case studies.

Semester-II **EIRIPC22 Artificial Organ System**

Course Outcomes

Student will be able to

1. Understand the concept of biocompatibility and the methods of biomaterial testing.
2. Awareness about the testing of the biomaterials done biologically before implantation in the human body.
3. Gain knowledge in the existing designs of artificial organs.
4. Understanding the applications of the organs implants.
5. Develop additional features in the existing instruments.

Semester-II **EIRIPC26 Bio Instrumentation Lab**

Course Outcomes

- 1) Students can learn different physiological signals.
- 2) Students will be benefited by carrying out the experiments with real subjects.
- 3) Students will be able know different abnormalities and simulate using the available equipments.
- 4) Students can face the society with challenging ideas.

Semester-II **EIRITS27 Internship and Seminar**

Course Outcomes

- 1) The students can face the challenges in the practice with confidence.
- 2) The student will be benefited by the training with managing the situation arises during the execution of works related to health care system.
- 3) The student will be able to design a project based on their training.
- 4) Students can face the society with challenging ideas.

Semester-III **EIRIPV33 Project Work and Viva-Voce Phase – I**

Course Outcomes

Upon completion of this project work, the students will be able to:

1. Take up any challenging practical problems and find solution.
2. Learn to adopt systematic and step-by-step problem solving methodology.
3. Design a given circuit with due interest.
4. Troubleshoot any given circuit and test the results.

Semester-IV **EIRIPV41 Project Work and Viva-Voce Phase – II**

Course Outcomes

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

- 1) Take up any challenging practical problems and find solution.
- 2) Learn to adopt systematic and step-by-step problem solving methodology.
- 3) Design a given circuit with due interest.
- 4) Troubleshoot any given circuit and test the results.

PROGRAM ELECTIVES

EIRIPEXX Medical Image Processing

Course Outcomes

Student will

1. Get the clear domain knowledge about the various Medical Imaging techniques.
2. To understand the various diagnostic applications of the medical imaging techniques.
3. To apply the imaging modalities in the medical hospitals.
4. To use the advanced techniques to diagnose the health problems.
5. Use their knowledge to use advanced Instruments for imaging.

EIRIPEXX Medical Diagnostic Instrumentation

Course Outcomes

Student will be able to

1. Demonstrate the principles of electronics used in designing various diagnostic equipment.
2. Have in-depth knowledge about different streams in Biomedical Engineering with greater emphasis on health care equipments and the advanced technologies such as Telemedicine, Telemetry, Medical Imaging, etc.
3. Provide a better technical support with exposure to the hospitals and health care industry.
4. Understand the various techniques and applying for the betterment of the patients.
5. Understand critical care units and its importance

EIRIPEXX Computational Neuro Engineering

Course Outcomes

Through this course of study students will be able to

1. Understand the application of basic science and engineering techniques.
2. Develop methods to record from and exert control over the nervous system.
3. Understand and develop the models of associated organ systems.
4. Can carryout research in the analysis of memory of physiological systems.
5. Apply clinically for validation through research

EIRIPEXX Computational Methods and Cancer Modelling

Course Outcomes

Through this course of study students can able to

1. Understand the basics of molecular biology and cancer.
2. Analyse how Cancer develops and progresses.
3. Design the mathematical modelling and the causes of cancer can be analysed.
4. Understand various treatments methods and Imaging of cancer and the research problems can be solved to the extent.
5. Do research in the area of cancer modeling.

EIRIPEXX Biosignal Processing

Course Outcomes

Student will be able to

1. Understand the fundamental techniques and applications of digital signal processing with emphasis on biomedical signals.
2. Implement algorithms based on discrete time signals.
3. Understand Circular and linear convolution and their implementation using DFT analyse signals using discrete Fourier transform.
4. Understand efficient computation techniques such as DIT and DIF FFT algorithms.
5. Analyse the biological signals for the scope of diagnosis.

EIRIPEXX Transportation In Living Systems

Course Outcomes

Student will be able to

1. Understand the internal organs.
2. Understand the organs functioning in detail.
3. Know the Physics involved in the body fluids.
4. Understand in depth knowledge of human systems.
5. Know about the minerals and liquids present in the body.

EIRIPEXX Cancer Biology

Course Outcomes

Student will be able to

1. Have clear understanding of basics of cancer and its types.
2. Understand the causes of Cancer.
3. Analyse the modalities for the detection of Cancer.
4. Develop cancer detecting modules.
5. Help the society by the developed products.

EIRIPEXX Computational Methods And Bone Modelling

Course Outcomes

Student will be able to

1. Understand the types of bone tissues and its structures.
2. Analyse the causes of Bone Cancer.
3. Model the different types of bones and Cancer affected Bones.
4. Do research on the therapeutics on Bone Cancer.
5. Design new modalities for diagnosis with study analysis.

EIRIPEXX Medical Imaging Systems and Radio Therapy

Course Outcomes

Student will be able to

1. Understand the different methods and modalities used for medical imaging.
2. Learn the preferred medical imaging methods for routine clinical applications.
3. Understand the engineering models used to describe and analyze medical images.
4. Apply these tools to different problems in medical imaging.
5. Develop drugs with the research Analysis

EIRIPEXX Wavelet Transforms And Its Applications

Course Outcomes

Student will be able to

1. Understand an in-depth knowledge about the basic concepts of wavelet and speech analysis
2. Apply wavelet for various physiological signals
3. Analyse the signal features and its functions
4. Do mathematical analysis on various types of Bio signals
5. Develop new algorithms for early diagnosis

EIRIPEXX Bioinformatics

Course Outcomes

Student will be able to

1. Understand the concept of Gene structures.
2. Acquire awareness about the computational biology.
3. Work with various software tools.
4. Understands the various aspects of informatics applied in health industry so that quality of health care is improved.
5. Analyse the gene formations and diseases.

EIRIPEXX Medical Ethics and Standards

Course Outcomes

Upon completion of this course the student should be able to demonstrate a measurable increase in their knowledge, skills and abilities related to:

1. Legal and professional guidelines for the health professions.
2. Public duties and consent.
3. Guidelines to obtain medical standards in hospitals.
4. Medical ethics, legal ethics and the differences associated with the medical society.
5. Standards for the devices

OPEN ELECTIVES

EIRIOEXX Computers In Medicine

Course Outcomes

Student will be able to

1. Exposed to PC hardware as well as various microprocessor family.
2. Hardware behind data acquisition.
3. Scope of virtual reality in health care.
4. Develop insight knowledge about the biometrics and network security.
5. Automate the existing systems with computers.

EIRIOEXX Tissue and Stem Cell Engineering

Course Outcomes

By successfully completing this course, students will be able to:

1. Understand the importance of tissue engineering in the field of biomedical engineering.
2. Understand the mechanisms involved in interaction of different materials with cells and tissues.
3. Explain different methods involved in characterization and preparation of biomaterials in tissue engineering.
4. Apply the knowledge in creating new models in drug delivery systems using synthetic and basic knowledge on stem cells and its various functional applications and therapy.
5. Design an implant for tissue replacement.

EIRIOEXX Radiological Equipments

Course Outcomes

The student is exposed to the

1. Basics of radiation and its effects.
2. Various imaging modalities and current techniques.
3. Radiation safety and precautions to be followed in the Hospitals.
4. Advanced radiation therapy for cancer treatment.
5. Knowledge of radiation and its effects.

EIRIOEXX Sports Medicine

Course Outcomes

The student is exposed to the

1. Awareness in sport Medicine.
2. Techniques to be applied for sports injuries.
3. Applications of Medical techniques for athletes.
4. Physiological exercises for various human systems and developmental strength.
5. New ideas for design projects.

EIRIOEXX Computational Bioengineering

Course Outcomes

Through this course of study students will be able to

1. Understand the application of basic science and engineering techniques,
2. Develop methods to record from and exert control over the nervous system
3. Understand and develop the models of associated organ systems.
4. Can carry out research in the analysis of memory of physiological systems
5. Apply neural networks for detection and analysis of diseases.

EIRIOEXX Health Care Systems

Course Outcomes

The student is exposed to the

1. Hospital administration.
2. Various environmental challenges in Health care domain
3. History and overview of healthcare system in the country.
4. Understands the regulation and standards.
5. Epidemiology Principles

EIRIOEXX Telemedicine

Course Outcomes

The student is exposed to the

1. Technologies applied in multimedia using telemedicine.
2. Protocols behind encryption techniques for secure transmission of data.
3. Applications of telehealth in healthcare.
4. Concept of the fundamental concepts necessary to for any telemedicine and telehealth activity.
5. Telemedicine and ways of connecting nodal hospitals

EIRIOEXX Modelling of Physiological Systems

Course Outcomes

Student will be able to

1. Acquire an insight into and understanding of the utilization of models, system analysis and analog simulation in the field of bioengineering.
2. Understand basic concepts of modeling for designing biological model.
3. Model and simulate physiological processes for better understanding.
4. Use various simulation softwares for modeling biological systems.
5. Understand micro level analysis of cell signaling.

EIRIOEXX Biomechanics

Course Outcomes

Student will be able to

1. Understand the definition of biomechanics, prostheses orthoses and its classification and design principles.
2. Develop a better understanding of how mechanical principles influence human motion during everyday life.
3. Analyze the forces at joints for various static and dynamic human activities; analyze the stresses and strains in biological tissues.
4. Understand the principles of mechanics that is used to analyze human movement.
5. Analyse the mechanism of joints and bones

EIRIOEXX Troubleshooting of Medical Equipments

Course Outcomes

Students will be able to

1. Understand the concepts of Medical Equipments.
2. Understand the functioning of equipments and usage in Hospitals.
3. Techniques about various electronic circuits in medical equipments.
4. Troubleshoot the medical devices
5. Applying the service concepts in developing new features

EIRIOEXX Design of Medical Equipments

Course Outcomes

Students will be able to

1. Understand the basic design of medical devices.
2. Learn various acquisition modules in Medical devices.
3. Learn various therapeutic equipments.
4. Understand the design of implants.
5. Understand more about joint replacements.

AUDIT COURSES

EIRIACXX English for Research Paper Writing

EIRIACXX Disaster Management

EIRIACXX Sanskrit for Technical Knowledge

Course Outcomes

Students will be able to

1. Understanding basic Sanskrit language
2. Ancient Sanskrit literature about science & technology can be understood.
3. Being a global language, will help to develop logic in students.

EIRIACXX Value Education

Course Outcomes

Students will be able to

1. Knowledge of self-development.
2. Learn the importance of Human values
3. Developing the overall personality

EIRIACXX Constitution of India

Course Outcomes:

Students will be able to:

1. Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
2. Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.
3. 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.
4. Discuss the passage of the Hindu Code Bill of 1956.

EIRIACXX Pedagogy Studies

Course Outcomes

Students will be able to understand:

1. What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries.
1. What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners.
2. How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy.

EIRIACXX Stress Management By Yoga

Course Outcomes:

Students will be able to:

1. Develop healthy mind in a healthy body thus improving social health also Improve efficiency

EIRIACXX Personality Development Through Life Enlightenment Skills

Course Outcomes:

Students will be able to:

1. Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life
2. The person who has studied Geeta will lead the nation and mankind to peace and prosperity
3. Study of Neetishatakam will help in developing versatile personality of students.

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

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 in-depth 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 ENGINEERING

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 its 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.

B.E. ELECTRONICS AND INSTRUMENTATION ENGINEERING (FOUR YEARS)

Semester-III ETBS301: ENGINEERING MATHEMATICS III

Course outcome

At the end of the course the students will be able to acquire knowledge on

CO1 Partial differential equations.

CO2 Fourier series.

CO3 Fourier transform.

CO4 Z-transforms and the methods of solving them.

CO5 Solving boundary value problems.

Semester-III ETES302 ENVIRONMENTAL STUDIES

COURSE OUTCOMES

At the end students can able to

CO1. Understand the importance of environment.

CO2. Analyze the importance of environment in engineering.

CO3. Apply their own ideas and demonstrate advanced technologies that will be useful to protect environment.

CO4. Employ awareness among the society about environmental problems and natural disasters.

CO5. Practice according to the present and future environmental issues.

Semester-III ETES303 ENGINEERING MECHANICS

COURSE OUTCOMES

At the end, Students can able to

CO1. Explain the forces and its related laws of mechanics in static and dynamic conditions.

CO2. Analyse the forces and its motions on particles, rigid bodies and structures.

CO3. Solve the moment of inertia of any sections and masses for the structural members.

CO4. Understand the principles of kinetics and dynamics.

CO5. Understand the concept of particle dynamics in motion.

Semester-III EIES304 THERMODYNAMICS AND FLUID MECHANICS

COURSE OUTCOMES

By the end of this course, the students will be able to:

CO1. Understand the basics of thermodynamics (Unit I)

CO2. Understand various thermodynamic cycles and apply them to heat engines. (Unit II)

CO3. Quantify the properties of fluids. (Unit III)

CO4. Familiarize the equations relating boundary layer and concepts (Unit IV)

CO5. Know the principles of operation of some of the widely used fluid machinery. (Unit V)

Semester-III EIPC305 ELECTRICAL CIRCUIT ANALYSIS

COURSE OUTCOMES

COURSE OUTCOMES

At the end of this course, students will demonstrate the ability to

CO1. Apply network theorems for the analysis of electrical circuits.(Unit I)

CO2. Obtain the transient and steady-state response of electrical circuits.(Unit II)

CO3. Analyse circuits in the sinusoidal steady-state (single-phase and three-phase).(Unit III)

CO4. Analyse two port circuit behavior.(Unit IV)

CO5. Acquire engineering analytic techniques and skills.(UnitV)

Semester-III **EIPC306 ANALOG ELECTRONIC CIRCUITS**

COURSE OUTCOMES

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

CO1. Understand the characteristics of transistors.(Unit II)

CO2. Design and analyse various rectifier and amplifier circuits. (Unit I)

CO3. Understand the fundamental concepts of MOSFETs and their applications for analog electronics circuits. (Unit III)

CO4. Understand the functioning of OP-AMP. (Unit IV)

CO5. Understand the design OP-AMP based circuits. (Unit V)

Semester-III **EISP307 FLUID MECHANICS & HYDRAULICS MACHINERY LAB**

COURSE OUTCOMES

Make the students understand

CO1.After completion of this course, a student will be able to:

CO2.Compute forces on immersed plane and curved plates applying continuity equation and energy equation in solving problems on flow through conduits

CO3.Develop Characteristics of pumps and turbines.

Semester-III **EICP308 ELECTRIC CIRCUITS LAB**

COURSE OUTCOMES

Make the students understand

CO1. The significance of the theorem and the practical verification of theorems.

CO2. The usage of the theorem in the analysis of the circuits.

CO3. The way of trouble shooting the circuit connection and to test the devices.

CO4. The circuit connections and testing points of the circuit by simulation and implementation.

CO5. The significance of resonance conditions in series and parallel circuits.

Semester-III **EICP309 ANALOG ELECTRONICS LAB**

COURSE OUTCOMES

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

CO1. Observe the characteristics of the devices and to find various practical parameters like input impedance, trans-conductance, pinch-off voltage etc., related to their applications.

CO2. Understand the circuit connections and testing points of the circuit by simulation and implementation.

CO3. Design of various electronic circuits using the fundamental concepts for industrial applications

CO4. Simulate various electronic circuits using Electronic Work Bench Software without the use of physical electronic components so that it is possible to reduce the time, energy and cost.

CO5. Troubleshoot the malfunctioning of electronic circuits and to identify the compatibility of system components in the design of Integrated Circuit.

Semester-III **ETIT 310 INTERNSHIP INTER/ INTRA INSTITUTIONALACTIVITIES**

COURSE OUTCOME – NIL

Semester-IV **EIBS401 PROBABILITY, RANDOM PROCESSES AND NUMERICAL METHODS**

COURSE OUTCOMES

At the end of the course, the students would

- CO1. Acquire skills in handling situations to solve problems for engineers using numerical methods.
- CO2. Understand random variables and random processes
- CO3. Understand numerical differentiation and integration
- CO4. Give numerical solution for algebraic and transcendental equations.
- CO5. Give numerical solution for ordinary differential equation.

Semester-IV **EIES402 ELECTRICAL TECHNOLOGY**

COURSE OUTCOMES

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

- CO1. Understand the practical application of Wattmeters and Energy meters.(Unit-I)
- CO2. Construct and determine the circuit parameters using AC and DC bridges.
- CO3. Get the knowledge of electrical DC machines (Unit-III)
- CO4. Understand the practical application of Induction machines.(Unit-IV)
- CO5. Acquire knowledge on magnetic circuits. (Unit-II)

Semester-IV **EIPC403 CONTROL SYSTEMS**

COURSE OUTCOMES

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

- CO1. Understand the basics of control system for the design and analysis (Unit I)
- CO2. Understand the issues related to time response analysis. (Unit II)
- CO3. Perform frequency response and stability analysis. (Unit III)
- CO4. Design compensators in time and frequency domain. (Unit IV)
- CO5. Understand the concept of stability and its assessment for linear-time invariant systems.(Unit V)

Semester-IV **EIPC404 DIGITAL ELECTRONICS**

COURSE OUTCOMES

At the end of this course, students be able to

- CO1. Understand working of logic families and logic gates.(Unit I)
- CO2. Design and implement Combinational logic circuits. (Unit II)
- CO3. Design and implement Sequential logic circuits (Unit III)
- CO4. Understand the process of Analog to Digital conversion and Digital to Analog conversion. (Unit IV)
- CO5. Be able to use PLDs to implement the given logical problem.(Unit V)

Semester-IV **EIPC405 ELECTRONIC INSTRUMENTATION AND MEASUREMENT TECHNIQUES**

COURSE OUTCOMES

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

- CO1. Understand different types of electronic meters and their applications. (Unit I)
- CO2. Understand different types of waveform generators, analyzers and their applications. (Unit I)
- CO3. Understand digital instruments and intelligent instruments. (Unit II)
- CO4. Gain knowledge of cathode ray oscilloscope, recorders and other display devices with their applications. (Unit III & IV)
- CO5. Understand computer controlled system and virtual instrumentation. (Unit V)

Semester-IV **EIPC406 TRANSDUCERS AND MEASUREMENT SYSTEMS**

COURSE OUTCOMES

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

- CO1) Select a measurement system to meet the requirements. (Unit I)
- CO2) Knowledge about characteristics of system based on the type of input. (Unit II)

CO3) Choose among the various types of resistance transducers for particular application.(Unit III)

CO4) Choose among the various types of capacitive and inductive transducers depending on the principle, range, cost and commercial availability. (Unit IV & V)

CO5) Understand the recent trends in the development of transducers and the engineering involved in it. (Unit V)

Semester-IV **EICP407 CONTROL SYSTEMS LAB**

COURSE OUTCOMES

After successful completion of this course, the students should be able

CO1. to identify the model of any system using various techniques and investigate its performances in open and closed loops.

CO2. To obtain desired performance by designing and implementing suitable compensators for the taken up system.

CO3. To identify any type of control system with respect to system stability in time domain as well as frequency domain.

CO4. To understand the concept of sensitivity and stability characteristics of open loop and closed loop control systems.

CO5. To obtain the time response analysis of type-0 and type-1 systems.

Semester-IV **EICP408 DIGITAL ELECTRONICS LAB**

COURSE OUTCOMES

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

CO1. Test and understand the logic gates using their truth tables which is very useful in the design of Integrated Circuits.

CO2. Simplify the complex logic function into simplest one so that it is possible to reduce the size of the circuit.

CO3. Design of various electronic circuits using the fundamental concepts in digital electronic systems for various industrial applications.

CO4. Simulate various electronic circuits using Electronic Work Bench Software without the use of physical electronic components so that it is possible to reduce the time, energy and cost.

CO5. Troubleshoot the malfunctioning of electronic circuits and to identify the compatibility of system components in the design of Integrated Circuit.

Semester-IV **EICP409 SENSORS AND SIGNAL CONDITIONING LAB**

COURSE OUTCOMES

At the end of the practical course the students will be able to

CO1) Select and use the proper transducer for the required application.

CO2) Have a knowledge of characteristics of various sensors

CO3) Obtain the Transfer function model for sensors

CO4) Design and implement signal conditioning circuits for process variables such as temperature, pressure and displacement.

CO5) Apply the MATLAB and EWB software packages for the design and verification of signal conditioning circuits.

Semester-V **EIPC501 INDUSTRIAL INSTRUMENTATION**

COURSE OUTCOMES

At the end of the course the student attains the

CO1. Ability to understand Load cell, strain gauge, Speed measurement (Unit I)

CO2. Ability to understand and apply Manometers, Bourdon tube, McLeod gauge, Piezo resistive, Ionization gauge, dead weight tester to pressure measurement. (Unit II)

CO3. Ability to understand temperature sensors like thermometers, RTD, thermistors, thermocouple and pyrometers. (Unit III)

CO4. Ability to understand and apply variable head type, variable area type flow meters, electromagnetic, ultrasonic, laser Doppler and solid type to flow measurement. (Unit-IV)

CO5. Ability to understand level sensors like float type, air purge, Capacitive, Nucleonic and Ultrasonic gauge, boiler drum level and viscosity, humidity and moisture measurement. (Unit V)

Semester-V **EIPC502 SIGNALS AND SYSTEMS**

COURSE OUTCOMES

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

CO1. Understand the concepts of continuous time systems (Unit I)

CO2. Understand the concepts of discrete time systems.(Unit II)

CO3. Analyse continuous time systems in complex frequency domain.(Unit III)

CO4. Analyse discrete time systems in complex frequency domain.(Unit IV)

CO5. Understand sampling theorem and its implications. (Unit V)

Semester-V **EIPC503 PROCESS CONTROL**

COURSE OUTCOMES

At the completion of this course, students will be able to:

CO1. Understand basic principles and importance of process control in industrial process plants.(Unit I)

CO2. Acquire knowledge of dynamic modeling, system behavior and tuning of controllers. (Unit II)

CO3. Specify the required instrumentation and final control elements to ensure well-tuned control. (Unit III)

CO4. Gain the knowledge of Piping and Instrumentation Diagram (Unit IV)

CO5. Apply the control system in various complex processes. (Unit V)

Semester-V **EIPC504 MICROPROCESSORS AND MICROCONTROLLERS**

COURSE OUTCOMES

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

CO1. Learn basic concept of microprocessor and architecture and implement programs on 8085 microprocessor. (Unit I)

CO2. Design of peripheral interfacing circuits. (Unit II)

CO3. Understand architecture of microcontrollers and develop simple assembly language program. (Unit III)

CO4. Programming the on-chip peripherals of microcontroller. (Unit-IV :)

CO5. Understand the recent trends and make use of microprocessor and microcontroller for different applications. (Unit V)

Semester-V **EIPC507 INDUSTRIAL INSTRUMENTATION LAB**

COURSE OUTCOMES

CO1. Ability to design components of control system like transmitters, convertors and controllers

CO2. Ability to analyze and design the characteristics of ON/OFF, single speed floating and averaging control.

CO3. Ability to design signal conditioning circuits.

CO4. Ability to use both software and hardware tools.

CO5. Familiarize with the linearization of sensors and transducers

Semester-V EICP508 PROCESS CONTROL LAB

COURSE OUTCOMES

At the end of the practical course the students will be able to

CO1. To model and design controllers for different processes.

CO2. To design and implement advanced control techniques.

CO3. Familiarize with TUNSIM and MATLAB software for process control applications.

CO4. Familiarize with PLC software and its applications for process control operations

CO5. To design and implementation of control techniques for various process control applications

Semester-V EICP509 MICROPROCESSOR LAB

COURSE OUTCOMES

Understand the architecture of 8085.

CO1. Familiarize with the assembly level programming and impart the knowledge about the instruction set.

CO2. Work with standard microprocessor interfaces like Timers, Programmable peripheral interface, Programmable Interrupt controller, serial ports, digital-to-analog converters and analog-to-digital converters etc.

CO3. An in-depth knowledge of applying the concepts on real-time applications.

CO4. Interfacing devices with PC using assembly language programming

Semester-VI EIPC601 DIGITAL SIGNAL PROCESSING

Course Outcomes

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

CO1. Represent signals mathematically in continuous and discrete-time, and in the frequency domain.(Unit I)

CO2. Analyze discrete-time systems using z-transform.(Unit II)

CO3. Understand the Discrete-Fourier Transform (DFT) and the FFT algorithms.(Unit III)

CO4. Design digital filters for various applications.(Unit IV)

CO5. Apply digital signal processing for the analysis of real-life signals.(Unit V)

Semester-VI EIPC602 INSTRUMENTATION SYSTEM DESIGN

COURSE OUTCOMES

At the end of the course the student attains the

CO1. Ability to design signal conditioning circuit for Instrumentation systems.(Unit I)

CO2. Ability to design and develop flow measurement system using orifice & rotameter and to design signal conditioning circuit for temperature transmitters using RTD & thermocouple. (Unit II)

CO3. Ability to design and develop air purge type of level measurement system and to design electronic PID controllers. (Unit III)

CO4. Ability to design and select control valves and pumps for typical control applications. (Unit-IV :)

CO5. Ability to design alarm circuits, interlocks & the ability to develop microprocessor based data acquisition system and PID control system. (Unit V)

Semester-VI EIPC607 INSTRUMENTATION SYSTEM DESIGN LAB

COURSE OUTCOMES

At the end of the practical course the students will be able

CO1. To implement the Auto/Manual switch in PID controller

- CO2. To design practical forms of PID and anti reset windup scheme.
- CO3. To design and implement electronic PID controller
- CO4. To familiarize with cold junction compensation for Thermocouple using RTD.
- CO5. To design of process control components

Semester-VI EICP608 SIGNAL PROCESSING AND EMBEDDED SYSTEMS LAB

COURSE OUTCOMES

- CO1. Understand the architecture of 8051 and PIC microcontroller.
- CO2. Familiarize with the assembly level programming, Embedded C and impart the knowledge about the instruction set.
- CO3. Develop software for embedded system using Cross compilers like RIDE , MPLAB.
- CO4. Students will have the knowledge through hands-on experimentation the Xilinx tools for FPGA.
- CO5. Design as well as the basics of VHDL to design, simulate and implement the digital systems.

Semester-VII ETHS701 ENGINEERING ETHICS

COURSE OUTCOMES

- CO1. Understand the relationship between the engineer and the society.
- CO2. Learn the importance of codes in engineering practice.
- CO3. Acquire knowledge on the legal, moral and ethical aspects in engineering.
- CO4. Learn about the MNCs and their practices.
- CO5. Understand the ethical dimensions in engineering

Semester-VII EIPC702 COMPUTER CONTROL OF PROCESSES

COURSE OUTCOMES

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

- CO1. Analyze a system in discrete domain using Z-transform and modified Ztransform. (Unit I)
- CO2. Design and develop algorithms for sampled data control system. (Unit II)
- CO3. Understand various system identification and modeling techniques in time domain and in frequency domain.(Unit III)
- CO4. Appreciate the application and hardware parts of a Programmable Logic Controller. (Unit-IV)
- CO5. Develop and implement logical programs in PLC and trouble shoot, install and maintain a PLC system. (Unit V)

Semester-VII EICP706 INDUSTRIAL AUTOMATION LAB

COURSE OUTCOMES

- CO1. Able to design and implement a closed loop system in discrete domain.
- CO2. Able to understand and develop ladder logics PLC.
- CO3. Ability to use the software tools like MATLAB and TUTSIM.
- CO4. Ability to use the software tool LABVIEW and data acquisition using LABVIEW.
- CO5. Ability to identify process using LSE algorithm

Semester-VIII EIPV803 PROJECT WORK AND VIVA VOCE

COURSE OUTCOMES

- CO1. On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology
- CO2. Carrying out any experimental works on chosen topics.
- CO3. Understand the modelling, analysis, design and control aspects

PE - PROFESSIONAL ELECTIVES

EIPESCN VIRTUAL INSTRUMENTATION & SMART SENSORS

COURSE OUTCOMES

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

- CO1. Engineering Knowledge on VI. (Unit I)
- CO2. Data acquisition using DAQ VI's. (Unit II)
- CO3. Understand the Virtual Instruments basis concepts. (Unit III)
- CO4. Incorporate various VI Toolsets based on the application. (Unit-IV)
- CO5. Get the knowledge of Smart Sensors. (Unit V)

EIPESCN ANALYTICAL INSTRUMENTATION

COURSE OUTCOMES

- CO1. Gain adequate knowledge about the analytical tools, principles and types of spectroscopy. (Unit I).
- CO2. Importance and applications of IR spectroscopy (Unit II).
- CO3. Importance and applications of Magnetic resonance spectroscopy and mass analyzer (Unit III).
- CO4. Importance and applications of X-ray spectroscopy and dilution tracer analysis (Unit-IV).
- CO5. Separation of similar materials using Chromatograph. (Unit V).

EIPESCN BIOMEDICAL INSTRUMENTATION

COURSE OUTCOMES

- CO1. To educate students on the various physiological systems of the human body.(Unit-I)
- CO2. To impart knowledge on the electrodes and allied recorders so as to obtain measurements from the human body. (Unit-II)
- CO3. To provide insight into advanced imaging systems. (Unit-III)
- CO4. To study the various bio signals along with the principles of measurement. (Unit-IV).
- CO5. To provide an exposure to the medical equipments/instruments used in various departments and laboratories of a hospital. (Unit-V)

EIPESCN POWER PLANT INSTRUMENTATION

COURSE OUTCOMES

- CO1. Ability to understand the function of boiler and also P&ID of thermal power plant.(Unit I)
- CO2. Ability to understand the types of measuring equipment used in thermal power plant. (Unit-I and II)
- CO3. Ability to identify and analyze the specific features of different types of control techniques used in Boilers.(Unit III)
- CO4. Ability to understand the function of turbine and its lubrication method and understand the various safety methods involved in the proper functioning of thermal power plant. (Unit-IV)
- CO5. Ability to understand the function of nuclear power plant, various sensors, control loops and safety measures employed in nuclear power plant. (Unit V)

EIPESCN UNIT OPERATIONS AND CONTROL

COURSE OUTCOMES

At the end of the course the student will be able to:

- CO1. Understand the definitions and basic principles of unit operations and unitsystems.(Unit I)
- CO2. Acquire a thorough knowledge of fluid mechanics and its types of flow.(Unit II)
- CO3. Gain sound knowledge on heat transfer and its applications.(Unit III)
- CO4. Imbibe the concepts of mass transfer and master its applications.(Unit IV)

CO5. Analyze the significance of control systems with multiple loops and plant wide control strategy.(Unit V)

EIPESCN FLUID MECHANICS AND HYDRAULIC MACHINERY

COURSE OUTCOMES

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

1. Apply the basic knowledge of fluid mechanics in finding fluid properties, performance parameters of hydraulic turbines and pumps.
2. Use fluid dynamics for study of flow through pipes and flow in open channels.
3. Present hydraulic design for the construction of efficient hydraulic turbines and pumps.

EIPESCN PRINCIPLES OF COMMUNICATION SYSTEMS

COURSE OUTCOMES

Student can able to

CO1. Develop an understanding of need for modulation and generation & detection of Analog modulation techniques (Unit-I).

CO2. Explore AM and FM Super heterodyne receiver working principle (Unit-II).

CO3. Discuss the techniques for generation and detection of pulse Analog modulation Techniques (Unit-III)

CO4. To understand the basic operation involved in PCM like sampling, quantization & encoding and are able to calculate and derive entropy and channel capacity (Unit-IV).

CO5. To compare different communication system with various modulation techniques in the presence of noise by analytically (Unit-V).

EIPESCN DIGITAL SYSTEM DESIGN

COURSE OUTCOMES

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

CO1. Design of various digital communication systems (Unit I).

CO2. Develop VHDL code describing them at various levels (Unit II).

CO3. Implement the designed digital system using programmable devices (Unit III).

CO4. Utilize advanced features of VHDL with FPGA in their system design (Unit IV)

CO5. Develop digital system with testability (Unit V).

EIPESCN REAL TIME OPERATING SYSTEMS

COURSE OUTCOMES

CO1. Will get to know the fundamentals of interaction of OS with a computer and User computation. (Unit-I : & II)

CO2. Will get to know the programming logic of modeling Process based on range of OS features. (Unit-III : & IV)

CO3. To help the students to come with design and development of solutions using RTOS. (Unit V)

EIPESCN COMPUTER NETWORKS AND DCS

COURSE OUTCOMES

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

CO1. Understand the basic principle of communication and the modes of data transmission. (Unit I)

CO2. Understand the various types of bus devices used for data communication in industry.(Unit II)

CO3. Implement the automation concepts in a process industry. (Unit II)

- CO4. Understand about profibus for data communication. (Unit III)
- CO5. Use HART and Field Bus protocols for process industries. (Unit–IV and V)

EIPESCN VLSI SYSTEM DESIGN

COURSE OUTCOMES

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

- CO1. Perform IP based design. (Unit I)
- CO2. Handle technology dependent parameters in the fabrication process effectively. (Unit II)
- CO3. Perform delay analysis and testability properties of combinational logic networks including both interconnect and gates.(Unit–III & Unit–IV)
- CO4. Design an architecture that executes the desired function and that meets area, performance and testability constraints.(Unit V)

EIPESCN MICROCONTROLLER BASED SYSTEM DESIGN

COURSE OUTCOMES

- CO1. Understand the basis of RSIC processor. (Unit I)
- CO2. Programming the ARM processors.(Unit II)
- CO3. Design of operating system for advanced microcontrollers.(Unit III)
- CO4. By the end of this course, the students will be able to know about the functions and operations of the ARM processor (Unit IV)
- CO5. Develop assembly code for various applications.(Unit V)

EIPESCN EMBEDDED SYSTEMS

COURSE OUTCOMES

- CO1. Understand the basis of embedded system and embedded networking.(Unit I)
- CO2. Learn the architecture and programming of PIC18.(Unit II)
- CO3. Design of embedded networking.(Unit III)
- CO4. Design of embedded system using Embedded C and RTOS.(Unit–IV)
- CO5. By the end of this course, the students will be able to formulate design and analyze any embedded system for real time applications. (Unit V)

EIPESCN POWER ELECTRONICS DRIVES AND CONTROL

COURSE OUTCOMES

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

- CO1. Understand the characteristics & applications of power semi-conductor devices. (Unit I)
- CO2. Understand the AC to DC, DC to AC, and DC to DC converters. (Unit II)
- CO3. To design a firing circuit that solves the specific control problem. (Unit III)
- CO4. Understand the issues related implementation of drives & control. (Unit–IV and V)
- CO5. Understand the recent trends in power converter technology. (Unit–I to V)

EIPESCN SOFT COMPUTING TECHNIQUES FOR PROCESS CONTROL

COURSE OUTCOMES

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

- CO1. Understand the basics of neural networks.(Unit I)
- CO2. Derive the different algorithms. (Unit II)
- CO3. Understand the concept of neuro controller. (Unit III)
- CO4. Understand the basics of fuzzy logic controller (Unit–IV)
- CO5. Understand the concept of fuzzy control. (Unit V)

EIPESCN NON LINEAR CONTROL SYSTEMS

COURSE OUTCOMES

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

- CO1. Understand the basics of nonlinear systems.(Unit I)
- CO2. Derive the describing function. (Unit II)
- CO3. Understand the stability analysis of nonlinear systems. (Unit III)
- CO4. Implement modelling of nonlinear systems and feedback linearization design. (Unit-IV)
- CO5. Understand the recent trends in sliding mode control. (Unit V)

EIPESCN OPTIMAL CONTROL

COURSE OUTCOMES

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

- CO1. Ability to understand the optimal control problem formulation and its selection of performance measures.(Unit I)
- CO2. Ability to recognize and recall the fundamentals of calculus of variation.(Unit II)
- CO3. Ability to implement optimal control concept for minimum time and minimum control effort problems. (Unit III)
- CO4. Ability to apply Matrix Ricatti Equation for real world problem. (Unit-IV)
- CO5. Ability to understand the concepts of dynamic programming. (Unit V)

EIPESCN MODEL PREDICTIVE CONTROL

COURSE OUTCOMES

After completion of this paper the student will understand

- CO1. The basics of MPC including tuning parameters such as prediction horizon, control horizon and control weight. (Unit I)
- CO2. The basics of Dynamic matrix control and model algorithmic control.(Unit II)
- CO3. Effect of tuning parameters on control performance, stability and ability to handle constraints. (Unit III)
- CO4. Development of various methods of MPC algorithm. (Unit-IV)
- CO5. Implementation issues and applications of MPC in industry.(Unit V)

EIPESCN FAULT DETECTION AND DIAGNOSIS

COURSE OUTCOMES

- CO1. Ability to understand different approaches to Fault Detection and Diagnosis. (Unit I)
- CO2. Ability to estimate the kind, size, type and time of occurrence of faults by analytical methods.(Unit II)
- CO3. Ability to design and detect single and multiple faults using structured residual approach. (Unit III)
- CO4. Ability to design and detect single and multiple faults using directional structured residual approach. (Unit-IV)
- CO5. Ability to Understand the data driven methods like principle, partial least square methods etc., (Unit V)

OE - OPEN ELECTIVES

EIOESCN TRANSDUCER ENGINEERING

COURSE OUTCOMES

At the end of this course, students be able to

- CO1. Familiar with the basics of measurement system and its input, output configuration of measurement system (Unit-I).
- CO2. Familiar with both static and dynamic characteristics of measurement system (Unit-II)..
- CO3. Familiar with the principle and working of various sensors and transducers. (Unit-III).
- CO4. Able to design signal conditioning circuit for various transducers (Unit-IV).
- CO5. Able to identify or choose a transducer for a specific measurement application (Unit-V).

EIOESCN TEST AND MEASURING INSTRUMENTS

COURSE OUTCOMES

At the end of the course the student will be

- CO1. Familiar with various measuring instruments (ammeters, voltmeters, wattmeters, energy meters extension of meters, current and voltage transformers) used to detect electrical quantities. (Unit I & II)
- CO2. Able to design suitable DC and AC bridges for the measurement of R, L, C and Frequency measurement. (Unit-III)
- CO3. Able to understand the analog and digital measurements (Unit-IV).
- CO4. Familiar with the operation and usage of various analyzing instruments. (Unit-V)

EIOESCN MEASUREMENTS IN PROCESS INDUSTRIES

COURSE OUTCOMES

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

- CO1. Familiar with the different temperature measurement techniques used in process industries. (Unit-I)
- CO2. Able to understand the working principle of different pressure transmitters and level sensors used in industries. . (Unit-II)
- CO3. Able to identify or choose temperature, flow, pressure and level measuring device for specific process measurement. (Unit-III & IV)
- CO4. Familiar with various flow instrumentation used in industrial flow measurement.(Unit-V)

EIOESCN INDUSTRIAL AUTOMATION AND CONTROL

COURSE OUTCOMES

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

- CO1. Design and development of PLC ladder programming for simple process applications. (Unit I & II)
- CO2. Understand the different security design approaches, Engineering and operator interface issues for designing Distributed control system. (Unit III)
- CO 3. Understand the popular process automation technologies(Unit IV)
- CO4. Know the latest communication technologies like HART and Field bus protocol (Unit V)

EIOESCN NANO MATERIALS AND NANO ELECTRONICS

COURSE OUTCOMES

- CO1. Will get to know the future of electronics and its applications. (Unit I, II & IV)
- CO2. Updates the students with the recent advancements in the nanotechnology. (Unit I, II & IV)
- CO3. To introduce the students the concepts of quantum mechanics for analysis of nanoelectronic devices. (Unit III)
- CO4. To understand Nano-material (Unit V)

EIOESCN MICRO ELECTRO MECHANICAL SYSTEMS

COURSE OUTCOMES

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

- CO1. The fundamentals of Micro electromechanical systems and their applications will be studied. (Unit I)
- CO2. The fundamental concepts of MEMS Fabrication process will be gained. (Unit II)
- CO3. The design concepts of MEMS devices will be developed. (Unit II, III & IV)
- CO4. The Functionalities of various methods of micromachining involved in different MEMS devices will be studied. (Unit V)

EIOESCN INSTRUMENTATION IN PETROCHEMICAL INDUSTRIES

Course Outcomes

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

- CO1. Understand the principle and working of Oil Industries.(Unit I)
- CO2. Understand the refining process in Oil Industries (Unit II)
- CO3. To know the petroleum by-products.(Unit III)
- CO4. Analyse the control loops in petrochemical industries.(Unit IV)
- CO5. To know the safety in instrumentation systems.(Unit V)

HONOUR ELECTIVES

EIHESCN ADVANCED TOPICS IN PID CONTROL

COURSE OUTCOMES

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

- CO1. Understand the basics of PID control.(Unit I)
- CO2. Implement Anti-windup strategies.(Unit II)
- CO3. Design a PID controller.(Unit III)
- CO4. Understand the robust performance.(Unit-IV)
- CO5. Understand the need for Adaptive PID control. (Unit V)

EIHESCN INDUSTRIAL SAFETY

COURSE OUTCOMES

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

- CO1. Identify hazard and potential hazard areas Unit I)
- CO2. Develop safety programs to prevent or mitigate damage or losses (Unit II)
- CO3. Assess safety practices and programs.(Unit III)
- CO4. Conduct safety audits.(Unit-IV)'
- O5. Improve safety practices. (Unit V)

EIHESCN ROBOTICS AND AUTOMATION

COURSE OUTCOMES

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

- CO1. Expertise in fundamentals of Robotics (Unit I)
- CO2. Understand the issues related to end effectors and sensors (Unit II)
- CO3. Acquire knowledge in Programming and control of Robots (Unit III)
- CO4. Understand the issues related to implementation of Industrial Automation with Robot Application (Unit-IV :)
- CO5. Gain an in depth understanding of the selection of robots for various application and their safety issues (Unit V)

EIHESCN FIBER OPTICS AND LASER INSTRUMENTATION

COURSE OUTCOMES

- CO1. Understand the Characteristics and properties of optical fibers. (Unit I)
- CO2. Use of optical fibers in industries. (Unit II)
- CO3. Identify the characteristics and principles of optical lasers. (Unit III)
- CO4. Development of optical laser in industry applications. (Unit-IV :)
- CO5. Applications of lasers in medical electronics. (Unit V)

EIHESCN PROCESS DATA ANALYTICS

COURSE OUTCOMES

Students will be able to:

- CO1. Will be able to identify a suitable continuous time domain identification method for the taken up process. (Unit – I)
- CO2. Ability to select particular state space model based on specific control engineering problem. (Unit – II)
- CO3. Understand and implement the various complexity estimation methods,offline and online, open and closed loop estimation methods for modeling and estimating a process. (Unit – III)
- CO4. Gain an idea for robust parameter estimation. (Unit – IV)
- CO5. Select a specific identification method with an approximately equal complexity for the case studies. (Unit – V)

EIHESCN SCADA SYSTEMS AND APPLICATION

COURSE OUTCOMES

Students will be able to:

- CO1. Describe the basic tasks of Supervisory Control Systems (SCADA) as well as their typical applications. (Unit-I)
- CO2. Acquire knowledge about SCADA architecture, various advantages and disadvantages of each system. (Unit-II)
- CO3. Knowledge about single unified standard architecture IEC61850. (Unit-III)
- CO4. To learn about SCADA system components: remote terminal units, PLCs,intelligent electronic devices, HMI systems, SCADA server. (Unit-IV)
- CO5. Learn and understand about SCADA applications in transmission and distribution sector, industries etc. (Unit-V)

MINOR ENGINEERING

EIMISCN TRANSDUCER ENGINEERING

COURSE OUTCOMES

At the end of this course, students be able to

- CO1. Familiar with the basics of measurement system and its input, output configuration of measurement system (Unit-I).
- CO2. Familiar with both static and dynamic characteristics of measurement system (Unit-II).
- CO3. Familiar with the principle and working of various sensors and transducers. (Unit-III).
- CO4. Able to design signal conditioning circuit for various transducers (Unit-IV)..
- CO5. Able to identify or choose a transducer for a specific measurement application (Unit-V).

EIMISCN TEST AND MEASURING INSTRUMENTS

COURSE OUTCOMES

At the end of the course the student will be

- CO1. Familiar with various measuring instruments (ammeters, voltmeters, wattmeters, energy meters extension of meters, current and voltage transformers) used to detect electrical quantities. (Unit I & II)
- CO2. Able to design suitable DC and AC bridges for the measurement of R, L, C and Frequency measurement. (Unit-III)
- CO3. Able to understand the analog and digital measurements (Unit-IV).
- CO4. Familiar with the operation and usage of various analyzing instruments. (Unit-V)

EIMISCN MEASUREMENTS IN PROCESS INDUSTRIES

COURSE OUTCOMES

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

- CO1. Familiar with the different temperature measurement techniques used in process industries. (Unit-I)
- CO2. Able to understand the working principle of different pressure transmitters and level sensors used in industries. (Unit-II)
- CO3. Able to identify or choose temperature, flow, pressure and level measuring device for specific process measurement. (Unit-III & IV)
- CO4. Familiar with various flow instrumentation used in industrial flow measurement. (Unit-V)

EIMISCN ESSENTIALS OF CONTROL ENGINEERING

COURSE OUTCOMES

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

- CO1. The student learns the importance of feedback control system. (Unit-I)
- CO2. The student understands time domain and frequency domain techniques using simulation software. (Unit-II & III)
- CO3. The student is exposed to classical control design using simulation software (Unit IV & V).

EIMISCN INDUSTRIAL AUTOMATION AND CONTROL

COURSE OUTCOMES

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

- CO1. Design and development of PLC ladder programming for simple process applications.
- CO2. Understand the different security design approaches, Engineering and operator interface issues for designing Distributed control system.
- CO3. Understand the popular process automation technologies
- CO4. Know the latest communication technologies like HART and Field bus Protocol

EIMISCN INSTRUMENTATION IN PETROCHEMICAL INDUSTRIES

Course Outcomes

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

- CO1. Understand the principle and working of Oil Industries. (Unit I)
- CO2. Understand the refining process in Oil Industries (Unit II)
- CO3. To know the petroleum by-products. (Unit III)
- CO4. Analyse the control loops in petrochemical industries. (Unit IV)
- CO5. To know the safety in instrumentation systems. (Unit V)

DEPARTMENT OF ELECTRONICS AND INSTRUMENTATION ENGINEERING
M.E., MICROELECTRONICS AND MEMS PROGRAMME

EIMMPC11 SEMICONDUCTOR DEVICES AND MODELLING

COURSE OUTCOMES:

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

1. Describe the equations based on energy band diagrams, acceptable approximations and for intrinsic, p and N type semiconductors
2. Explain the operation of p-n junction diodes quantitatively and qualitatively.
3. Describe the fabrication, device operation of a BJT quantitatively and model its characteristics from basic principles
4. Understand the effects of junction capacitance and break down voltages on the performance of P-N junction diodes and BJTs the Classify and describe the semiconductor devices for special applications
5. To analyze and develop models of optoelectronic devices such as Solar Cells and LEDs.

EIMMPC12 VLSI FABRICATION TECHNIQUES

COURSE OUTCOMES :

Upon completing the course, the students will be able to

1. Know the basic concepts of micro systems and advantages of miniaturization.
2. Understand the fundamentals of micromachining and micro fabrication techniques.
3. To be aware about the trends in semiconductor technology, and how it impacts scaling and performance.
4. Expertise the knowledge in design of micro sensors and actuators fabrication.
5. Able to learn Layout, Stick diagrams, Fabrication steps, Static and Switching characteristics of inverters.

EIMMMC15 RESEARCH METHODOLOGY AND IPR

COURSE OUTCOMES:

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

1. Understand research problem formulation.
2. Analyze research related information
3. Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity.
4. 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.
5. Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new better products, and in turn brings about, economic growth and social benefits.

EIMMCP16 SEMICONDUCTOR DEVICES SIMULATION LABORATORY

COURSE OUTCOMES :

At the end of the practical course the students will be able to

1. Understand the concepts they have learnt in the semiconductor devices modeling course.
2. Develop programs to simulate semiconductors, PN junction diode and BJT and verify their operation under different conditions.
3. Develop models for semiconductor devices.
4. Develop MATLAB programs for simulating basic electronic devices.
5. Work as a software developer for semiconductor devices simulation.

EIMMCP17 VLSI FABRICATION LABORATORY

COURSE OUTCOMES

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

1. Obtain and analyze I-V characteristics of any electronic component using Semiconductor parametric analyser
2. Observe the I-V characteristics for different packaged MEMS devices using Semiconductor parametric analyser.
3. Perform wafer level testing of any Integrated circuits or MEMS structure using probe station and semiconductor parameter analyser.
4. Conduct thin film metal deposition and thin film coating in clean room environment.
5. Work in any semiconductor industry environment.

EIMMPC21 MEMS TECHNOLOGY

COURSE OUTCOMES:

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

1. Gain thorough knowledge of materials used for micromachining techniques
2. Understand the process of Bulk Micro Machining techniques.
3. Acquire the knowledge of Electromechanical effects, Thermal effects, Micro fluidics, Devices such as pumps, valves, mixers, Integrated fluidic systems and BioMEMS.
4. Analyze and develop models for different types of Pressure Sensors and accelerometers.
5. Acquire expertise in the design of sensors for any practical applications

EIMMPC22 MOS DEVICES AND MODELLING

COURSE OUTCOMES:

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

1. Know the basic concepts of MOS structure under different modes of operation and characteristics
2. Understand the fundamentals on solving the problem based on MOS structure
3. Gain the expertise on fundamentals of MOSFET Operation under various SPICE level models and problem solving
4. Understand the design concepts about short and long channel effects
5. Acquire knowledge on the SOI MOSFETS and High Speed Devices

EIMMCP26 MEMS SIMULATION LABORATORY

COURSE OUTCOMES:

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

1. Know the basic concepts of MEMS structures under different modes of operation and characteristics.
2. Understand the fundamentals on solving the problem based on MEMS structure.
3. Gain the expertise on fundamentals of MEMS design and operation.
4. Understand the design concepts of MEMS sensors and actuator for practical applications.
5. Work in any MEMS design industry.

EIMMETS27 INTERNSHIP AND SEMINAR

COURSE OUTCOMES:

At the end of the training the students will be able to

1. Face the challenges related to work environment
2. Manage the issues arising during the execution of projects related to MEMS.

EIMMPV33 PROJECT WORK & VIVA-VOCE PHASE-I

COURSE OUTCOMES :

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

1. Take up any challenging practical problems and find solution
2. Learn to adapt systematic and step-by-step problem solving methodology.

EIMMPV41 PROJECT WORK & VIVA-VOCE PHASE-II

COURSE OUTCOMES :

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

1. Take up any challenging practical problems and find solution
2. Learn to adapt systematic and step-by-step problem solving methodology.

EIMMPEXX RF MEMS

COURSE OUTCOMES:

Upon completing the course, the student should

1. Understand the basic concepts of RF MEMS.
2. Acquire the working concepts of RF MEMS Circuit Elements.
3. Understand the concepts and structure of RF MEMS Circuits, reconfigurable RF MEMS circuits and elements and their modelling.
4. Acquire the working knowledge of RF MEMS based reconfigurable antenna.
5. Understand the concepts and working of RF MEMS based phase shifter and oscillators

EIMMPEXX SEMICONDUCTOR POWER DEVICES AND MODELLING

COURSE OUTCOMES :

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

1. Understand the function and application of power diodes.
2. Explain the operation of Power JFET quantitatively and qualitatively.
3. Describe the device operation of power field controlled diodes quantitatively and model its characteristics from basic principles.
4. Understand the structure and characteristics operation of the power MOSFET.

5. Understand the basic structure and modelling of IGBT.

EIMMPEXX FINITE ELEMENT ANALYSIS FOR MEMS

COURSE OUTCOMES:

Upon completing the course, the student should have

1. The ability to identify mathematical model for solution of common engineering problems and formulate finite elements model to obtain the solutions.
2. Familiarity to use professional – level finite element software to solve engineering problems in solid mechanics, fluid mechanics and heat transfer.
3. The capability to derive element matrix equation by different methods based on basic laws in mechanics and integration by parts.
4. Learnt the formulation of one – dimensional, two – dimensional, and three dimensional elements used in MEMS sensors and actuators.
5. Exposure to conduct FEA using commercial FEM software.

EIMMPEXX POLYSILICON TECHNOLOGY

COURSE OUTCOMES:

Upon completing the course, the student should have

1. Understood the concept of polysilicon deposition and various processes.
2. Acquired the expertise on electrical properties, Carrier Transport, Effective mobility and Different passivation techniques of polysilicon.
3. Understood the vital applications of Polysilicon.
4. Understood the modelling of PSOI MOSFETs and threshold voltage model for various modes of PSOI MOSFETs.
5. Acquired the complete knowledge of the design of Polysilicon for MEMS applications.

EIMMPEXX MICROFLUIDICS AND BIO MEMS

COURSE OUTCOMES:

Upon completing the course, the student should

1. Understand the basic properties of microfluids
2. Acquire the working concepts of fluidic sensors
3. Understand the concepts and structure of micropumps.
4. Acquire the working knowledge of Passive chemical sensors, Work function based Sensors, Electrochemical Transducers.
5. Understand the application of sensors for various biological applications.

EIMMPEXX VLSI DESIGN

COURSE OUTCOMES:

Upon completing the course,

1. Student will be able to design digital systems using CMOS circuits.
2. Be able to use mathematical methods and circuit analysis models in analysis of CMOS digital electronics circuits.

3. Student will be able to learn Layout, Stick diagrams, Fabrication steps.
4. It offers a profound understanding of the design of complex digital VLSI circuits, computer aided simulation and synthesis tool for hardware design.
5. Student will be able to understand the concept behind ASIC (Application Specific Integrated Circuits) design and the different implementation approaches used in industry.

EIMMPEXX DIGITAL INTEGRATED CIRCUIT DESIGN

COURSE OUTCOMES:

Upon completing the course, the students will be able to

1. Understand the impact of technology scaling.
2. Understand the basic operation of MOS transistors, current equations, and parasitic and to understand the concepts of propagation delay, power consumption of CMOS ICs.
3. Know how to analyze and design complex logic gates in standard CMOS technology and compute their delay and power consumption.
4. Be able to analyze and design of static sequential circuits and understand basic clocking issues.
5. Know the basics of semiconductor memories

EIMMPEXX ADVANCED VLSI SYSTEM DESIGN

COURSE OUTCOMES:

Upon completing the course,

1. Student will be able to learn and participate in the process of modern VLSI design and verification.
2. Student will be able to develop an understanding for the advanced design concepts in modern VLSI technologies.
3. Student will be able to design and layout a complex chip containing entities such as a register arrays, shifters, multipliers, an arithmetic logic unit (ALU), and other large scale devices.
4. Student will be able to Apply techniques used to test and debug IC designs
5. Be able to complete a VLSI design project having a set of objective criteria and design constraints.

EIMMPEXX FUNDAMENTALS OF IC PACKAGING, ASSEMBLY AND TEST

COURSE OUTCOMES :

Upon completing the course, the student should have

1. Understood the importance and issues of Integrated Circuit Packaging.
2. Acquired the expertise in the manufacturing of various Integrated Circuit Packages
3. Understood the design considerations on various physical parameters.
4. The ability to test and analyse the performance characteristics of Integrated Circuit Packages
5. Acquired the knowledge of various emerging Integrated Circuit Package technologies.

EIMMPEXX MIXED SIGNAL IC DESIGN

COURSE OUTCOMES :

Upon completing the course, the students will be able to

1. Appreciate capabilities and limitations of advanced microelectronic (or IC) technologies.
2. Understand and use advanced circuit models of IC components

3. Analyse analogue and digital microelectronic circuits
4. Design analogue, digital and mixed microelectronic circuits
5. Critically read and present papers from technical journals, and keep up-to-date with future technological development in the field.

EIMMPEXX DIGITAL SYSTEM DESIGN WITH HDL (VERILOG)

COURSE OUTCOMES:

Upon completing the course, the student should

1. Understand the basic operation of Verilog simulators.
2. Acquire knowledge of different modelling methods like Switch, Gate Level and Behavior Modeling
3. Understand the concepts of introducing timing and delay in VHDL programming.
4. Acquire the working knowledge in VHDL simulation.
5. Understand the synthesis process in VHDL.

EIMMPEXX FUNDAMENTALS OF NANOELECTRONICS

COURSE OUTCOMES :

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

1. Understand the basics of quantum mechanics with reference to electron.
2. Gain in-depth knowledge of the structure of carbon nanotubes and its properties
3. Understand principles, properties and applications of carbon nanotubes devices for Nanoelectronics.
4. Acquire the knowledge of CNTFETs and its fabrication techniques
5. Model and fabricate a CNT based nanoelectronic device using various fabrication techniques with the thorough knowledge of material and device properties

EIMMPEXX PHOTOVOLTAIC DEVICES TECHNOLOGY

COURSE OUTCOMES:

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

1. Understand the basics of semiconductor materials, their electrical properties and optical properties
2. Gain the knowledge of the fundamentals of silicon solar cells, theory and operation of silicon solar cells, its fabrication and characterization analysis of silicon solar cells
3. Understand the basic concepts of Dye sensitized solar cells with its Pros and Cons
4. Understand the concept of conjugated polymer solar cells for various structures
5. Gain the knowledge of the operation and characteristics of quantum dot solar cells and qualitative analysis of these devices.

EIMMPEXX SOLAR CELL DESIGN AND FABRICATION

COURSE OUTCOMES:

As an outcome of completing this course, the students will:

1. Gain an understanding of the available solar energy and the current solar energy conversion and utilization processes,
2. Have a working knowledge of semiconductor physics, optical systems, load matching, and storage and grid connections related to photovoltaic engineering,

3. Be able to comprehend the challenges in sustainable energy processes, perform cost analysis, design photovoltaic systems for different applications meeting residential and industrial needs, predict and test performance
4. Understand the manufacturing processes involved, environmental challenges that need to be solved, economic aspects, and future potentials of solar energy utilization
5. Evaluate the performance of a PV solar module using various measurement techniques

EIMMPEXX INTRODUCTION TO NANOMATERIALS

COURSE OUTCOMES :

Upon completing the course, the student will be able to

1. Understand the basic properties of nano materials and their importance in Nanoelectronics.
2. Gain the knowledge of nanomaterials structure.
3. Acquire the knowledge of the fabrication techniques involved in nano fabrication process.
4. Understand the function of nanoparticles.
5. Provide expertise in the fabrication of nanostructures.

EIMMPEXX DESIGN AND SYNTHESIS OF NANOMATERIALS

COURSE OUTCOMES:

Upon completing the course the students will be able to,

1. Synthesize of various nano materials for several MEMS applications.
2. Characterize and analyse the synthesized nano materials
3. Understand the biological methods of synthesis
4. Gain the knowledge of various lithographic techniques
5. Use the imprint technology for nanomaterial synthesis.

EIMMPC12 CHARACTERIZATION TECHNIQUES OF NANOMATERIALS

COURSE OUTCOMES:

Upon completing the course, the students will be able to

1. Understand the spectroscopic characterization techniques to investigate the properties of nano materials
2. Get the knowledge regarding various microscopic techniques available
3. Know the characterization techniques to analyse thermal characteristics of nano materials
4. Calculate the mechanical properties of nanomaterials using different characterization methods
5. Measure the magnetic and electrochemical properties of nanomaterials using various suitable techniques

EIMMPEXX NANO FABRICATION TECHNIQUES

COURSE OUTCOMES:

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

1. Get the knowledge of various fabrication techniques available in the field of Nanotechnology
2. Understand the concept and methods of lithographic techniques available for nanofabrication
3. Get the knowledge of nanofabrication process by charged beams

4. Get basic idea about various scanning probes technology and their application in the field of nanofabrication
5. Understand the concept of Etching and pattern transfer techniques used in nanofabrication

EIMMOEXX OPTOELECTRONIC MATERIALS AND DEVICES

COURSE OUTCOMES :

Upon completing the course, the student should

1. Understand the basic concepts of Optoelectronic Materials and Devices.
2. Acquire the knowledge on basic structure and realization of Optoelectronic Devices, LEDs and acquire the working concepts of LEDs.
3. Understand the concepts and structure of semiconductor LASER diodes and their application in optical fibre communication.
4. Acquire the working knowledge of RF MEMS based reconfigurable antenna.
5. Understand the concepts working and application of photo detectors and optoelectronic modulators

EIMMOEXX MEMS DESIGN AND FABRICATION

COURSE OUTCOMES :

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

1. Know the basic concepts of micro systems and advantages of miniaturization.
2. Understand the fundamentals of micromachining and micro fabrication techniques.
3. Design the solid models for microsystems.
4. Expertise the knowledge in design of micro sensors and actuators fabrication.
5. Develop various packaging techniques in the design of MEMS.

EIMMOEXX SOLAR PANEL DESIGN AND TESTING

COURSE OUTCOMES:

As an outcome of completing this course, the students will

1. Gain an understanding of the available solar energy and the current solar energy conversion and utilization processes,
2. Have a working knowledge of semiconductor physics, optical systems, load matching, and storage and grid connections related to photovoltaic engineering,
3. Be able to comprehend the challenges in sustainable energy processes, perform cost analysis, design photovoltaic systems for different applications meeting residential and industrial needs, predict and test performance
4. Understand the manufacturing processes involved, environmental challenges that need to be solved, economic aspects, and future potentials of solar energy utilization
5. Evaluate the performance of a PV solar module using various measurement techniques

EIMMOEXX INTRODUCTION TO MEMS SIMULATION

COURSE OUTCOMES :

Upon completing the course, the student should have

1. The ability to identify mathematical model for solution of common engineering problems and formulate finite elements model to obtain the solutions.
2. Familiarity to use professional – level finite element software to solve engineering problems in solid mechanics, fluid mechanics and heat transfer.
3. The capability to derive element matrix equation by different methods based on basic laws in mechanics and integration by parts.
4. Learnt the formulation of one – dimensional, two – dimensional, and three dimensional elements used in MEMS sensors and actuators.
5. Exposure to conduct FEA using commercial FEM software.

EIMMOEXX ADVANCED NANO FET MODELLING

COURSE OUTCOMES :

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

1. Understand the basics of quantum mechanics with reference to electron.
2. Gain indepth knowledge of the structure of carbon nanotubes and its properties
3. Understand principles, properties and applications of carbon nanotubes devices for Nanoelectronics.
4. Acquire the knowledge of CNTFETs and its fabrication techniques
5. Model and fabricate a CNT based nanoelectronic device using various fabrication techniques with the thorough knowledge of material and device properties

EIMMACXX ENGLISH FOR RESEARCH PAPER WRITING- NIL

EIMMACXX VALUE EDUCATION

COURSE OUTCOMES:

Students will be able to

1. Knowledge of self-development.
2. Learn the importance of Human values
3. Developing the overall personality

EIMMACXX CONSTITUTION OF INDIA

COURSE OUTCOMES:

Students will be able to:

1. Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
2. Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.
3. 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.
4. Discuss the passage of the Hindu Code Bill of 1956.

EIM`MACXX PEDAGOGY STUDIES

COURSE OUTCOMES:

Students will be able to understand:

1. What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries.
2. What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners.
3. How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy.

EIMMACXX STRESS MANAGEMENT BY YOGA

COURSE OUTCOMES:

Students will be able to:

1. Develop healthy mind in a healthy body thus improving social health also
2. Improve efficiency

EIMMACXX PERSONALITY DEVELOPMENT THROUGH LIFE ENLIGHTENMENT SKILLS

COURSE OUTCOMES:

Students will be able to:

1. Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life
2. The person who has studied Geeta will lead the nation and mankind to peace and prosperity
3. Study of Neetishatakam will help in developing versatile personality of students.