

February 1, 2018

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

Course Outcomes (Cos)

F.E. –I

- **C11: Engineering Physics – I**

At the end of this course, the students can able to

C11.1	Express the basic concepts of diffraction and polarization and can relate them to day to day observable phenomena.
C11.2	Reveal the formation of materials and their internal structure to solve problems associated with matter and energy.
C11.3	Apply basic concepts of acoustics and ultrasonic's for basic civil and other engineering applications.
C11.4	Explain concepts of nanoscience and express its importance and need in modern technology.
C11.5	Evaluate the application of laser and fiber optics in the field of medical and telecommunication.
C11.6	Explain the principles of fission and fusion and its significance for power generation.

- **C12: Engineering Chemistry – I**

At the end of this course:

C12.1	Student can describe vital properties of engineering materials like lubricants, polymers, metals, ceramics, composites and adhesives leading to a selection of an appropriate material for various engineering applications.
C12.2	Student can explain behaviour and applications of different heterogenous systems in equilibrium under different states of conditions.
C12.3	Student can recognize various types of corrosions and can propose a suitable prevention technique.
C12.4	Student can describe various water sources and can relate various water quality parameters to it. They can select appropriate water purification treatments.
C12.5	Student can describe various instrumental techniques like GLC and TGA related to analysis of various chemical compounds.
C12.6	Student can review various fuels and can calculate calorific values associated.

- **C112: Engineering Mathematics – I**

At the end of this course,

C112.1	Student can write higher order derivative of standard functions
C112.2	Student can express the power series expansion of a given function and evaluate limits
C112.3	Student can apply De-Moivre's Theorem to solve complex problems and to determine imaginary roots of polynomial
C112.4	Student can evaluate simultaneous linear equations
C112.5	Student can evaluate Eigen values and Eigen vectors of the matrix
C112.6	Student can evaluate partial derivatives and can implement to estimate maxima and minima of multivariable function

- **C113: Applied Mechanics**

At the end of this course,

C113.1	Student can determine resultant of force system and apply conditions of static equilibrium to plane force systems
C113.2	Student can identify and quantify all forces associated with a static framework.
C113.3	Student can determine moment of inertia of plane figures and solids.
C113.4	Student can solve problems in kinematic and dynamic systems.
C113.5	Student can evaluate Eigen values and Eigen vectors of the matrix
C113.6	Student can undertake laboratory work and can analyze results

- **C114: Basic Electrical Engineering**

At the end of this course,

C114.1	Student can apply the network theorems to analyze dc circuits and calculate energy consumption in electrical systems.
C114.2	Student can use the concept of magnetic circuits to calculate parameters of circuits, and single phase transformer
C114.3	Student can apply knowledge of ac fundamentals to analyze series & parallel ac circuits.
C114.4	Student can use the concept of poly phase ac circuit to analyze three phase star, delta circuits and working of electrical drives.

- **C115: Basic Mechanical Engineering**

At the end of this course,

C 115.1	Student can calculate the thermodynamic heat and work quantum in the field of refrigeration, air conditioning and internal combustion engines.
C 115.2	Student can categorize different fluid machines as pumps, compressors, turbines and explain its relevant applications
C 115.3	Student can identify and select different power transmission systems for machine tools and day to day applications.
C 115.4	Student can state and explain general design procedure and design considerations for products.
C115 .5	Student can select the manufacturing process like machining, and joining operations.

- **C116: Communication Skill I**

At the end of this course,

C116 .1	Student can communicate by using correct grammar
C116 .2	Student can write formal letters
C116 .3	Student can to write his C.V. / Resume
C116 .4	Student can actively participate in Group Discussion and can effectively express his views.
C116 .5	Student can to communicate effectively in different formal & informal situations with general awareness & prudence
C116 .6	Student can comprehend the passage and can answer the questions based on it.

- **C117: Workshop Practices**

At the end of this course,

C117 .1	Student can draw, design and fabricate different Carpentry Joints
C117 .2	Student can prepare different shaped metal work pieces and their joints from the given metal blanks by selecting required machines and tools
C117 .3	Student can perform different types of welding of metal components
C117 .4	Student can select different engineering tools required to perform carpentry, fitting and welding processes
C117 .5	Student is able to assemble the demonstrated components related to his respective program.

F.E. –II

- **C122: Engineering Mathematics-II**

At the end of this course,

C122.1	Student can solve first order ordinary differential equation by analytical and numerical method
C122.2	Student can evaluate numerical derivatives.
C122.3	Student can explain curve tracing with justification.
C122.4	Student can evaluate improper and multiple integrals.
C122.5	Student can determine area, surface area, mass and volume of solid regions.

- **C123: Engineering Graphics**

At the end of this course,

C123 .1	Student can draw different curves related to engineering applications.
C123 .2	Student can draw projection of lines and solids for engineering applications.
C123 .3	Student can interpret various regular and sectional views of objects leading to imagination of shapes.
C123 .4	Student can draw three dimensional views of different objects/parts used in engineering applications.
C123.5	Student can draw architectural views of various objects.

- **C124: Basic Civil Engineering**

At the end of this course,

C124.1	Student can describe the role of civil engineer in the development of the society.
C124.2	Student can explain relationship of civil engineering with other branches of engineering and technology.
C124.3	Student can discuss buildings and common civil engineering projects.
C124.4	Student can express the need of Eco-friendly constructions.
C124.5	Student can measure heights, distances and angles on ground using basic surveying instruments and plot them on paper.
C124.6	Student can identify the advances in civil Engineering viz.- remote sensing techniques, GIS and GPS.

- **C125: Basic Electronics & Computer Engineering**

At the end of this course,

C125.1	Student can test and measure different electronic components.
C125.2	Student can explain working, characteristics and application of diode and transistor.
C125.3	Student can gain knowledge of transducer for measurement of physical parameters like distance and temperature.
C125.4	Student can solve problems related to number systems and Boolean algebra.
C125.5	Student can organize various blocks of a personal computer and comment about critical selection of each.
C125.6	Student can write a structured C program.
C125.7	Student can design flowchart / algorithms for given problem
C125.8	Student can use pointers and pointer arithmetic efficiently in the programs
C125.9	Student can use advanced features like structures and unions efficiently.

- **C126: Communication Skill -II**

At the end of this course,

C126 .1	Student is able to use appropriate vocabulary in spoken and written communication.
C126 .2	Student can write E-mails for business and personal purpose.
C126 .3	Student can use Skills like body language, communication, interpersonal skills, team & presentation skills in various contexts.
C126 .4	Student can express his ideas effectively in Personal Interview
C126 .5	Student can prepare a good quality presentation and can deliver it effectively.

S.E. Electronics –I

- **C211: Engineering Mathematics-III**

At the end of this course,

C211.1	Student can solve the higher order linear differential equation related to electrical circuit theory
C211.2	Student can solve linear and non-linear Partial differential equations
C211.3	Student can apply Laplace and inverse Laplace transforms for analysis of simple electrical circuits
C211.4	Student can express the function in terms of sine and cosines components so as to model simple Periodic functions
C211.5	Student can exhibits knowledge of Z transform and its properties
C211.6	Student can use different vector differential operators

- **C212: Electronics Circuit Analysis and Design – I**

At the end of this course,

C212.1	Student can interpret working of the diode and examine it for various applications
C212.2	Student can analyze and design unregulated power supply
C212.3	Student can interpret working and characteristics of BJT
C212.4	Student can analyze applications of BJT as an amplifier and multivibrator.
C212.5	Student can analyze and design single stage amplifier and multivibrator.
C212.6	Student can explain working of FET and MOSFET and its applications.

- **C213: Network Theory and Analysis**

At the end of this course,

C213.1	Student can apply different network theorems and network reduction techniques
C213.2	Student can interpret resonance in a series and parallel circuits.
C213.3	Student can analyze two port networks
C213.4	Student can analyze transient response of A.C. circuits.
C213.5	Student can apply filter approximations to design analog passive filters
C213.6	Student can interpret the system stability.

- **C214: Digital Logic Design**

At the end of this course,

C214.1	Student is able to explain underlying concept of digital logic, signal and circuits.
C214.2	Student can use various logic gates to design a logic circuits
C214.3	Student evaluates various number systems, Boolean algebra and is able to solve relevant problems.
C214.4	Student can realizes CMOS and VLSI families along with their vital parameters.
C214.5	Student can design combinational and sequential circuits
C214.6	Student can use concept of synchronous state machine for solving design problems.
C214.7	Student can use programmable logic devices for designing logic circuits.

- **C215: Data Structures**

At the end of this course,

C215.1	Student can implement stack, queues, and linked list
C215.2	Student can define and also demonstrate recursion and its execution.
C215.3	Student can design algorithm on nonlinear data structures and their applications.
C215.4	Student can implement different searching and sorting techniques.

- **C216: Electronics Workshop**

At the end of this course,

C216.1	Student can use different electronic measuring instruments to test and measure electronic components and circuits.
C216.2	Student can simulate electronic circuits using simulation software and can interpret results
C216.3	Student can select appropriate transducer for measurement of basic physical quantities
C216.4	Student can describe PCB making procedure and design single sided PCB

S.E. Electronics –II

- **C221: Electrical Machines**

At the end of this course,

C221.1	Student can interpret different speed control methods along with starting and breaking for dc motors.
C221.2	Student is able to analyze performance issues like torque and power requirement for single and three phase motors.
C221.3	Student is able to measure three phase power and analyze performance of transformer connections.
C221.4	Student can evaluate different power factor improvement methods.

- **C222: Electronics Circuit Analysis and Design – II**

At the end of this course,

C222.1	Student can analyze multistage amplifier.
C222.2	Student can analyze and design feedback amplifier and power amplifier.
C222.3	Student can analyze and design oscillators.
C222.4	Student can design timer circuits using IC 555 and its applications
C222.5	Student can analyze and design transistorized series voltage regulators.
C222.6	Student can describe working of different voltage regulator ICs and can design voltage regulators using them.

- **C223: Analog Communication**

At the end of this course,

C223.1	Student can describe basic components of communication system and compute power relations and modulation index for AM & FM signals
C223.2	Student can classify suppression techniques and explain balanced modulator for designing block schematic of DSB and SSB.
C223.3	Student can interpret circuits of FM modulators, FM & AM demodulators.
C223.4	Student can classify noise and calculate performance measures like noise temperature, SNR, noise figure, etc.
C223.5	Student can design basic switching systems for a given number of subscriber lines and analyze network traffic load.
C223.6	Student can describe behavior of wave propagation and compute antenna characteristics.
C223.7	Student can simulate components of communication system using simulation software and can interpret results.

- **C224: Linear Integrated Circuits**

At the end of this course,

C224.1	Student can explain working of op amp and characteristics of ideal and practical op amp
C224.2	Student can describe frequency response of op amp
C224.3	Student can analyze different linear and non linear applications of op amp
C224.4	Student can design first and second order filters and can analyze oscillators
C224.5	Student can describe monolithic PLL and its application in VCO
C224.6	Student can explain data converter techniques and can use monolithic data converters for practical applications.

- **C225: Signals & Systems**

At the end of this course,

C225.1	Student is able to represent the continuous & discrete signals mathematically.
C225.2	Student is able to develop the input output relationship for system & to find its properties.
C225.3	Student can calculate the convolution between given signals.
C225.4	Student can analyze LTI systems using Laplace, Fourier and Z transform.
C225.5	Student is able to plot PDF & CDF of a given random variable.

- **C226: Software Simulation Tools**

At the end of this course,

C226.1	Student can use different features of MATLAB for writing efficient programs
C226.2	Student can use MATLAB to simulate simple engineering applications
C226.3	Student can interpret system behavior using different analysis tools
C226.4	Student can simulate different electronic circuits using MATLAB
C226.5	Student can simulate different electronic circuits using OrCAD/PROTEUS

- **C227: Environmental Science**

At the end of this course,

C227.1	Student is able to describe the natural environment and its relationships with human activities.
C227.2	Student is able to explain the ethical means and technological methods for sustainable management of environmental systems.
C227.3	Student is able to explain social, economical and legal policies involved in the resolution of environmental problems.

T.E. Electronics –I

- **C311: Control Systems**

At the end of this course,

C311.1	Student can find transfer function and performance parameter of a system.
C311.2	Student can explain application of control system components to form a feedback control system
C311.3	Student exhibits knowledge of stability, time and frequency domain analysis necessary to find systems performance
C311.4	Student is able to draw Root locus, Bode plot and Polar plot for a feedback control system which can be further analyzed to find its stability
C311.5	Student is able to decide the necessary compensation technique to stabilize systems performance

- **C312: Digital Signal Processing**

At the end of this course,

C312.1	Student is able to analyze a given signal or system using tools such as Fourier transform and z-transform.
C312.2	Student can evaluate different transforms
C312.3	Student is able to draw the structure for realization of a given system – which structure?
C312.4	Student is able to design IIR and FIR filters.
C312.5	Student can draw and explain the functionality of various blocks of a typical digital signal processor.

- **C313: Microprocessor and Interfacing**

At the end of this course,

C313.1	Student can describe 8085 MPU, its peripherals and their various applications.
C313.2	Student can write assembly program for different applications.
C313.3	Student can design 8085 microprocessor based systems.

- **C314: Electromagnetic Engineering**

At the end of this course,

C314.1	Student can solve numerical problems on coordinate systems, divergence, curl and gradient.
C314.2	Student can derive basic laws of electro-static and magneto-static and can apply them for different fields.
C314.3	Student can derive Maxwell's equations under different conditions and can derive wave equation from them.
C314.4	Student is able to describe and analyze electromagnetic wave propagation in different media.
C314.5	Student can describe transmission lines and antennas

- **C315: Information Technology & Management**

At the end of this course,

C315.1	Student become aware of changing face of business and classifies management information systems
C315.2	Student can describe features of digital commerce and is aware of social and ethical issues associated with new business practices.
C315.3	Student can illustrate different business models, mechanisms and describe how companies can gain benefit of E-commerce to enhance business through examples and case studies.
C315.4	Student is able to illustrate and apply software development life cycle and software models.
C315.5	Student can apply knowledge of project management process through case study and able to explain methods for monitoring and control of the project.

- **C316: Object Oriented Programming with C++**

At the end of this course,

C316.1	Student can differentiate between C and C++ in terms of data hiding & class and can implement applications using programming with class
C316.2	Student can describe significance of and implement different types of constructors. He can also explain the difference between a constructor and a destructor.
C316.3	Student can implement the structure, types of inheritance and explain the importance of inheritance.
C316.4	Student can implement types of polymorphism- compile type polymorphism, run type polymorphism and virtual function.
C316.5	Student can apply different features of OOP's for efficient programming.

- **C317E: Self Learning Module I- Professional Ethics & Human Values**

At the end of this course, student can

C317E.1	Explain importance of morals, values and ethics in personal, professional and social life
C317E.2	Demonstrate the sense of engineering ethics while playing professional roles in society
C317E.3	Perform analysis of safety and risk and associated benefits
C317E.4	Describe global ethical issues related to environment, information technology and weapon development.
C317E.5	Summarize the principles described in codes of ethics recommended by ASCE, ASME.IEEE etc

T.E. Electronics –II

- **C321: Operating System**

At the end of this course,

C321.1	Student is able to identify and describe structure, operations of operating system and its different types.
C321.2	Student can compare different operations on process, thread implementation, scheduling techniques, synchronization algorithms and also their performance analysis
C321.3	Student is able to describe deadlock condition and methods to overcome deadlock
C321.4	Student can create file and directories
C321.5	Student is able to analyze memory management system and its different aspects
C321.6	Student is able to use I/O sub system.

- **C322: Digital Communication**

At the end of this course,

C322.1	Student can identify and describe different blocks of a pulse and digital communication systems with relevance.
C322.2	Student can describe different carrier modulation and detection techniques along with their performance analysis.
C322.3	Student can analyze theoretical bounds on the rates of digital communication systems.
C322.4	Student can solve numerical problems based upon source coding and channel coding techniques.

- **C323: Microcontrollers**

At the end of this course,

C323.1	Student can describe architecture of 8051 and PIC 16F877 microcontrollers and their various applications.
C323.2	Student can write assembly and C program for different applications.
C323.3	Student can design a simple microcontroller based system for different applications.-

- **C324: Industrial Electronics**

At the end of this course,

C324.1	Student can explain the characteristics of power semiconductor devices and select suitable switching device for given application.
C324.2	Student can analyze and design power electronics applications such as controlled rectifiers, switched mode power supplies and stabilizers.
C324.3	Student can design control scheme for single phase converters using microcontroller
C324.4	Student can design various firing circuits for power devices.
C324.5	Student is able to select appropriate power devices for conversion, control and conditioning of power
C324.6	Student is able to select power devices and firing circuits for special application to industrial processes.

- **C325: VLSI Design**

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

C325.1	Design, simulate and debug combinational and sequential circuits based on an abstract functional specification.
C325.2	Partition a digital system into different subsystems
C325.3	Use modern software tools for digital design in VHDL
C325.4	Describe principal parts in programmable circuits (PLD, FPGA) and describe how small designs are implemented in programmable circuits
C325.5	Write a VHDL test bench.
C325.6	Design the digital functions and basic gates using NMOS & PMOS transistors.

- **C326: Mini Hardware Project**

At the end of this course student is able to

C326.1	An appropriate project in applied area of his interest
C326.2	Design circuit, select and test required components
C326.3	Use modern software tools for PCB designing and circuit simulation
C326.4	Test completed circuit / project as a system
C326.5	Write technical report of the project
C326.6	Estimate costing of the project and also demonstrates social and safety aspects associated with project
C326.7	Complete project in a team with proper sharing of responsibilities and work

- **C327D: Electronic Instrumentation**

At the end of this course,

C327D.1	Student can describe types of error and calculate performance characteristics of measuring instruments.
C327D.2	Student can describe various conditioning and shielding methods for reducing signal interference.
C327D.3	Student can describe designing aspects for electronic counters, measuring instruments of different ranges.
C327D.4	Student can identify different sensors and design their interfacing circuits with controllers.
C327D.5	Student can describe designing aspects of DAS for different types of data

B.E. Electronics –I

- **C411: Power Electronics**

At the end of this course, student is able to

C411.1	Analyze and design power electronics applications such as controlled rectifiers, choppers, inverters and cycloconverter.
C411.2	Formulate and calculate power consumption by understanding converter and commutation specifications
C411.3	Evaluate control schemes for three phase converters using suitable microcontroller
C411.4	Describe operation principles circuit topologies of various chopper commutation circuits and select it for suitable application
C411.5	Interpret control of voltage of inverter using different harmonic reduction and PWM reduction techniques
C411.6	Design power electronics applications to control AC and DC drives
C411.7	Describe the operation principle and characteristics of various power electronics drive systems
C411.8	Compare different power factor controlling techniques

- **C412: Computer Networks**

At the end of this course, student is able to

C412.1	Describe types of data communication and their performance parameters
C412.2	Evaluate benefits of layered model approach, able to select appropriate network device and network topology for the given application
C412.3	Create IEEE 802.3 LAN and provide different services to the users
C412.4	Implement basic network programming to start server–client communication and various other services

- **C413: Mobile Technology**

At the end of this course, student is able to

C413.1	Give details for design challenges for wireless and mobile system development
C413.2	Describe frequency reuse concept and can apply different techniques for improving coverage and capacity
C413.3	Describe 3G GSM in detail with architecture, protocol, signal processing and security
C413.4	Evaluate CDAMA technique and can describe IS 95 block diagram and channels
C413.5	Describe IEEE 802.11 and Bluetooth with architecture and protocol
C413.6	Explain mobile TCP/IP

- **C414: Electronics System Design**

At the end of this course, student is able to

C414.1	Describe complete electronic product design process as a big picture
C414.2	Analyze and design analog circuits which constitutes to final system design of an electronic product
C414.3	Analyze and design digital circuits which constitutes to final system design of an electronic product
C414.4	Can implement software design, testing and debugging process for final year project
C414.5	Develop various technical documents for final year project
C414.6	Prepare and deliver progress presentations and closure presentation at various stages of final year project

- **C415A: Elective-I Biomedical Instrumentation**

At the end of this course,

C415A.1	Student can analyze bio electrical signals from various parts of body
C415A.2	Student can decide appropriate sensor and necessary instrumentation for physiological parameter measurement.
C415A.3	Student is able to explain working of basic medical equipment.
C415A.4	Student is able to plan for protection of subject and biomedical instrument against electrical shocks

- **415B : Elective-I Mechatronics**

At the end of this course, student is able to

C415B.1	Analyze different types of controllers
C415B.2	Explain principles and drive techniques for DC motors
C415B.3	Design PLC based systems for simple applications
C415B.4	Evaluate precision mechanical actuation
C415B.5	Interpret the operation, principle and characteristics of MEMS
C415B.6	Analyze the mechatronics system as a whole

- **C415C: Elective-I Image Processing**

At the end of this course, student is able to

C415C.1	Evaluate various application areas and applications of image processing
C415C.2	Describe and derive for low level operations in spatial and frequency domain
C415C.3	Develop MATLAB programs for few basic image processing operations in spatial and frequency domain
C415C.4	Describe and derive for image analysis and description operations
C415C.5	Compare different image compression techniques
C415C.6	Few students decide to take up project in image processing / computer vision

- **C416: Project I**

At the end of this course,

C416.1	Student can select a suitable project based upon requirement analysis and literature survey
C416.2	Student can plan for management and financial aspects of the project
C416.3	Student can design hardware and software architecture of the project
C416.4	Student can apply design concepts for realization of project
C416.5	Student demonstrates leadership and team working behavioral skills
C416.6	Student can write synopsis and various reports
C416.7	Student demonstrates presentation skills
C416.8	Student can use programming / simulation software and presentation, word processing software at various stages of project

- **C417: Vocational Training**

After successful completion of a vocational training,

C417.1	Student undertakes suitable project based on the learning in vocational training and successfully completes it – Can you prove it?
C417.2	Student can write a good quality vocational training report capturing learning and exposure gained during training
C417.3	Student can prepare a good quality presentation and can deliver it
C417.4	Student can use programming / simulation software and presentation , word processing tools

B.E. Electronics –II

- **C421: Advanced Communication Engineering**

At the end of this course, student is able to

C421.1	Compare radio frequency and microwave frequency communication in view of devices, working principle and applications.
C421.2	Explain different radar systems
C421.3	Describe satellite subsystem and earth station block diagram with their working principle.
C421.4	Apply different modulation techniques and access techniques for wireless communications
C421.5	Deign radio link models and analyze link budget for satellite.
C421.6	Identify main components of an optical communications system and describe typical optical communication systems

- **C422: Audio Video Systems**

At the end of this course,

C422.1	Student can describe audio systems of multimedia.
C422.2	Student can analyze data coding and compression techniques.
C422.3	Student can identify and measure different components of composite video signal.
C422.4	Student can explain standard NTSC, PAL and SECAM systems and derive chroma signals for each.
C422.5	Student can design receiver antenna section of a TV system.
C422.6	Student can describe functional blocks of digital television, high definition television, satellite television and cable television systems.

- **C423: Embedded Systems**

At the end of this course, student is able to

C423.1	Portray hardware and software architecture of an embedded system.
C423.2	Describe ARM7 core architecture.
C423.3	Describe LPC2148 architecture.
C423.4	Write assembly and C program for different applications for LPC2148.
C423.5	Interface (design hardware and write software) for interfacing different peripherals with LPC2148.
C423.6	Apply concepts of Real Time Operating System to organize embedded system.
C423.7	Develop (design hardware and write software) LPC2148 based systems for simple applications.

- **C424A: Elective II Broadband communication**

At the end of this course, student is able to

C424A.1	Analyze and plan for different communication parameters to achieve high speeds in communication.
C424A.2	Explain usage of various networks presently available for high speed communication.
C424A.3	Analyze different protocols to utilize available networks with high efficiency.
C424A.4	Evaluate different protocols for fixed and Adhoc wireless broadband access.

- **C424B: Elective II Speech Processing**

At the end of this course, student is able to

C424B.1	Describe need of different speech processing operations and can list applications for each
C424B.2	Express the speech signal in terms of its time and frequency domain representations and the different ways in which it can be modeled.
C424B.3	Evaluate simple features used in speech classification applications.
C424B.4	Implement simple speech processing operations like speaker recognition using MATLAB [®]

- **C424C: Elective II PLC and Industrial Controllers**

At the end of this course, student is able to

C424C.1	Student can identify applications for PLC
C424C.2	Student can identify the basic components of the PLC and explain how they function
C424C.3	Able to write and debug ladder diagrams for PLC applications
C424C.4	Student can establish communication through interfacing with PLC
C424C.5	Student can explain PID controllers with necessary mathematical background and can also describe its tuning control
C424C.6	Student can describe the operation principle and characteristics of various sensors and actuating systems for electromechanical applications
C424C.7	Student can design signal conditioning circuits for interfacing various sensors and actuating systems

- **C425: Project II**

At the end of this course,

C425.1	Student can apply design concepts for detail design of project
C425.2	Student can validate the results and can also analyze them
C425.3	Student demonstrates leadership and team working behavioral skills
C425.4	Student can write project report
C425.5	Student demonstrates presentation skills
C425.6	Student can use programming / simulation software and presentation, word processing software at various stages of project