Course Outcomes with CO-PO-PSO Mapping Table of all courses

Specialization: Electronics and Telecommunication

PROGRAM OBJECTIVES

PO1: Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems

PO2: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences

PO3: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PO12: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

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(B) PROGRAM SPECIFIC OUTCOMES (PSOs)

A Graduate of the Electronics and Telecommunication program will be able to:

PSO1: Apply the concepts of Analog and Digital Electronics, Microprocessors, Signal processing and communication engineering in design and implementation of Engineering Systems.

PSO2: Solve complex problems in the field of Electronics and telecommunication using latest hardware and software tools along with analytical and managerial skills

PSO3: Acquire the social and environmental awareness with ethical responsibility to have successful carrier

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Course Outcomes

ET1301 ELECTRONIC DEVICES AND CIRCUITS

Course Outcomes:

After Completion of Course, the student will able to

ET1301.1 Be familiar with electronic devices, and their applications to circuits

ET1301.2 Analyze the characteristics of electronic device like MOSFET

ET1301.3 Analyze MOSFET and BJT amplifier circuits parameters

ET1301.4 Discuss about the frequency response of MOSFET amplifiers

ET1301.5 Understand the basic processes required for fabrication of electronic devices

ET1302 SIGNALS AND SYSTEMS

Course Outcomes:

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

ET1302.1 Understand mathematical description and representation different types of signals and systems

ET1302.2 Develop IO relationship for LTI system and understand the convolution operator for continuous and discrete time system

ET1302.3 Represent continuous and discrete systems in time and frequencydomain using different transforms like Fourier series and Fourier Transform

ET1302.4 Understand the limitations of Fourier transform and need for Laplace transform and develop the ability to analyze the system in s- domain.

ET1302.5 Understand sampling and various issues related to it

ET1303 DIGITAL ELECTRONICS

Course outcomes

At the end of the course student will be able

ET1303.1 Optimize the digital circuits by applying the applying the Boolean algebra and other minimization techniques

ET1303.2 Examine and design the combinational circuits using gates and MSIs

ET1303.3 Realize the sequential circuits suing flip-flops counters and shift registers.

ET1303.4 Comparisons of logic families and implementation of gates using RTL, DTL and TTL

ET1303.5 Device logic circuits using SSIs and MSIs.

ET1304 ELECTRONICS DEVICES AND CIRCUITS LAB

Course Outcomes:

After Completion of Course, the student will able to

ET1304.1 Be familiar with electronic devices and their applications to circuits

ET1304.2 Demonstrate simple amplifier circuits using BJT and FET

ET1304.3 Analyze simple current mirror circuits

ET1304.4 Demonstrate theoretical device/circuit operation in properly constructed analog circuits

ET1304.5 Simulate a few of the circuit applications using appropriate Circuit Simulation package

ETU1305 SIGNALS AND SYSTEMS LAB

Student shall be able to

ET1305.1 Verify basic concepts of signals and systems.

ET1305.2 Analyzing signal and systems in time and frequency domain

ET1305.3 Substantiate the use of discrete Fourier transformation

ET1305.4 U n d e r s t a n d and verify need and concept of Z and Laplace transform

ET1305.5 Substantiate the process of sampling and various issues related to it.

ET1306 DIGITAL ELECTRONICS LAB

Course Outcomes:

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

ET1306.1 Realize the importance of Boolean algebra

ET1306.2 Apply concepts and methods of Combinational circuit design techniques introduced in ET1303 through experimentation.

ET1306.3 to design, analyze, synthesize and realize combinational circuits using componentsand ICs

ET1306.4 Apply concepts and methods of Sequential circuit design techniques introduced in ET1303 through experimentation.

ET1306.5 Able to design and realize simple digital systems

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ET1307 INNOVATION, CREATIVITY& ENTREPRENEURSHIP

Course Outcomes:

ET1307.1 Students will be able to practice acquired knowledge within the chosen area of technology for project development.

ET1307.2 Identify, discuss and justify the technical aspects of the chosen project with a comprehensive and systematic approach.

ET1307.3 Work as an individual with implementation of overall knowledge acquired in a program in development of technical projects.

ET1307.4 Communicate and report effectively project related activities.

ET1401 ANALOG COMMUNICATION

Course Outcomes: After completion of course, students will be able to:

ET1401.1 interpret the basic concept of communication systems and gain the knowledge of components of analogue communication system.

ET1401.2 Understand the concepts of analog modulation transmission and reception, various methods of analog communication.

ET1401.3 Illustrate and evaluate the parameters of analog communication system.

ET1401.4 Analyze the effect of noise on various transmission systems and summarize the concepts of wave propagation.

ET1401.5 Understand and evaluate antenna parameters and design antenna.

ET1402 ANALOG CIRCUITS

After Completion of Course, the student will able to

ET1402.1 Analyze negative feedback amplifier and power amplifiers circuits

ET1402.2 Understand various oscillator circuits

ET1402.3 Understand the functioning of OP-AMP and design OP-AMP based circuits

ET1402.4 Troubleshoot various linear applications of OP-AMP

ET1402.5 Helps students to know about active filter design using OP-AMP

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ET1403 MICROPROCESSORS AND MICROCONTROLLERS

Course Outcomes: After completing this course, Students shall be able to:

ET1403.1 Understand Microprocessor and Microcontrollers basics

ET1403.2 Develop and implement Assembly language programs

ET1403.3 Understand the hardware interfaces required to develop a simple microcomputer system

ET1403.4 Learn Assembly language programming for 8085

ET1403.5 Develop simple application based projects.

ET1404 CONTROL SYSTEMS

Course Outcomes:

ET1404.1 Model a physical system by means of block diagrams, mathematical model and Transfer functions

ET1404.2 Analyze the systems in time.

ET1404.3 Investigate stability of a system using different tests

ET1404.4 Analyze the system in frequency domain Model

ET1404.5 Analyze the control systems using state space analysis

ET1405 ANALOG COMMUNICATION LABORATORY

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

ET1405.1 to develop practical knowledge about theories of analog communication.

ET1405.2 Evaluate analog modulated waveform in time /frequency domain and also find modulation index.

ET1405.3 Develop understanding about performance of analog communication systems.

ET1405.4 Analyze performance of noise on AM and FM.

ET1405.5 Illustrate techniques for antenna parameter measurements and analyze the performance of radiation pattern

ET1406 ANALOG CIRCUITS LABORATORY

After Completion of Course, the student will able to

ET1406.1 Analyze negative feedback amplifier and power amplifiers

ET1406.2 Understand various oscillator circuits

ET1406.3 Understand the functioning of OP-AMP and design OP-AMP based circuits

ET1406.4 Troubleshoot various linear applications of OP-AMP

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ET1406.5 Helps students to know about active filter design

ET1407 MICROPROCESSOR AND MICROCONTROLLER LABORATORY

After completing this course, Students shall be able to:

ET1407.1 Appreciate architecture of Microprocessor and Microcontrollers basics

ET1407.2 Realize the importance of Instruction set

ET1407.3 Develop Assembly language programs for 8085/8051

ET1407.4 Learn the hardware interfaces required to develop a simple microcomputersystem

ET1407.5 Develop simple application based projects

ETU521 ELECTROMAGNETIC WAVES

Course Outcomes:

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

ETU521.1	Apply the knowledge of Engineering Mathematics to solve the numerical, analyse and evaluate various scalar and vectors quantities of electrostatics, magneto statics.
ETU521.2	Understand the concept of electrostatics, magneto statics behavior and wave propagation.
ETU521.3	Describe, select and apply various laws and theorems to evaluate electrostatics and magneto statics quantities.
ETU521.4	Analyze and evaluate EM wave propagation parameters in different media
ETU521.5	Understand principle of radiation and radiation characteristics of an antenna

ETU522 COMPUTER ARCHITECTURE

Course Outcomes:

After completing this course, Students shall be able to:

ETU522.1	Understand the working of the computer components and analyze the performance
ETU522.2	Illustrate the system memory hierarchy and memory management hardware
ETU522.3	Discuss the pipelining and parallelism in computer system
ETU522.4	Apply the knowledge of combinational and sequential logic circuits to design simple ALU

ETU523 DIGITAL COMMUNICATION

Course Outcomes:

At the end of course, student shall be able to:

ETU523.1	Understand the principles of digital communications systems.

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ETU523.2 Apply the knowledge of signals and system and evaluate the performance of digital communication system in the presence of noise.
ETU523.3 Analyze the performance of advance modulation techniques.
ETU523.4 Explain importance and use of channel coding in digital communication.
ETU523.5 Analyze the performance of spread spectrum communication system.

ETU524 DIGITAL SIGNAL PROCESSING

Course Outcomes:

On the successful completion of this course; student shall be able

ETU524.1 To represent and analyze discrete systems in time domain.
ETU524.2 To analyze discrete signals and systems in frequency domain using DTFT, DFT.
ETU524.3 To design FIR and IIR filters and realize them in direct form, cascade form and parallel form.
ETU524.4 To implement architecture of DSP processor in various applications.

ETU525 OPERATIONAL RESEARCH AND OPTIMIZATION

Course Outcomes:

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

ETU525.1 Cast engineering minima/maxima problems into optimization framework.
ETU525.2 Learn efficient computational procedures to solve constrained and unconstrained optimization
ETU525.3 Solve operation research problems in field of machine sequencing and project development
ETU525.4 Program in Matlab/Python to implement important optimization methods.

ETU526 ELECTROMAGNETIC WAVES LAB

Course Outcomes:

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

ETU526.1 Demonstrate various laws of Electric Field and Magnetic field.
ETU526.2 Understand the propagation of EM waves within the waveguides.
ETU526.3 Fabricate printed antenna and analyze its performance using Network Analyzer.
ETU526.4 Design, simulate and analyze the antenna using antenna designing software

ETU527 COMPUTER ARCHITECTURE LAB

Course Outcomes:

After completing this course, Students shall be able to:

ETU527.1 Learn the different circuits of ALU
ETU527.2 Implement circuits to form processing unit
ETU527.3 Design memory for a computer system
ETU527.4 Simulate small microcomputer system

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ETU528 DIGITAL COMMUNICATION LAB

Course Outcomes:

On completion of this lab course the students shall be able to:

ETU528.1	Able to understand basic theories of digital communication system in practical.
ETU528.2	Able to design and implement different modulation and demodulation techniques.
ETU528.3	Able to analyze digital modulation techniques by using MATLAB tools.
ETU528.4	Able to identify and describe different techniques in modern digital communications, in particular in source coding using MATLAB tools.
ETU528.5	Able to demonstrate the error detection and error correction in linear convolution codes.

ETU529 DIGITAL SIGNAL PROCESSING LAB

Course Outcomes:

On the successful completion of this course; student shall be able to

ETU529.1	Analyze discrete systems in time domain.
ETU529.2	Analyze discrete systems in frequency domain using DFT.
ETU529.3	Design FIR / IIR filters and implement on software platform.
ETU529.4	Implement FIR / IIR filters on digital signal processor.

ETU 621 CONTROL SYSTEMS

Course Outcomes:

ETU621.1	Model a physical system by means of block diagrams, mathematical model and transfer functions
ETU621.2	Investigate stability of a system using different tests
ETU621.3	Analyse the systems in time and frequency domain
ETU621.4	Model and analyse the control systems using state space analysis

ETU622 COMMUNICATION NETWORKS

Course Outcomes:

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

ETU622.1	Describe the components and infrastructure that form the basis for most computer networks
ETU622.2	Describe the technical aspects of data communications on the Internet
ETU622.3	Design the network by using the concepts of layered architecture
ETU622.4	Understand the concepts of networking thoroughly.

PROGRAM ELECTIVE-I

ETU623A INFORMATION THEORY AND CODING

Course Outcomes:

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

ETU623A.1 Quantify the notion of information in a mathematically sound way.

ETU623A.2 **C**alculate entropy and channel capacity of a system.

ETU623A.3 Differentiate between lossy and lossless compression techniques.

ETU623A.4 Apply coding techniques.

ETU623B SCIENTIFIC COMPUTING

Course Outcomes:

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

ETU623B.1 Understand the significance of computing methods, their strengths and application areas.

ETU623B.2 Perform the computations on various data using appropriate computation tools.

ETU623B.3 Apply these methods to academic and simple practical instances.

ETU623B.4 Modeling and solving real time application using ODE.

ETU 623C ELECTRONIC DESIGN TECHNIQUES WITH HDL

Course Outcomes:

At the end of the course student will be able to

ETU623C.1 Simulate the basic concepts of verilog HDL

ETU623C.2 Model digital systems in verilog HDL at different levels of abstraction

ETU623C.3 Analyze the design flow from simulation to synthesizable version

ETU623C.4 Execute the special features of VLSI front end CAD tools.

ETU623D MACHINE LEARNING

Course Outcomes:

After completing this course, Students shall be able:

ETU623D.1 To differentiate between Supervised and Unsupervised learning and able to select model and perform generalization.

ETU623D.2 To investigate and apply Bayesian Decision Theory to calculate the probabilities of classes and different Parametric Methods for estimation of probabilities.

ETU623D.3 To comprehend and apply the concept of Multivariate Methods, Dimensionality Reduction, Clustering and Nonparametric Methods.

ETU623D.4 To implement usage of Decision Trees, Linear Discrimination, Multilayer Perceptron's, and Local Models both for classification and regression.

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OPEN ELECTIVE – I

ETU633A CONSUMER ELECTRONICS

Course Outcomes:

At the end of the course, the student shall be able to:

ETU633A.1	Troubleshoot different types of microphones and speakers.
ETU633A.2	Maintain audio systems.
ETU633A.3	Troubleshoot smart TV receivers
ETU633A.4	Maintain various consumer/home electronics appliances
ETU633A.5	Understand product safety, compliance standards and techniques associated with electronic products

ETU633B INDUSTRIAL ELECTRONICS

Course Outcomes:

After completing this course, students shall be able to:

ETU633B.1	Analyze the performance of power supplies
ETU633B.2	Implement the control circuits using power switching devices for industrial applications
ETU633B.3	Implement timer and control circuits using operational amplifiers
ETU633B.4	Program PLC for basic arithmetic and logical operations

PROGRAM ELECTIVE-II

ETU625A MICROWAVE ENGINEERING

Course Outcomes:

After completing this course, students will demonstrate the ability to:

ETU625A.1	Understand and analyze various components of Microwave System.
ETU625A.2	Evaluate the performance parameters of microwave Transmission lines and waveguides
ETU625A.3	Understand structure and working of microwave tubes, various microwave active and passive components.
ETU625A.4	Design and implement resonators and filters at microwave frequencies.

ETU625 B WAVELETS AND OTHER ENGINEERING TRANSFORMS

Course outcomes:

At the end of the course student will be able

ETU625B.1	To observe windowed Fourier transform and difference between windowed Fourier transform and wavelet transform.
ETU625B.2	To design wavelet basis and characterize continuous and discrete wavelet transform.
ETU625B.3	To verify multi resolution analysis and identify various wavelets and evaluate their time frequency resolution properties.
ETU625B.4	To implement discrete wavelet transforms with multirate digital filters.

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ETU625C MICRO-ELECTROMECHANICAL SYSTEMS

Course Outcomes:

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

ETU625C.1	Review MEMS technology, micro sensors, micro-actuators, their types and applications.
ETU625C.2	Interpret the fabrication process of MEMS.
ETU625C.3	Estimation of forces, displacements and other mechanical concepts is paramount when fabricating MEMS devices.
ETU625C.4	Model and simulate the MEM systems.

ETU625D FUZZY LOGIC

Course Outcome: After completing this course, Students shall be able:

ETU625D.1	To differentiate between Classical Relation and Fuzzy Relation.
ETU625D.2	To investigate automated Methods and simulation of Fuzzy Systems.
ETU625D.3	To comprehend the concept of Bayesian Decision Theory and Fuzzy Classification.
ETU625D.4	To identify usage of Fuzzy logic and usage of Matlab in implementing Fuzzy Logic in different applications.

ETU626 HUMAN RESOURCE AND ECONOMICS

Course Outcomes:

After completing this course, student shall be able to:

ETU626.1	Apply the sustainable development principles during the planning and development of various engineering activities.
ETU626.2	Develop the understanding of the concept of human resource management, their needs & relevance in organizations.
ETU626.3	To manage with Economics, production in today's market structures
ETU626.4	To implement taxation system in India along with globalization.

ETU627 MINOR PROJECT

Course Outcomes:

ETU527.1	Students will be able to practice acquired knowledge within the chosen area of technology for project development.
ETU527.2	Identify, discuss and justify the technical aspects of the chosen project with a comprehensive and systematic approach.
ETU527.3	Work as an individual with implementation of overall knowledge acquired in a program in development of technical projects.
ETU527.4	Communicate and report effectively project related activities.

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ETU628 COMMUNICATION NETWORKS LAB

Course Outcomes: After completion of the course, the students will be able to

ETU628.1	Understand fundamental underlying principles of computer networking
ETU628.2	Understand details and functionality of layered network architecture.
ETU628.3	Analyze performance of various communication protocols.
ETU628.4	Compare routing algorithms

ETU629 ELECTRONIC MEASUREMENTS LAB.

Course Outcomes:

ETU629.1	Design and validate DC and AC bridges
ETU629.2	Analyze the dynamic response and the calibration of few instruments
ETU629.3	Classify various measurement devices, their characteristics, operation and limitations
ETU629.4	Analyze statistical data analysis

ELECTRICAL ENGINEERING DEPARTMENT

ETU631ELECTRONIC DESIGN LABORATORY

Course Outcomes:

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

ETU 631.1	Learn about various measurement devices, their characteristics, operation and limitations
ETU 631.2	Understand the implementation on hardware development board
ETU 631.3	Understand statistical data analysis

ETU721 – PROGRAM ELECTIVE – III

ETU721 (A) ANTENNAS AND WAVE PROPAGATION

Course Outcomes:

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

ETU721(A).1	Understand the properties and various types of antennas.
ETU721(A).2	Analyze the properties of different types of antennas and their design.
ETU721(A).3	Operate antenna design software tools and come up with the design of the antenna of required specifications.

ETU721(B) MULTIRATE SIGNAL PROCESSING

Course Outcomes: At the end of this course students will be able to

ETU721(B).1 Realize sampling, reconstruction, sampling rate conversion using multirate building blocks
ETU721(B).2 Analyze framework for Reconstruction Filter banks
ETU721(B).3 Apply multirate DSP in Filter design, Filterbanks, etc
ETU721(B).4 Analyze Wavelets and Multichannel filter banks
ETU721(B).5 Write code/program using MATLAB or similar software tool for multirate DSP principles and applications

ETU721C CMOS DESIGN

Course Outcomes:

At the end of this course students will be able to

ETU721(C).1 To know fundamental principal of VLSI circuit design flow

ETU721(C).2 Realize CMOS Fabrication Process flow

ETU721(C).3 Analyze and design differential amplifiers using CMOS

ETU721(C).4 Analyze and design active and passive current mirrors using CMOS

ETU721(C).5 Design performance parameters related to operational amplifiers

ETU721(D) ARTIFICIAL NEURAL NETWORKS

Course Outcomes:

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

ETU721(D).1 know the basic ANN architectures, algorithms, and their limitations.
ETU721(D).2 understand the Various Learning methodologies.
ETU721(D).3 get expertise in the use of different ANN structures and algorithm.
ETU721(D).4 develop ANN based models.

ETU722 – PROGRAM ELECTIVE – IV

(A)WIRELESS COMMUNICATION

Course Outcomes:

After completing this course, Students shall be able to:

ETU722(A).1 Understand the functioning of wireless communication systems, and their evolution
ETU722(A).2 Demonstrate ability to explain various multiple access techniques for Wireless communication
ETU722(A).3 Compare the various wireless system standards

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ETU722(A).4 Understand cordless and wireless local loop concepts
ETU722(A).5 Understand the concept of different wireless networks and Bluetooth technology

ETU722(B) ADAPTIVE SIGNAL PROCESSING

Course Outcomes: At the end of this course students will be able to

ETU722(B).1 Elaborate the importance of signal processing in non-stationary environment.
ETU722(B).2 Interpret and justify various components of Adaptive signal processing
ETU722(B).3 Explain and compare and the role of adaptive signal processing in communications
ETU722(B).4 Apply the various mathematical models to adaptive signal processing. and minimum error
ETU722(B).5 Write Code and use simulation tools related to the concepts of ASP and applications

ETU722(C) MIXED SIGNAL DESIGN

Course Outcomes: At the end of the course, student will demonstrate the ability to

ETU722(C).1 Understand the practical situations where mixed signal analysis is required.
ETU722(C).2 Analyze and handle the inter-conversions between signals.
ETU722(C).3 Analyze the mixed signal design using ADC and DAC
ETU722(C).4 Understand analog and digital PLL.
ETU722(C).5 Design systems involving mixed signals

ETU722(D) SOFT COMPUTING TOOLS

Course Outcomes: At the end of this course students will be able to

ETU722(D).1 Understand and apply the concept of human intelligence and Artificial Intelligence.
ETU722(D).2 Understand the genetic algorithms and other random search procedures and apply it to find out global optimum solutions in self-learning situations.
ETU722(D).3 Understand the fundamental syntax of R through readings, practice exercises, demonstrations, and writing R code.
ETU722(D).4 Apply critical programming language concepts such as data types, iteration, functions and Boolean operators by writing R programs and through examples.
ETU722(D).5 Solve the complex problems and methods in Engineering using Soft Computing Techniques.

ETU723 – OPEN ELECTIVE – II

ETU723(A) MECHATRONICS

Course Outcomes:

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After completing this course, students will be able to:

ETU723(A).1 Realize the mechatronics systems components.
ETU723(A).2 Understand and Apply the working principle of sensors and transducers.
ETU723(A).3 Understand various signal conditioning, processing and actuator mechanisms.
ETU723(A).4 Demonstrate the working of controllers.
ETU723(A).5 Identify and Select the system components to model and design a mechatronics system.

ETU723 – OPEN ELECTIVE – II

ETU723(B) BIOENGINEERING

Course Outcomes:

After completing this course, Students will be able to:

ETU723(B).1 Identify the multidisciplinary applications of bioengineering
ETU723(B).2 Understand the basic concepts of application of principles of biology and engineering tools
ETU723(B).3 Understand the technical aspects of existing technologies capable of addressing the biological and medical challenges faced by mankind
ETU723(B).4 Apply the knowledge information extraction databases useful in computer modeling
ETU723(B).5 Apply acquired knowledge to identify usable and cost efficient solutions in bioengineering

ETU724 – PROGRAM ELECTIVE – V

ETU724(A)SATELLITE COMMUNICATION

Course Outcome:

At the end of the course students will be able to

ETU724(A).1 Apply knowledge about the Satellite communications Principles properties.
ETU724(A).2 Analyze the effects of various parameters on Satellite System performance.
ETU724(A).3 Discuss and understand how analog and digital technologies are used for satellite communication networks.
ETU724(A).4 Design Satellite Earth station antennas and link power budget for satellites.
ETU724(A).5 Understands the applications of Satellite Communication.

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ETU724(B) DIGITAL IMAGE AND VIDEO PROCESSING

Course Outcomes:

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

ETU724(B).1 Mathematically represent the various types of images and analyze them.
ETU724(B).2 Explain the need of spatial and frequency domain techniques for image compression.
ETU724(B).3 Process these images for the enhancement of certain properties or for optimized use of the resources.
ETU724(B).4 Understand the colour image processing
ETU724(B).5 Study the fundamentals of video processing and understand the video encoding and decoding.

ETU724(C) NANOTECHNOLOGY

Course Outcomes:

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

ETU724(C).1 Understand various aspects of nanotechnology for making nano components and material.
ETU724(C).2 Study the processes involved in making nano components and material.
ETU724(C).3 Leverage advantages of the nano materials.
ETU724(C).4 Study appropriate use of the nano materials in solving practical problems.
ETU724(C).5 Understand the requirement of futuristic of semiconductor material

ETU724(D)PATTERN RECOGNITION

Course Outcomes

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

ETU724(D).1 understand the fundamentals of pattern recognition and its application.
ETU724(D).2 revise the concepts of probability and linear algebra and review them from the viewpoint of ways and means for pattern understanding.
ETU724(D).3 analyze the unsupervised algorithms suitable for pattern Classification.
ETU724(D).4 understand the role of pattern classification in various machine intelligence applications.

ETU725 VLSI DESIGN

Course Outcome:

ETU725.1 Realize VLSI Design Flow
ETU725.2 Analyze CMOS Logic
ETU725.3 Implementation Different Combinational logic circuits
ETU725.4 Design layout for CMOS various circuits.

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ETU725.5 Analyze testing, Verification.

ETU726 OPTICAL COMMUNICATION

Course Outcomes:

At the end of course, student shall be able to:

ETU726.1	Apply the knowledge with basic concepts of Optical Communication.
ETU726.2	Ability to demonstrate optical communication components, assemble them and solve problems on Optical Communication system.
ETU726.3	Ability to design, implements, analyzes and maintains optical communication system.
ETU726.4	Acquaintance of different source of light as well as receiver and their comparative study
ETU726.5	Assess the different techniques to improve the capacity of the system and solve problems on Optical Communication system.

ETU727 SEMINAR

Course Outcomes:

After completing this course, Students shall be able:

ETU727.1	To study research papers for understanding of a new field, in the absence of a textbook , to summaries and review them.
ETU727.2	To identify promising new directions of various cutting edge technologies
ETU727.3	To impart skills in preparing detailed report describing the topic and results
ETU727.4	To effectively communicate by making an oral presentation before an evaluation committee

ETU821– PROGRAM ELECTIVE – VI

ETU821(A) MOBILE COMMUNICATION

Course Outcome:

At the end of course, student shall be able to:

ETU821(A).1	Apply the basic principles of mobile communication system
ETU821(A).2	Identify and describe the development and implementation of mobile communication systems
ETU821(A).3	Analyze the Mobile radio propagation, fading, diversity concepts and the channel modeling.
ETU821(A).4	Discuss the cellular system design and technical challenges.
ETU821(A).5	Test mobile communication equipment for the technical functionality.

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ETU821(B)SPEECH PROCESSING

Course Outcomes:

At the end of this course students will be able to

ETU821(B).1	Mathematically model the speech signal.
ETU821(B).2	Analyze the quality and properties of speech signal.
ETU821(B).3	Modify and enhance the speech and audio signals.
ETU821(B).4	Design and implement the methods and systems for efficient quantization coding of speech signals.
ETU821(B).5	Solve the problems regarding various methods in speech processing.

ETU821(C) MEMS TECHNOLOGY

Course Outcomes:

After completing this course, students will:

ETU821(C).1	Realise the importance of MEM system and smart materials.
ETU821(C).2	Apply the principle of MEM structures in various application fields.
ETU821(C).3	Understand the working of MEM application systems
ETU821(C).4	Demonstrate the principles of MEM to model applications.

ETU821(D) ARTIFICIAL INTELLIGENCE

Course Outcomes:

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

ETU821(D).1	Identify appropriate AI methods to solve given problems.
ETU821(D).2	formulation of real-world problems using search strategies.
ETU821(D).3	Acquire skills on knowledge representation, natural deduction, and dealing with uncertainty.
ETU821(D).4	Implement basic AI algorithms and identify their scale which the state of art AI applications are using.

ETU822A). PROJECT OR B). INDUSTRY INTERNSHIP PROJECT

Course Outcomes:

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

ETU822.1	Demonstrate a sound technical knowledge of their selected project topic.
ETU822.2	Undertake problem identification, formulation and solution.
ETU822.3	Design engineering solutions to complex problems utilising a systems approach.
ETU822.4	Conduct an engineering project.
ETU822.5	Demonstrate the knowledge, skills and attitudes of a professional engineer.

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