Program educational objectives

1. Graduates will able to succeed in positions in engineering practice or research, and in other fields they choose to pursue.
2. Graduates will become a responsible member of society.
3. Graduates will be leaders, both in their chosen profession and in other activities.
4. Graduates will address the complexities of real life engineering problems and be able to formulate solutions that are technically sound, economically feasible & sustainable.

PROGRAM OUTCOMES

Upon successful completion of this course it is expected that electronics graduate will be able to:

a. Understand and proficiently apply the relevant sciences & scientific methods to Electronics engineering to design solutions to complex problems in electronics systems, electronic circuits & control processes.

b. Identify, interpret & critically appraise current developments, advanced technologies and apply them to electronic engineering field to enhance reliability and efficiency of electronics based systems, components and programs.

c. Identify and synthesize the constraints posed by economic factors, safety considerations, environmental impacts and professional standards on Electronics engineering practices and use them for professional judgments in solving the critical field problems for sustainable technological development of nation.

d. Determine, analyze and proficiently apply theoretical and numerical analysis of Phenomenon to

   conceive, control & optimize the performance of Electronics engineering systems used for different applications such as in navigation, automobiles, transportation, and automation.

e. Identify and critically evaluate the performance of a electronics engineering systems in terms of economics, safety, and social and physical environment and implement approaches to minimize any adverse impact leading to sustainable development of society.

f. Understand and proficiently apply a systems approach for electronics system design and addressing the broad contextual constraints, leading to sustainable developments of global level electronics technologies and standards.

g. Show awareness and ability to proficiently apply project management tools and methodologies to the planning and execution of projects leading to electronics engineering solutions of professional standards.

h. Develop & implement creative and innovative approaches to enhance the reliability, efficiency and economical aspect of electronics systems for sustainable improvement of electronics technologies.

i. Communicate effectively on both technical and general issues with peers, associate, clients and the general public to find solutions using technical proficiency.

j Operate effectively and professionally within a team environment to solve complex problems of analyze, design and development of electronics systems.

k. Use all fundamental knowledge of electronics engineering, sciences and mathematics to plan, organize and use resources efficiently to reduce adverse effect on environments.

SY B. Tech (E&TC) Course Outcomes for all subjects

1. BTEXC302 Analog Circuits

Course Outcomes:
On completion of the course, students will be able to:
1. Understand the characteristics of IC and Op-Amp and identify the internal structure.
2. Understand and identify various manufacturing techniques.
3. Derive and determine various performances based parameters and their significance for Op-Amp.
4. Comply and verify parameters after exciting IC by any stated method.
5. Analyze and identify the closed loop stability considerations and I/O limitations.
6. Analyze and identify linear and nonlinear applications of Op-Amp.
7. Understand and verify results (levels of V & I) with hardware implementation.
8. Implement hardwired circuit to test performance and application for what it is being designed.

2. BTEXC303 Electronic Devices & Circuits

Course Outcomes:
On completion of the course, students will be able to:
1. Comply and verify parameters after exciting devices by any stated method.
2. Implement circuit and test the performance.
3. Analyze small signal model of FET and MOSFET.
4. Explain behavior of FET at low frequency.
5. Design an adjustable voltage regulator circuits.

3. BTEXC304 Network Analysis

Course Outcomes:
On completion of the course, students will be able to:
1. Apply knowledge of mathematics to solve numerical based on network simplification and it will be used to analyze the same.
2. Design passive filters and attenuators theoretically and practically. To apply knowledge for design of active filters as well as digital filters and even extend this to advance adaptive filters.
3. Identify issues related to transmission of signals, analyze different RLC networks.
4. Find technology recognition for the benefit of the society.

4. BTEXC305 Digital Logic Design

Course Outcomes:
On completion of the course, students will be able to:
1. Use the basic logic gates and various reduction techniques of digital logic circuit in detail.
2. Design combinational and sequential circuits.
3. Design and implement hardware circuit to test performance and application.
4. Understand the architecture and use of VHDL for basic operations and Simulate using simulation software.

5. BTHM3401 Basic Human Rights

Course Outcomes:
On completion of the course, students will be able to:
1. Simply put, human rights education is all learning that develops the knowledge, skills, and values of human rights.
2. Strengthen the respect for human rights and fundamental freedoms.
3. Enable all persons to participate effectively in a free society.
4. Learn about human rights principles, such as the universality, indivisibility, and interdependence of human rights.
5. Learn about regional, national, state, and local law that reinforces international human rights law.
6. Learn and know about and being able to use global, regional, national, and local human rights instruments and mechanisms for the protection of human rights.

6. BTEXC401 Electrical Machines and Instruments

Course Outcomes:
On completion of the course, students will be able to:
1. The ability to formulate and then analyze the working of any electrical machine using mathematical model under loaded and unloaded conditions.
2. The skill to analyze the response of any electrical machine.
3. The ability to troubleshoot the operation of an electrical machine.
4. The ability to select a suitable measuring instrument for a given application.
5. The ability to estimate and correct deviations in measurements due to the influence of

the instrument and due to the accuracy of the instrument

7. BTEXC402 Analog Communication Engineering

Course Outcomes:
On completion of the course, students will be able to:
1. Understand and identify the fundamental concepts and various components of analog communication systems.
2. Understand the concepts of modulation and demodulation techniques.
3. Design circuits to generate modulated and demodulated wave.
4. Equip students with various issues related to analog communication such as modulation, demodulation, transmitters and receivers and noise performance.
5. Understand the concepts of modulation and demodulation techniques of angle modulation (frequency and phase).
6. Explain signal to noise ratio, noise figure and noise temperature for single and cascaded stages in a communication system.
7. Develop the ability to compare and contrast the strengths and weaknesses of various communication systems.

8. BTEXC403 Microprocessor

Course Outcomes:
1. Learner gains ability to apply knowledge of engineering in designing different case studies.
2. Students get ability to conduct experiments based on interfacing of devices to or interfacing to real world applications.
3. Students get ability to interface mechanical system to function in multidisciplinary system like in robotics, Automobiles.
4. Students can identify and formulate control and monitoring systems using microprocessors.
5. Students will design cost effective real time system to serve engineering solution for Global, social and economic context.
6. This course understanding will enforce students to acquire knowledge of recent trends like superscalar and pipelining and thus finds recognition of continuous updation.
7. Learn use of hardware and software tools.
8. Develop interfacing to real world devices.

9. BTEXC404 Signals and Systems

Course Outcomes:
On completion of the course, students will be able to:
1. Understand mathematical description and representation of continuous and discrete time signals and systems.
2. Develop input output relationship for linear shift invariant system and understand the convolution operator for continuous and discrete time system.
3. Understand and resolve the signals in frequency domain using Fourier series and Fourier transforms.
4. Understand the limitations of Fourier transform and need for Laplace transform and

develop the ability to analyze the system in s- domain.
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.

10. BTID405 Product Design Engineering

Course Outcomes: At the end of the course, students will be able to
1. Create simple mechanical or other designs
2. Create design documents for knowledge sharing
3. Manage own work to meet design requirements
4. Work effectively with colleagues.

11. BTBSC406 Numerical Methods and Computer Programming

Course Outcomes:
On completion of the course, students will be able to:
1. Able to solve algebraic and transcendental equations by using numerical techniques and will be able to compare different numerical techniques used for this purpose and also will be able to choose a proper one as per the requirement of the problem.
2. Able to solve a system of linear equations with any number of variables using different direct and iterative numerical techniques.
3. Understand the concept of interpolation, finite difference operators and their relations, and can apply different interpolation techniques on equi-spaced or non equi-spaced data values.
4. Prepare them to write computer programs for the numerical computational techniques.
5. Understand application of the NMCP course in many engineering core subjects like signal processing, digital communication, numerical techniques in electromagnetics etc.
6. Understand procedure-oriented and object oriented programming concepts.
7. Capable of writing C and C++ programs efficiently

TE (E&TC) Course Outcomes for all subjects

1. Power Electronics and Drives

Course Outcomes:
On completion of the course students will be able to
1. Understand various power devices, their firing circuits and communication.
2. Design 1Φ & 3 Φ power converters.
3. Study and design DC to AC converters.
4. Understand DC to DC control techniques.
5. Understand inverter and chopper based drive applications.

2. Digital Communication

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

1.To understand the building blocks of digital communication system.
2.To understand modulation techniques in digital communication.
3. To prepare mathematical background for communication signal analysis.
4.To understand and analyze the signal flow in a digital communication system.

3. Microprocessors and Microcontrollers

Course Outcomes:

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

1. Assess and solve basic binary math operations using the microprocessor and explain the microprocessor's and Microcontroller's internal architecture and its operation within the area of manufacturing and performance.
2. Apply knowledge and demonstrate programming proficiency using the various addressing modes and data transfer instructions of the target microprocessor and microcontroller.
3. Compare accepted standards and guidelines to select appropriate Microprocessor (8085 & 8086) and Microcontroller to meet specified performance requirements.
4. Analyze assembly language programs; select appropriate assemble into machine a cross assembler utility of a microprocessor and microcontroller.
5. Design electrical circuitry to the Microprocessor I/O ports in order to interface the processor to external devices.
6. Evaluate assembly language programs and download the machine code that will provide solutions real world control problems.

4. Electromagnetic Engineering

Upon successful completion of this course it is expected that engineering graduates will be able to

1. Understand different laws, equations, rules of electric field intensity related to EME.
2. Understand and evaluate energy and potential in an electric field.
3. Understand conductors, dielectrics, and capacitance of a material.
4. Understand magnetics forces, materials and inductance while studying magnetistatics.
5. Analyze wave propagation in an uniform plane wave.

5. Feedback Control System

Upon successful completion of this course it is expected that engineering graduates will be able to

1. Understand and proficiently apply the relevant sciences and scientific methods to electronics engineering.
2. Identify, interpret and critically appraise current developments and advanced technologies and apply them to electronics engineering.
3. Develop and implement creative and innovative approaches to control system (h)
4. Understand and analyze to 1storder and 2^{nd} order system in time domain general applications.

5. Determine analyses and proficiently apply theoretical and numerical analysis of phenomena to conceive, control and optimize the performance of control systems in engineering.
6. Show awareness of and ability to proficiently apply circuit project management tools and methodologies to the planning and execution of projects leading to the electronics engineering solutions of a professional standards.
7. Demonstrates the highest standards of personal performance
8. Demonstrate commitment to lifelong learning and professional development.
9. Understand the responsibilities of electronics engineers to the community' the engineering profession and industrial and business world.
10. Develop and implement creative and innovative approaches to problem solving.

6. Embedded System

Upon successful completion of this course it is expected that student will be able to have following outcomes

1. Design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, health and safety, manufacturability, and sustainability.
2. Design, test and critically evaluate embedded solutions to real world situations using (embedded) computer systems interfaced to digital hardware.
3. Build circuits and program the microcontroller in the C programming language.
4. Synchronize hardware and software input/output with switches, lights and motors .
5. Implement an I/O driver and multi-threaded programming.
6. Deal with complex issues in embedded systems both systematically and creatively.
7. Make decisions in complex and unpredictable situations.
8. Work as a team leader to work on complex projects in a project team environment

7. Digital Signal Processing

At the end of course, Student will able to:

1. Compute various transform analysis of Linear Time Invariant System
2. Apply engineering problem solving strategies to DSP problems
3. Design and test signal processing algorithms for various applications.
4. Design and simulate digital filters.
5. Recover information from signals.
6. Understand various applications of DSP such as multi rate signal processing, telecommunication

8. Electronic Circuit Technology

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

1. Develop an ability study and design different circuits
2. Understand different aspects of Op-amps circuit design
3.To measure different analog quantities
4. Understand different aspects and kinds of digital system design
5. Understand basic theory while designing circuit i.e. design considerations.

BE (E&TC) Course Outcomes for all subjects

1. Satellite Telecommunication (EL-II)

After Completing this course students will be able to:

1. Explain the basics of satellite communication
2. Explain and analyze link budget of satellite signal for proper communication
3. Use the system for the benefit of society
4. Use the different application of satellite communication

2. Microwave & Radar Engineering

After Completing this course students will be able to:

1. Understand basic concepts of microwave communication and transmission
2. Understand building blocks of microwave communication
3. Understand and design microwave generation techniques
4. Understand and learn fundamentals of Radar System.
5. Able to design impedance matching network for any transmission line or system.
6. Able to analyze and find applications and limitations of microwave tube Generators and Amplifiers.

3. Embedded System

Course Outcomes:

Upon successful completion of this course it is expected that student will be able to

1. Understand fundamentals of embedded systems, design paradigms, architectures, possibilities and challenges, both with respect to software and hardware.
2. Practically apply gained theoretical knowledge in order to design, analyze and implement embedded systems, e.g. integrating embedded su00bsystems and applications.
3. Analyze a system both as whole and in the included parts, to understand how these parts interact in the functionality and properties of the system.

4. Wireless Mobile Communication

Course Outcomes:

Upon successful completion of this course students are able to

1. Discuss the cellular system design and technical challenges.
2. Explain classification of mobile communication system.

3. Analyze the mobile radio propagation, diversity concepts, fading and channel modeling.
4. Develop ability to analyze improved data services in cellular communication.

5. Digital Image Processing

Course Outcomes:

After learning the course the students should be able to:

1.Understand the basic image enhancement techniques in spatial & frequency domains.
2.Understand the various kind of noise present in the image and how to restore the noisy image.
3.Understand the basic multiresolution techniques and segmentation methods.
4.Apply different image processing concepts for image handling in various fields.
5.Apply various compression standards studied, reducing the image size for optimizing storage and transmission bandwidth in their image processing related projects.
6.Work as a team leader to work on complex projects in a project team environment

6. Very Large Scale Integration

After successful completion of the course student will be able to:

1.Identify the various IC fabrication methods.
2.Differentiate various FPGA architectures and CPLD architecture.
3.Design an application using Vhdl
4.Concepts of modelling a digital system using Hardware Description Language.
5.Demonstrate a clear understanding of CMOS fabrication flow and technology scaling.
6.Assess the various reliability issues in VLSI technology

7. Optical Fibre Communication

After completion of the course, the student is able to

1.Distinguish Step Index, Graded index fibers and compute modevolume.
2.Explain the Transmission Characteristics of fiber and Manufacturing techniques of fiber/cable.
3.Understand basic laws of optical physics. Distinguish between the various modes of operation of Optical fibers. Identify the various causes for signal degradation.
4.Predict the pulse broadening happening due to the effect of dispersion of the signal.
Classify the construction and characteristics of optical sources and detectors.
5.Discuss splicing techniques, passive optical components and explainn oise in optical system.

8. Consumer Electronics

At the end of the course, the student will be able to
1. List technical specification of electronics Audio system (microphone and speaker).

2. Trouble shoots consumer electronics products like TV, washing machine and AC.
3. Identify and explain working of various colour TV transmission blocks.
4. Understand various functions of various devices related to telecommunication system.
5. Understand the basic functions of various consumer electronic goods.

9. Computer Communication Network

Course Outcomes:

At the end of the course, the student will be able to
1. Able to know basic concepts of computer, computer communication and use of it in networking.
2. Able to know basics of Networking with different switching techniques.
3. Study of Networking topologies: Mesh and Bus toplogy, Star topology & ring Topology.

4. Network Software : device driver for network interface card, LAN, MAN, WAN.
5. Overview of Network model: ISO-OSI and TCP/IP network reference Model.

10. Applied Digital Signal Processing (ADSP)

Course Outcomes:

At the end of the course, the student will be able to
1. Able to know different digital signal, filter techniques and it's algorithms.
2. Able to know multirate signal processing like interpolation and Decimation.
3. To enhance the knowledge of polyphase filter structures and two channel quadrature Mirror filter bank.
4. Need of Adaptive filter, its main components and its algorithms.
5. Able to design Lattice structures AR, MA & ARMA.
6. Able to represent & calculate the characterization of random signals.
7. Ability to estimate autocorrelation and power spectrum of random signals (Bartlett Window & Welch Method)
8. Ability to know different architecture of DSPs and floating & fixed point representations.
9. Case study of TMS320C54XX and introduction of SHARRC processor.
10. Applications of DSP (Ex. Biomedical, Audio-Video systems, Radar System etc.)