Walchand Institute of Technology, Solapur
Department of Electronics Engineering

Vision

To be a distinguished center for nurturing the holistic development of competent young engineers in the electronics and allied field

Mission

1. To inculcate and stimulate Electronics & allied Engineering proficiency amongst students through **quality education and innovative educational practices**
2. To create engineering **professionals with social consciousness**
3. To foster **technical skills** of students through creativity and critical thinking
4. To enhance **soft skill** set of students which is crucial for career success through effectual training

Programme Educational Objectives (PEOs)

Graduate will –

1. Have a successful **professional career** in Electronics & allied fields.
2. Leverage his fundamental knowledge to pursue **higher education** and will continue his **professional development** in Electronics & other fields
3. Exhibit professional ethics, team spirit and effective communication skills to be **successful leader and manager** with a holistic approach.
4. Be sensitive to **ethical, societal & environmental** issues while conducting his professional work.

Programme Outcomes (POs)

Engineering Graduate will be able to –

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
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.
3. **Design/development of solutions**: 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.

4. **Conduct investigations of complex problems**: 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.

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 the limitations.

6. **The engineer and society**: 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.

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

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

9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

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 presentations, and give and receive clear instructions.

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.

12. **Life-long learning**: 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.

Program Specific Outcomes (PSOs)

1. **Algorithms** : Graduate will able to design, realize and validate algorithms for different analog and digital electronic systems

2. **Systems**: Graduate will able to design, implement and test different analog and digital electronic systems

3. **Self Learning:** Graduate with his sound fundamentals is prepared to comprehend applications of the Electronics engineering through self learning mode

SOLAPUR UNIVERSITY, SOLAPUR

FACULTY OF ENGINEERING & TECHNOLOGY

ALL BRANCHES

Course Outcomes

First Year B.Tech. (All Branches)
w.e.f. Academic Year 2018-19

- ## C011 Engineering Physics

C011.1	Describe the concepts of semiconducting material and crystal structure.
C011.2	Apply basic concepts of acoustics and ultrasonic in engineering field.
C011.3	Relate space, time, mass and energy equations.
C011.4	Express the concepts of diffraction, polarization and can relate them to day to day observable phenomena.
C011.5	Explain the fundamental concepts, advantages and applications of laser and optical fiber in the field of science, engineering and medical.
C011.6	Express the basic concepts of quantum mechanics and nanotechnology.

- ## C012 Engineering Chemistry

C012.1	Describe importance of quality of water and appropriate water treatment process.
C012.2	Recognize various types of corrosion & propose a suitable prevention technique.
C012.3	Describe various instrumental techniques.
C012.4	Identify and explain different engineering materials like metals, ceramics, fuels, lubricants, polymers for various engineering and day to day applications.
C012.5	Calculate hardness of water, concentration of unknown solution, calorific value of fuels, saponification & acid value of oils, molecular weight of polymers etc.
C012.6	Describe various types of chemical reactions and commonly used drug molecules.

- ## C112 Engineering Mathematics

C112.1	Student can compute higher order derivative of standard functions and verify Mean Value Theorems.
C112.2	Student can express the power series expansion of a given function and evaluate limits
C112.3	Students are able to use matrices techniques for solving system simultaneous linear equations , Eigen values and Eigen vectors of the matrix
C112.4	Student can evaluate Multivariable derivatives and can implement to estimate maxima and minima of multivariable function
C112.5	Students can compute velocity vector, gradient, divergence, curl and applications.

- ## C113 Basic Electrical ands Electronics Engineering

C113.1	Student can apply the various simplification methods to analyze dc circuits.
C113.2	Student can use the concept of magnetic circuits to calculate parameters of magnetic circuits and single phase transformer
C113.3	Student can apply knowledge of ac fundamentals to analyze series ac circuits.
C113.4	Student can use the concept of poly phase ac circuit to analyze three phase star, delta circuits.
C113.5	Student can explain working and applications of diode.
C113.6	Student can explain working and characteristics of BJT.
C113.7	Select appropriate transducers to measure various physical parameters like distance, temperature etc.
C113.8	Perform arithmetic operations on digital number system and solve Boolean expressions.

- ## C114 Engineering Mechanics

C114.1	Apply fundamentals of Engineering Mechanics for analyzing effects of a system forces acting on a rigid body.
C114.2	Analyze various types of statically determinate beams, pin jointed trusses by analytical and graphical methods.
C114.3	Locate centroid and centre of Gravity and calculate moment of Inertia of plane lamina.
C114.4	Apply knowledge of Kinematics and Kinetics of rigid body motion to solve problems of bodies in motion.
C114.5	Use Work Energy methods for analyzing linear and rotational motion.

- ## C115 Basic Mechanical Engineering

C115.1	Determine the heat and work quantum in the area of refrigeration and I.C.engines
C115.2	Determine the heat and work for various gas processes
C115.3	Distinguish and select the type of power producing/absorbing systems for a typical application.
C115.4	Identify power transmission element for day to day applications
C115.5	Explain various design considerations in mechanical engineering design.
C115.6	Explain various machining/joining process for required in manufacturing.

• C116 Communication Skills

C116.1	Student can frame grammatically correct sentences for day to day communication
C116.2	Student can use numerous appropriate words and sentences in written communication.
C116.3	Student can demonstrate effective oral communication skills in various situations.
C116.4	Student can read, comprehend and answer the questions based on a passage.
C116.5	Student can draft letters, emails, write paragraphs and essays with appropriate content and context.
C116.6	Students are able to solve verbal ability questions in competitive exams

• C117 Workshop Practice

C117.1	Draw, design and fabricate different carpentry joints.
C117.2	Prepare different shaped metal work piece joints from the given metal blanks by selecting different tools and machines.
C117.3	Perform different types of welding of metal components.
C117.4	Select different engineering tools required to perform carpentry, fitting and welding processes.
C117.5	Carry out pipe fitting and plumbing work.

• C122 Engineering Mathematics II

C122.1	Solve first order ordinary differential equation and able to apply in different engineering applications
C122.2	Test divergence & convergence of infinite series
C122.3	Use the tools of differentiation of functions of a complex variable that are used in various techniques dealing engineering problems.
C122.4	Draw approximate shape of planer curve with justification.
C122.5	Evaluate improper and multiple integrals and their usage.

- ## C123 Engineering Graphics and Design

C123.1	Draw projection of lines and planes for engineering applications
C123.2	Draw regular and sectional views of various types of solids
C123.3	Draw the 2 D view (orthogonal views) given 3D drawing
C123.4	Draw the development of the regular and truncated solids
C123.5	Draft the 2-D drawing of machine components.

- ## C124 Basic Civil Engineering

C124.1	Describe the role of civil engineer in the development of the society and relationship of civil engineering with other branches of engineering and technology.
C124.2	Measure heights, distances and angles on ground using basic surveying instruments.
C124.3	Explain various elements of Environmental and water supply systems such as dam, canal and elements of transportation structures.
C124.4	Classify types of buildings depending upon use and select suitable materials of construction.
C124.5	Explain need of Green building, remote sensing techniques, GIS and GPS for Civil Engineering applications.

- ## C1265 Programming for Problem Solving

C125.1	Design the flowcharts and algorithms for the given problem
C125.2	Translate the algorithms into C programs and test & execute the programs.
C125.3	Design & develop C programs by appropriately selecting control and loop structures.
C125.4	Design & develop C programs using functions and pointers.
C125.5	Design & develop C programs using arrays, structure and unions
C125.6	Develop small applications using C Programming concepts

- ## C127 Professional Communication

C127.1	Prepare good quality presentation and deliver it effectively.
C127.2	Participate effectively in group discussion
C127.3	Perform effectively in personal interview
C127.4	Prepare effective resume for job interviews
C127.5	Draft and write various reports professionally.
C127.6	Demonstrate various soft skills like team skills, leadership, creativity, etc. in different situations.

SOLAPUR UNIVERSITY, SOLAPUR

FACULTY OF ENGINEERING & TECHNOLOGY

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Course Outcomes

S.E. (Electronics)
w.e.f. Academic Year 2017-18

- ## C211 Engineering Mathematics III

  1. Student can solve higher order linear differential equation related to electrical circuit theory
  2. Student can apply Laplace and inverse Laplace transforms for analysis of simple electrical circuits
  3. Student can express a function in terms of sine's and cosines components so as to model simple periodic functions.
  4. Student can solve problems on Z transform and explain its properties
  5. Student can find the relation between two variables for the given data using regression
  6. Student can sketch and explain various probability distribution functions
  7. Student can solve simultaneous linear equations and non linear equations

- ## C212 Electronic Circuit Analysis and Design I

  1. Student can elaborate working and applications of diode.
  2. Student can analyze and design unregulated power supply using diode
  3. Student can elaborate working and characteristics of BJT.
  4. Student can analyze and design single stage amplifier and multivibrator.
  5. Student can evaluate FET and MOSFET parameters.
  6. Student can explain applications of FET and MOSFET

- ## C213 Network theory and Analysis

  1. Student can apply different network theorems and network reduction techniques on DC and AC passive electrical circuits
  2. Student can analyze resonance in a series and parallel circuits.
  3. Student can analyze two port networks
  4. Student can analyze transient response of AC circuits.
  5. Student can apply filter approximations to design analog passive filters.
  6. Student can evaluate the electrical system stability using analytical methods and pole zero diagram

- ## C214 Digital Logic Design

  1. Student is able to explain underlying concept of digital logic, signal and circuits.
  2. Student can use various logic gates to design a logic circuit.
  3. Student evaluates various number systems, Boolean algebra and is able to solve relevant problems.
  4. Student can realizes CMOS and VLSI families along with their vital parameters.
  5. Student can design combinational and sequential circuits
  6. Student can use concept of synchronous state machine for solving design problems.
  7. Student can use programmable logic devices for designing logic circuits

- ## C215 Analog Communication

  1. Student describes basic components of communication system and explains need of modulation
  2. Student describes concept of noise and also recognizes its effects.
  3. Student describes amplitude and frequency modulation and demodulation and can do analysis in time and frequency domain
  4. Student explains nature and behavior of wave propagation and basic principle of different antenna systems
  5. Student can simulate components of communication system using simulation software and can interpret results

- ## C216 Object Oriented Programming with C++

  1. Student can differentiate between C and C++ in terms of data hiding and class and can implement applications using programming with class.
  2. Student can describe significance and implement different types of constructors. He can also explain difference between a constructor and a destructor.
  3. Student can implement structure, types of inheritance and explain importance of inheritance.
  4. Student can implement types of polymorphism- compile type polymorphism, run type polymorphism and virtual function.
  5. Student can use different features of object oriented programming efficiently

- ## C221 Electrical Machines

  1. Students can explain working, speed control, starting and braking of dc motors and three - phase induction motors.
  2. Students can describe working and application of different single phase special motors.
  3. Students can explain three phase power measurement and power factor improvement methods.
  4. Students can describe three phase transformer connections.

- ## C222 Electronic Circuit Analysis and Design II

  1. Student can analyze multistage amplifier.
  2. Student can analyze and design feedback amplifier.
  3. Student can analyze power amplifiers.
  4. Student can analyze and design oscillators.
  5. Student can design and analyze timer circuits using IC 555 and some of its applications.
  6. Student can analyze and design transistorized series voltage regulators.
  7. Student can analyze and design voltage regulator using ICs.

- **C223 Data Structures**

  1. Student can implement stack, queues, and linked list.
  2. Student can use recursion
  3. Student can select non linear structures for autonomous realization of simple programs or program parts
  4. Student can implement different searching and sorting technique

- **C224 Linear Integrated Circuits**

  1. Student can explain working of op amp and characteristics of ideal and practical   op amp
  2. Student can describe frequency response of op amp
  3. Student can analyze different linear and non linear applications of op amp
  4. Student can design first and second order filter and can analyze oscillators
  5. Student can describe monolithic VCO and its application in PLL
  6. Student can explain data converter techniques and can use monolithic data converters for practical applications.

- **C225 Signals and Systems**

  1. Student is able to sketch & label signals, perform arithmetic operations, transformations on a given CT and DT signals.
  2. Student can calculate the convolution between given CT & DT signals.
  3. Student is able to represent the given periodic signal in terms of trigonometric Fourier series and obtain the Fourier transform of given periodic/ aperiodic signal.
  4. Student is able to define sampling theorem & explain the effect of aliasing.
  5. Given the impulse response or system transfer function of the LTI system student is able to determine whether the system is stable & or causal or not.
  6. Student is able to define correlation , spectral density & state their properties.

- **C226 Software Simulation Tools**
  1. Students can write program using different functions of MATLAB
  2. Students can simulate different electronic circuits using MATLAB
  3. Students can create simple models using SIMULINK blocks.
  4. Students can describe system behavior using different analysis tools and functions of MATLAB and SIMULINK
  5. Students can simulate different electronic circuits using OrCAD/PROTEUS

SOLAPUR UNIVERSITY, SOLAPUR

FACULTY OF ENGINEERING & TECHNOLOGY

ALL BRANCHES

Course Outcomes

T.E. (Electronics)
w.e.f. Academic Year 2018-19

- ## C311 Control Systems

  1. Student is able to determine system transfer function using block diagram reduction method, signal flow graph method.
  2. Student is able to derive transfer function of armature controlled and field controlled DC motor.
  3. Student can analyze step and impulse response of first & second order system.
  4. Student can apply different methods to determine the system stability
  5. Student can analyze system performance using frequency domain analysis
     Student can explain different compensation techniques and controllers

- ## C312 Digital Signal Processing

  1. Student is able to analyze a given signal or system using tools such as Fourier transform and z-transform
  2. Student is able to apply properties of Discrete Fourier Transform and to determine the discrete Fourier transform, Inverse discrete Fourier transform by direct computation & Fast Fourier Transform algorithm.
  3. Student is able to draw the structure for realization of a given system.
  4. Student is able to design IIR and FIR filters.
  5. Student can describe basic building blocks of digital signal processor.
  6. Student can explain the applications of digital signal processing in audio processing, biomedical, image processing areas.

- ## C313 Microcontrollers

  1. Student can describe architecture of 8051 and PIC 16F877 microcontrollers.
  2. Student can write assembly language program for different applications with 8051 and PIC 16F877 microcontrollers.
  3. Student can write "C" program for different applications with 8051 microcontroller.
  4. Student can develop the system for different applications using 8051 microcontrollers.
  5. Student can program PIC 16F877 on chip peripherals for different applications.
  6. Student can describe working of serial communication protocols RS232, SPI and I2C.

- ## C314 Electromagnetic Engineering

  1. Student can solve numerical problems on coordinate systems, divergence, curl and gradient.
  2. Student can derive basic laws of electrostatic and magnetostatic and can apply them for different fields.
  3. Student can derive Maxwell's equations under different conditions and can derive wave equation from them
  4. Student is able to describe and analyze electromagnetic wave propagation in different media.
  5. Student can describe transmission lines and their related parameters
  6. Student can describe radiating system concepts and power flow with focus on antennas

- **C315 Information Technology and Management**

  1. Student can present case studies about changing face of business and importance of management information system for today's business
  2. Along with the examples student can explain different e-commerce mechanisms
  3. Student can describe necessity and benefits of data management for business and organizations
  4. Student can present examples of primary and higher organizational applications of information system
  5. Student is able to illustrate software development life cycle and can describe popular software models
  6. Student can describe various social and ethical issues related to IT

- **C317 Programming with Java**

  1. Student can outline basics of core Java programming.
  2. Student can relate between C++ and Java in terms of object oriented programming features.
  3. Student can employ the concept of classes and methods to solve real world problems.
  4. Student can implement different types of inheritance and explain the importance of inheritance.
  5. Student can choose an appropriate Java package for different programming tasks.
  6. Student can create a GUI-based application using AWT package.

- **C321 Operating Systems**

  1. Student is able to identify and describe structure, operations and different types of operating system.
  2. Student is able to analyze effect of different scheduling criteria on scheduling techniques, thread implementation, synchronization of processes.
  3. Student is able to implement concepts like inter process communication and various scheduling algorithm using C programming.
  4. Student is able to describe deadlock condition and implement methods to overcome deadlock.
  5. Student can make use of file systems, directories and different commands associated to it.
  6. Student is able to analyze memory management concepts like logical and physical addressing.

- ## C 322 Digital Communication

  1. Explain different waveform coding techniques used to convert analog signal into digital signal
  2. Compare various digital modulation techniques
  3. Explain probability, random variable and various statistical analysis methods.
  4. Derive channel capacity for discrete memory less channel and continuous channel.
  5. Evaluate behavior of various modulation-demodulation techniques in presence of noise.
  6. Compare various error detection and correction codes.

- ## C323 Embedded Systems

  1. Student can describe hardware and software architecture of embedded system.
  2. Student can describe ARM7TDMI core architecture
  3. Student can write assembly and C program for different applications for LPC2148 microcontroller.
  4. Student can interface different peripherals with LPC2148 microcontroller.
  5. Student can build embedded system using real time operating system.
  6. Student can describe microcontroller based real time systems for different applications

- ## C324 Industrial Electronics

  1. Student can explain the characteristics of power semiconductor devices and identify suitable switching device for given application.
  2. Student can explain different types of protection and commutation circuits and identifies suitable circuit for given application.
  3. Student can analyze and design single phase controlled rectifiers
  4. Student can analyze various firing circuits for power devices.
  5. Student can analyze different types of power supplies.
  6. Student can analyze different industrial power circuits and implement it for different application.

- ## C325 VLSI Design

  1. Explain with suitable example VHDL features.
  2. Write VHDL code & test bench for modeling and testing combinational and sequential circuits.
  3. Describe the architecture of CPLD and FPGA and to implement some functions in FPGA.
  4. Discuss steps in the high level design flow.
  5. Implement digital functions using CMOS logic and gates.
  6. Design the minimal test set required for testing the circuits.

- ## C326A Robotics

  1. Student can describe the concepts of robotics.
  2. Student can analyze different control methods of robot and end effectors
  3. Student becomes aware about different sensors and can integrate the robot system.
  4. Student can describe different control scheme and types of mobile robots
  5. Student can express fundamentals of robotic vision
  6. Student becomes acquainted with current and future scope of industrial robotics applications.
  7. Student can develop innovative atomized robots.

- ## C326B Programming in Visual Basic .Net

  1. Implement object oriented concepts in programming.
  2. Create form for specific application
  3. Access external application using serial communication.

- ## C326C Automotive Electronics

  1. Student can describe basics of working of automobile engines and transmission
  2. Student get acquainted with different electronic circuits used in automobiles
  3. Student can describe communication and diagnostic systems used in automobiles
  4. Student realizes importance of environmental friendly vehicles

- ## C326D Electronic Instrumentation

  1. Student can identify type of errors occurring in measuring instruments.
  2. Student is able to convert measuring quantity into different standard units.
  3. Student can describe various shielding methods for reducing signal interference.
  4. Student can describe designing aspects for electronic counters, measuring meters of different ranges.
  5. Student can select proper transducers, recorders to assemble a measuring instrument for different applications.
  6. Student can identify different sensors and explain interfacing circuits for these.
  7. Student can explain data acquisition system for various applications

- C327 Mini Hardware Project

  1. Student is able to select an appropriate project in applied area
  2. Student can design circuit, select and test required components
  3. Student can use modern software tools for PCB designing and circuit simulation
  4. Student can test completed circuit / project
  5. Student can write technical report of the project
  6. Student can estimate costing of the project and also demonstrates social and safety aspects associated with project
  7. Student is able to complete project in a team with proper sharing of responsibilities and work

SOLAPUR UNIVERSITY, SOLAPUR

FACULTY OF ENGINEERING & TECHNOLOGY

ALL BRANCHES

Course Outcomes

B.E. (Electronics)
w.e.f. Academic Year 2015-16

- ## C411 Power Electronics

  1. Student can analyze and design power electronics applications such as controlled rectifiers, choppers, inverters and cycloconverters.
  2. Student is able to formulate and calculate power consumption by understanding converter and commutation specifications
  3. Student can describe control schemes for three phase converters using suitable microcontroller.
  4. Student can describe operation principles and circuit topologies of various chopper commutation circuits and select it for suitable application.
  5. Student can describe voltage control of inverter using different harmonic reduction and PWM reduction techniques
  6. Student can describe power electronics applications to control AC and DC drives.
  7. Student can describe the operation principle and characteristics of various power electronics drive systems
  8. Student can describe different power factor controlling techniques.

- ## C412 Computer Networks

  1. Student can describe types of data communication and their performance parameters.
  2. Student can describe benefits of layered model approach, able to select appropriate network device and network topology for the given application.
  3. Student is able to create IEEE 802.3 LAN and provide different services to the users.
  4. Student is able to implement basic network programming to start server –client communication and various other services.

- ## C413 Mobile Technology

  1. Student can give details for design challenges for wireless and mobile system development.
  2. Student can describe frequency reuse concept and can apply different techniques for improving coverage and capacity
  3. Student can describe 3G GSM in detail with architecture, protocol, signal processing and security
  4. Student can evaluate CDAMA technique and can describe IS 95 block diagram and channels
  5. Student can describe IEEE 802.11 and Bluetooth with architecture and protocol
  6. Student can explain mobile TCP/IP

- ## C414 Electronic System Design

  1. Student can describe complete electronic product design process as a big picture
  2. Student can analyze and design analog circuits which constitutes to final system design of an electronic product

3. Student can analyze and design digital circuits which constitutes to final system design of an electronic product
4. Can implement software design, testing and debugging process for final year project
5. Student can develop various technical documents for final year project
6. Student can prepare and deliver progress presentations and closure presentation at various stages of final year project

• C415A Biomedical Instrumentation

1. Student can analyze bio electrical signals from various parts of body
2. Student can decide appropriate sensor and necessary instrumentation for physiological parameter measurement
3. Student is able to explain working of basic medical equipments
4. Student is able to plan for protection to biomedical instrument against electrical shocks.

• C415B Mechatronics

1. Student can analyze different types of controllers
2. Student can explain principles and drive techniques for DC motors
3. Student can design programmable motion controllers
4. Student can describe precision mechanical actuation
5. Student can explain the operation, principle and characteristics of MEMS.
6. Student can analyze the mechatronic system as a whole
7. Student can analyze robot and its peripherals

• C415C Image Processing

1. Student can describe various application areas and applications of image processing
2. Student can describe and derive for low level operations in spatial and frequency domain
3. Student can write MATLAB® programs for few basic image processing operations in spatial and frequency domain
4. Student can describe and derive for image analysis and description operations
5. Student can explain different image compression techniques
6. Few students decide to take up project in image processing / computer vision

• C416 Project I

1. Student can select a suitable project based upon requirement analysis and literature survey
2. Student can plan for management and financial aspects of the project
3. Student can design hardware and software architecture of the project
4. Student can apply design concepts for detail design of project
5. Student can validate the results and can also analyze them
6. Student demonstrates leadership and team working behavioral skills
7. Student can write synopsis and project report
8. Student demonstrates presentation skills
9. Student can use programming / simulation software and presentation, word processing software at various stages of project

- **C417 Vocational Training**

  1. Student undertakes suitable project based on the learning in vocational training and successfully completes it.
  2. Student can write vocational training report
  3. Student demonstrates presentation skills
  4. Student can use programming / simulation software and presentation , word processing software at various stages of project

- **C421 Advanced Communication Engineering**

  1. Student is able to compare radio frequency and microwave frequency communication with respect to devices, working principle and applications.
  2. Student is able to explain different radar systems
  3. Student is able to describe satellite subsystem and earth station block diagram with their working principle.
  4. Student is able to apply different modulation techniques and access techniques for wireless communications
  5. Student is able to deign radio link models and analyze link budget for satellite.
  6. Student is able to apply ray theory for optical communication.

- **C422 Audio Video Systems**

  1. Student can describe basic components of multimedia.
  2. Student can explain and relate audio-video standards based on different applications.
  3. Student can identify and analyze various elements of composite video signal.
  4. Student can analyze amplitude and frequency of colour composite video signal such as burst cycles, spectrum of bar pattern, etc.
  5. Student can explain block diagram of NTSC, PAL and SECAM TV systems.
  6. Student can design receiver antenna section of a TV system.
  7. Student can describe functional blocks of digital television, high definition television, satellite television and cable television systems.

- **C423 Embedded Systems**

  1. Student can portray hardware and software architecture of an embedded system.
  2. Student can describe ARM7 core architecture
  3. Student can describe LPC2148 architecture
  4. Student can write assembly and C program for different applications for LPC2148
  5. Student can interface (design hardware and write software) for interfacing different peripherals with LPC2148
  6. Student can apply concepts of Real Time Operating System to organize embedded system.
  7. Student can develop (design hardware and write software) LPC2148 based systems for simple applications

- ## C424A Broadband Communication

  1. Student is able to analyze and plan for different communication parameters to achieve high speeds in communication.
  2. Student is able to explain usage of different present networks for high speed communication.
  3. Student is able to analyze different protocols to utilize available networks with high efficiency.
  4. Student is able to implement different protocols for fixed and adhoc wireless broadband access.

- ## C424B Speech Processing

  1. Can describe need of different speech processing operations and can list applications for each
  2. Student can express the speech signal in terms of its time and frequency domain representations and the different ways in which it can be modeled.
  3. Student can analyze simple features used in speech classification applications.
  4. Student can implement simple speech processing operations like speaker recognition using MATLAB

- ## C424C PLC and Industrial Controllers

  1. Student can identify applications for PLC
  2. Student can identify the basic components of the PLC and explain how they function
  3. Able to write and debug ladder diagrams for PLC applications
  4. Student can establish communication through interfacing with PLC
  5. Student can explain PID controllers with necessary mathematical background and can also describe its tuning control
  6. Student can describe the operation principle and characteristics of various sensors and actuating systems for electromechanical applications
  7. Student can design signal conditioning circuits for interfacing various sensors and actuating systems

- ## C425 Project II

  1. Student can select a suitable project based upon requirement analysis and literature survey
  2. Student can plan for management and financial aspects of the project
  3. Student can design hardware and software architecture of the project
  4. Student can apply design concepts for detail design of project
  5. Student can validate the results and can also analyze them
  6. Student demonstrates leadership and team working behavioral skills
  7. Student can write synopsis and project report
  8. Student demonstrates presentation skills
  9. Student can use programming / simulation software and presentation, word processing software at various stages of project