



Suman Ramesh Tulsiani Technical Campus

Faculty of Engineering

Mauje: Khamshet, Pune-Mumbai Highway(NH4), Tal:Maival, Dist: Pune- 410405

Approved By A.I.C.T.E. New Delhi, Recognized by Govt. of Maharashtra, Affiliated to University of Pune

Electronics & Telecommunications Engineering Department

Program Specific Outcomes (PSOs)

PSO 1	An ability to design and implement complex systems in areas like signal processing embedded systems, VLSI and Communication Systems.
PSO 2	An ability to make use of acquired technical knowledge for qualifying in competitive examinations at various levels.
PSO 3	Graduates will be able to apply fundamentals of electronics in various domains of analog and digital systems.

Program Outcome (POs)

PO 1	Engineering Knowledge – Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solutions of complex problems.
PO 2	Problem Analysis – Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	Design/Development of solutions – Design solutions for complex engineering problems and design system components or processes that meet the specified need with appropriate considerations for public health and safety, and the cultural, societal, and environmental considerations.
PO 4	Conduct investigation of complex problems – Used research based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusion.
PO 5	Modern tool usage – 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 limitations.
PO 6	The engineer and society – Apply reasoning informed by the contextual knowledge to assess societal, health, safety legal and cultural issues and consequent responsibilities relevant to professional engineering practice.



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PO 7	Environment and Sustainability – Understand the impact of professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need of sustainable development.
PO 8	Ethics - Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.
PO 9	Individual and Team work – Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	Communication – 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 presentation, give and receive clear instructions.
PO 11	Project Management and Finance – 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.
PO 12	Life Long Learning – Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadcast context of technological change.

Second Year E&TC Engineering (Curriculum 2015 Pattern)

Subject	Analog Communication (AC)
Subject Code	ETC211
Course Outcome (COs)	
ETC211.1	Understand and identify the fundamental concepts and various components of analog communication systems
ETC211.2	Explain signal to noise ratio, noise figure and noise temperature for single and cascaded stages in a communication system
ETC211.3	Describe analog pulse modulation techniques and digital modulation technique
ETC211.4	Develop the ability to compare and contrast the strengths and weaknesses of various communication systems



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Subject	Control System (CS)
Subject Code	ETC210
Course Outcome (COs)	
ETC210.1	Determine and use models of physical systems in forms suitable for use in the analysis and design of control systems
ETC210.2	Determine the (absolute) stability of a closed-loop control system
ETC210.3	Perform time domain and frequency domain analysis of control systems required for stability analysis
ETC210.4	Perform time domain and frequency domain correlation analysis
ETC210.5	Apply root-locus, Frequency Plots technique to analyze control systems
ETC210.6	Express and solve system equations in state variable form

Subject	Digital Electronics (DE)
Subject Code	ETC205
Course Outcome (COs)	
ETC204.1	Use the basic logic gates and various reduction techniques of digital logic circuit in detail
ETC204.2	Design combinational and sequential circuits
ETC204.3	Design and implement hardware circuit to test performance and application
ETC204.4	Understand the architecture and use of microcontrollers for basic operations and Simulate using simulation software

Subject	Data Structures & Algorithms (DSA)
Subject Code	ETC204
Course Outcome (COs)	



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ETC204.1	Discuss the computational efficiency of the principal algorithms such as sorting & searching
ETC204.2	Write and understand the programs that use arrays & pointers in C
ETC204.3	Describe how arrays, records, linked structures are represented in memory and use them in algorithms
ETC204.4	Implement stacks & queues for various applications
ETC204.5	Understand various terminologies and traversals of trees and use them for various applications
ETC204.6	Understand various terminologies and traversals of graphs and use them for various applications

Subject	Electrical Circuits & Machines (ECM)
Subject Code	ETC203
Course Outcome (COs)	
ETC203.1	Analyze basic AC & DC circuit for voltage, current and power by using KVL, KCL, and network theorems
ETC203.2	Explain the working principle of different electrical machines
ETC203.3	Select proper electrical motor for given application
ETC203.4	Design and analyze transformers

Subject	Electronic Devices & Circuits (EDC)
Subject Code	ETC202
Course Outcome (COs)	
ETC202.1	Comply and verify parameters after exciting devices by any stated method
ETC202.2	Implement circuit and test the performance
ETC202.3	Analyze small signal model of FET and MOSFET



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ETC202.4	Explain behavior of FET at low frequency
ETC202.5	Design an adjustable voltage regulator circuits

Subject	Engineering Mathematics-III (EM-III)
Subject Code	ETC208
Course Outcome (COs)	
ETC208.1	Solve higher order linear differential equation using appropriate techniques for modeling and analyzing electrical circuits
ETC208.2	Solve problems related to Fourier transform, Z-transform and applications to Communication systems and Signal processing
ETC208.3	Obtain Interpolating polynomials, numerically differentiate and integrate functions, numerical solutions of differential equations using single step and multi-step iterative methods used in modern scientific computing
ETC208.4	Perform vector differentiation and integration, analyze the vector fields and apply to Electro-Magnetic fields
ETC208.5	Analyze conformal mappings, transformations and perform contour integration of complex functions in the study of electrostatics and signal processing

Subject	Employability Skill Development (ESD)
Subject Code	ETC213
Course Outcome (COs)	
ETC213.1	Have skills and preparedness for aptitude tests
ETC213.2	Be equipped with essential communication skills (writing, verbal and non-verbal)
ETC213.3	Master the presentation skill and be ready for facing interviews



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ETC213.4	Build team and lead it for problem solving
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Subject	Integrated Circuits (IC)
Subject Code	ETC209
Course Outcome (COs)	
ETC209.1	Understand the characteristics of IC and Op-Amp and identify the internal structure
ETC209.2	Understand and identify various manufacturing techniques
ETC209.3	Derive and determine various performances based parameters and their significance for Op-Amp
ETC209.4	Comply and verify parameters after exciting IC by any stated method
ETC209.5	Analyze and identify the closed loop stability considerations and I/O limitations
ETC209.6	Analyze and identify linear and nonlinear applications of Op-Amp
ETC209.7	Understand and verify results (levels of V & I) with hardware implementation
ETC209.8	Implement hardwired circuit to test performance and application for what it is being designed
ETC209.9	Understand and apply the functionalities of PLL to Frequency synthesizer, multiplier, FM, and AM demodulators

Subject	Object Oriented Programming (OOP)
Subject Code	ETC212
Course Outcome (COs)	
ETC212.1	Describe the principles of object oriented programming
ETC212.2	Apply the concepts of data encapsulation, inheritance in C++



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ETC212.3	Understand basic program constructs in Java
ETC212.4	Apply the concepts of classes, methods and inheritance to write programs Java
ETC212.5	Use arrays, vectors and strings concepts and interfaces to write programs in Java
ETC212.6	Describe and use the concepts in Java to develop user friendly program

Subject	Signals & Systems (SS)
Subject Code	ETC201
Course Outcome (COs)	
ETC201.1	Understand mathematical description and representation of continuous and discrete time signals and systems
ETC201.2	Develop input output relationship for linear shift invariant system and understand the convolution operator for continuous and discrete time system
ETC201.3	Understand and resolve the signals in frequency domain using Fourier series and Fourier transforms
ETC201.4	Understand the limitations of Fourier transform and need for Laplace transform and develop the ability to analyze the system in s- domain
ETC201.5	Understand the basic concept of probability, random variables & random signals and develop the ability to find correlation, CDF, PDF and probability of a given event

Subject	System Programming & Operating System (SPOS)
Subject Code	ETC314
Course Outcome (COs)	



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ETC314.1	Demonstrate the knowledge of Systems Programming and Operating Systems
ETC314.2	Formulate the Problem and develop the solution for same.
ETC314.3	Compare and analyse the different implementation approach of system programming operating system abstractions
ETC314.4	Interpret various OS functions used in Linux / Ubuntu

Third Year E&TC Engineering (Curriculum 2015 Pattern)

Subject	Advanced Processors (AP)
Subject Code	ETC313
Course Outcome (COs)	
ETC313.1	Describe the ARM microprocessor architectures and its feature
ETC313.2	Interface the advanced peripherals to ARM based microcontroller
ETC313.3	Design embedded system with available resources
ETC313.4	Use of DSP Processors and resources for signal processing applications

Subject	Business Management (BM)
Subject Code	ETC312
Course Outcome (COs)	
ETC312.1	Get overview of Management Science aspects useful in business
ETC312.2	Get motivation for Entrepreneurship
ETC312.3	Get Quality Aspects for Systematically Running the Business



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ETC312.4	To Develop Project Management aspect and Entrepreneurship Skills
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Subject	Digital Communication (DC)
Subject Code	ETC301
Course Outcome (COs)	
ETC301.1	Understand working of waveform coding techniques and analyse their performance
ETC301.2	Analyze the performance of a baseband and pass band digital communication system in terms of error rate and spectral efficiency
ETC301.3	Perform the time and frequency domain analysis of the signals in a digital communication system
ETC301.4	Design of digital communication system
ETC301.5	Understand working of spread spectrum communication system and analyze its performance

Subject	Digital Signal Processing (DSP)
Subject Code	ETC302
Course Outcome (COs)	
ETC302.1	Analyze the discrete time signals and system using different transform domain techniques
ETC302.2	Design and implement LTI filters for filtering different real world signals
ETC302.3	Develop different signal processing applications using DSP processor

Subject	Electromagnetics (EM)
Subject Code	ETC303



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Course Outcome (COs)	
ETC303.1	Understand the basic mathematical concepts related to electromagnetic vector fields
ETC303.2	Apply the principles of electrostatics to the solutions of problems relating to electric field and electric potential, boundary conditions and electric energy density
ETC303.3	Apply the principles of magneto statics to the solutions of problems relating to magnetic field and magnetic potential, boundary conditions and magnetic energy density
ETC303.4	Understand the concepts related to Faraday's law, induced emf and Maxwell's equations
ETC303.5	Apply Maxwell's equations to solutions of problems relating to transmission lines and uniform plane wave propagation

Subject	<u>Electronic System Design (ESD)</u>
Subject Code	<u>ETC308</u>
CO statement	
ETC308.1	Apply the fundamental concepts and working principles of electronics devices to design electronics systems
ETC308.2	Shall be able to interpret datasheets and thus select appropriate components and devices
ETC308.3	Select appropriate transducer and signal conditioning circuit to design prototype of Data Acquisition system
ETC308.4	Design an electronic system/sub-system and validate its performance by simulating the same
ETC308.5	Shall be able to use an EDA tool for circuit schematic and simulation
ETC308.6	Create, manage the database and query handling using suitable tools

Subject	Employability Skills & Mini Project (ESMP)
Subject Code	ETC317
CO statement	



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ETC317.1	Understand, plan and execute a Mini Project with team
ETC317.2	Implement electronic hardware by learning PCB artwork design, soldering techniques, testing and troubleshooting etc
ETC317.3	Prepare a technical report based on the Mini project
ETC317.4	Deliver technical seminar based on the Mini Project work carried out

Subject	Information Theory Coding Techniques & Communication Networks
Subject Code	ETC311
CO statement	
ETC311.1	Perform information theoretic analysis of communication system
ETC311.2	Design a data compression scheme using suitable source coding technique
ETC311.3	Design a channel coding scheme for a communication system
ETC311.4	Understand and apply fundamental principles of data communication and networking
ETC311.5	Apply flow and error control techniques in communication networks

Subject	Microcontrollers (MC)
Subject Code	ETC304
CO statement	
ETC304.1	Learn importance of microcontroller in designing embedded application



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ETC304.2	Learn use of hardware and software tools
ETC304.3	Develop interfacing to real world devices

Subject	Mechatronics (MT)
Subject Code	ETC305
CO statement	
ETC305.1	Identification of key elements of mechatronics system and its representation in terms of block diagram
ETC305.2	Understanding basic principal of Sensors and Transducer
ETC305.3	Able to prepare case study of the system given

Subject	Power Electronics (PE)
Subject Code	ETC310
CO statement	
ETC310.1	Design & implement a triggering / gate drive circuit for a power device
ETC310.2	Understand, perform & analyze different controlled converters
ETC310.3	Evaluate battery backup time & design a battery charger
ETC310.4	Design & implement over voltage / over current protection circuit

Subject	System Programming & Operating System (SPOS)
Subject Code	ETC314



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CO statement	
ETC314.1	Demonstrate the knowledge of Systems Programming and Operating Systems
ETC314.2	Formulate the Problem and develop the solution for same.
ETC314.3	Compare and analyse the different implementation approach of system programming operating system abstractions
ETC314.4	Interpret various OS functions used in Linux / Ubuntu

Final Year E&TC Engineering (Curriculum 2012 Pattern)

Subject	Audio Video Engineering (AVE)
Subject Code	ETC419
CO statement	
ETC419.1	To study the analysis and synthesis of TV Pictures, Composite Video Signal, Receiver, Picture Tubes and Television Camera Tubes
ETC419.2	To study the various Colour Television systems with a greater emphasis on television standards
ETC419.3	To study the advanced topics in Digital Television and High Definition Television
ETC419.4	To study audio recording systems such CD/DVD recording, Audio Standards, and Acoustics principles

Subject	Broadband Communication System (BCS)
Subject Code	ETC416



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CO statement	
ETC416.1	Carry out Link power budget and Rise Time Budget by proper selection of components and check its viability
ETC416.2	Carry out Satellite Link design for Up Link and Down Link

Subject	Computer Networks (CN)
Subject Code:	ETC402
Course Outcome (COs)	
ETC402.1	Understand fundamental underlying principles of computer networking
ETC402.2	Describe and analyze the hardware, software, components of a network and the interrelations.
ETC402.3	Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies
ETC402.4	Have a basic knowledge of the use of cryptography and network security
ETC402.5	Have a basic knowledge of installing and configuring networking applications
ETC402.6	Specify and identify deficiencies in existing protocols, and then go onto select new and better protocols.

Subject	Digital Image Processing (DIP)
Subject Code:	ETC404
Course Outcome (COs)	
ETC404.1	Develop and implement algorithms for digital image processing
ETC404.2	Apply image processing algorithms for practical object recognition applications

Subject	Mobile Communication (MC)
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Subject Code:	ETC415
Course Outcome (COs)	
ETC415.1	Explain and apply the concepts telecommunication switching, traffic and networks
ETC415.2	Analyze the telecommunication traffic
ETC415.3	Analyze radio channel and cellular capacity
ETC415.4	Explain and apply concepts of GSM and CDMA system

Subject	Microwave Engineering (MWE)
Subject Code:	ETC403
Course Outcome (COs)	
ETC403.1	Formulate the wave equation in wave guide for analysis
ETC403.2	Identify the use of microwave components and devices in microwave applications
ETC403.3	Understand the working principles of all the microwave tubes
ETC403.4	Understand the working principles of all the solid state devices
ETC403.5	Choose a suitable microwave tube and solid state device for a particular application
ETC403.6	Carry out the microwave network analysis
ETC403.7	Choose a suitable microwave measurement instruments and carry out the required measurements

Subject	PLC & Automation (PLC)
Subject Code:	ETC410
Course Outcome (COs)	
ETC410.1	Understand PLC architecture, PLC addressing concepts
ETC410.2	Develop PLC ladder programs for simple industrial applications



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ETC410.3	Design Automation systems for industrial applications
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Subject	VLSI Design & Technology (VLSI)
Subject Code:	ETC401
Course Outcome (COs)	
ETC401.1	Model digital circuit with HDL, simulate, synthesis and prototype in PLDs
ETC401.2	Understand chip level issues and need of testability
ETC401.3	Design analog & digital CMOS circuits for specified applications

Subject	VLSI Design & Technology (VLSI)
Subject Code:	ETC401
Course Outcome (COs)	
ETC401.1	Model digital circuit with HDL, simulate, synthesis and prototype in PLDs
ETC401.2	Understand chip level issues and need of testability
ETC401.3	Design analog & digital CMOS circuits for specified applications