



Program Outcomes

- 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, research literature, and analyse 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 modelling 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.

Course Outcomes

2015 Pattern

F.E E&TC

101: Course Name: C107001-**Engineering Mathematics-I**

On the completion of the course, student will be able to

C101.1	Apply the knowledge of matrices in various engineering problems.
C101.2	Solve algebraic, transcendental equations and hyperbolic functions using complex numbers.
C101.3	Analyze infinite series and explain nth derivative of functions.
C101.4	Make Use of Taylor's &Maclaurian's series to expand infinitely differentiable functions and Solve examples of indeterminate forms.
C101.5	Explain and Apply Partial and Total derivatives in various engineering problems

102: Course Name: C107002 - **Engineering Physics**

On the completion of the course, student will be able to

C102.1	Define concepts in Engineering Physics.
C102.2	Explain concepts and applications of Optics, Acoustics, Solid State Physics, LASER, Quantum Mechanics, Superconductors and NanoParticles
C102.3	Derive formulae in Engineering Physics.
C102.4	Apply appropriate formulae to solve numericals in Engineering Physics.

103: Course Name: C102006 - **Engineering Graphics-I**

On the completion of the course, student will be able to

C103.1	Formulate solution to simple problems on projection of lines, planes, solids.
C103.2	Construct engineering curves such as ellipse, parabola, hyperbola, cycloid, involute, etc.
C103.3	Develop surfaces of solids.
C103.4	Create orthographic views from an isometric view.
C103.5	Create isometric view from orthographic views.



104: Course Name: C103004 - **Basic Electrical Engineering**

On the completion of the course, student will be able to

C104.1	Define the fundamentals of resistance, work, power, energy and can convert energy in different forms.
C104.2	Make use of basic rules of electromagnetism to relate multidisciplinary machines.
C104.3	Apply concept of faradays law for demonstration of transformer working.
C104.4	Describe single phase AC circuit fundamentals.
C104.5	Solve polyphase circuits analytically and measure these result experimentally.
C104.6	Illustrate basic concept of dc circuits and network theorems.

105: Course Name: C101005 - **Basic Civil Environmental Engineering**

On the completion of the course, student will be able to

C105.1	Identify basic areas of civil engineering and role of civil engineer in the completion of infrastructure projects.
C105.2	Identify and Compare different construction material, automation in construction industry.
C105.3	Illustrate the basic principles and advancement in Survey.
C105.4	Describe the concept of ecology and environment, its preservation by waste management techniques
C105.5	Identify and classify the concept of eco-friendly materials, principles and bye-laws for integrated built environment.
C105.6	Identify and describe the sources of energy, environmental pollution to find an alternative solution.

106: Course Name: C110003 - **Fundamentals Programming Languages-I**

On the completion of the course, student will be able to

C106.1	Explain the working of different components of computer system.
C106.2	Apply knowledge of C programming to solve different problems.
C106.3	Make Use of control structure & pointers for solving the problem.
C106.4	Develop program with array, function and string.

107:Course Name: C111007 - **Workshop Practices**

On the completion of the course, student will be able to

C107.1	Practice on manufacturing of components using workshop trades including fitting, carpentry, and welding
C107.2	Identify and apply suitable tools for machining processes including turning, facing, thread cutting and tapping



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C107.3	Describe manufacturing processes like forging, molding, Plumbing and machine tool operations including turning, facing, thread cutting, grinding etc.
C107.4	Comprehend the safety measures required to be taken while using the tools / Machines.

108: Course Name: C107008 - **Engineering Mathematics-II**

On the completion of the course, student will be able to

C108.1	Solve first order first degree differential equations for real world problem.
C108.2	Explain Fourier representation and solve definite integrals using advanced techniques.
C108.3	Analyze curve points and trace curve to find its arc length
C108.4	Apply solid geometry to find equations of sphere, cone and cylinder.
C108.5	Solve multiple integrals and to find different parameters.

109: Course Name: C107009 - **Engineering Chemistry**

On the completion of the course, student will be able to

C109.1	Describe technology involved in improving quality of water.
C109.2	Explain basic concept of electro analytical techniques that facilitate rapid and reliable measurements.
C109.3	Describe chemical structure, properties and applications of modern engineering materials
C109.4	Explain fossil fuel and derived fuels with its properties and applications
C109.5	Illustrate chemical and electrochemical corrosion and its prevention

110: Course Name: C102013 - **Basic Mechanical Engineering**

On the completion of the course, student will be able to

C110.1	Categorize various mechanical elements and power transmission devices.
C110.2	Describe design process, types of materials with their applications, types of mechanisms.
C110.3	Describe different manufacturing process with their applications.
C110.4	Illustrate working principle and operations of machining tools.
C110.5	Evaluate performance parameters of heat pump, heat engine and refrigerator.
C110.6	Categorize basic elements of power plant engineering.

111: Course Name: C101011 - **Engineering Mechanics**

On the completion of the course, student will be able to

C111.1	Explain the characteristics of force, force systems and its application.
C111.2	Explain kinetics and kinematics.



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C111.3	Explain and Describe work-energy and impulse momentum principle.
C111.4	Examine the equilibrium of structural members and concept of space force system.
C111.5	Calculate forces in different structural members, apply the laws of friction.

112: Course Name: C104012 - **Basic Electronics Engineering**

On the completion of the course, student will be able to

C112.1	Identify & Describe basic components used in Analog, digital & power electronics circuits.
C112.2	Explain the working and calculate basic parameters of electronic circuits and communication system.
C112.3	Explain basic principle of transducers and their applications.
C112.4	Implement basic electronic circuits.
C112.5	Improve written and oral skills related to Basic Electronics Engineering and engage in life-long learning.

113: Course Name: C110010 - **Fundamentals Programming Languages-II**

On the completion of the course, student will be able to

C113.1	Make Use of various user defined data types in C Language.
C113.2	Explain concepts of object oriented programming to solve problems.
C113.3	Develop web pages using HTML.
C113.4	Utilize Android & Embedded C Programming concepts to develop an application.

114: Course Name: C102014 - **Engineering Graphics-II**

On the completion of the course, student will be able to

C114.1	Formulate solution to simple problems on projection of solids through AUTOCAD
C114.2	Construct engineering curves using AUTOCAD
C114.3	Generate surfaces of solid using AUTOCAD
C114.4	Create orthographic views from an isometric view using AUTOCAD
C114.5	Create isometric view from orthographic views using AUTOCAD

S.E E&TC

201: Course Name: C204181-**Signals & Systems**

On the completion of the course, student will be able to

C201.1	Describe and analyze the properties of Continuous Time (CT) and Discrete Time (DT) signals and systems.
C201.2	Develop input output relationship for linear shift invariant system using convolution.



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C201.3	Describe and analyze signals in the Time & Transform domain.
C201.4	Perform Statistical analysis of signals using probability theory
C201.5	Improve written, oral, and presentation skills related to Signals and Systems and engage in life-long learning.

202: Course Name: C204182-Electronics Devices and Circuits

On the completion of the course, student will be able to

C202.1	Explain fundamental concepts of JFET and MOSFET.
C202.2	Design, Build and Test MOSFET circuits in ac and dc analysis and Describe various applications of MOFET.
C202.3	Evaluate the performance of FETs in feedback amplifiers and oscillators.
C202.4	Explain and Design adjustable voltage regulators.
C202.5	Improve written, oral, & presentation skills related to Electronics Devices and Circuits and engage in lifelong learning.

203: Course Name: C204183-Electrical Circuits and Machines

On the completion of the course, student will be able to

C203.1	Analyse basic AC & DC circuit for voltage, current and power by using KVL, KCL, and network theorems.
C203.2	Design transformer by analysing its various parameters.
C203.3	Explain operation and calculate parameters like speed, torque, losses etc. of different types of DC and 3 phase AC Motors.
C203.4	Select appropriate electrical motor for given application.
C203.5	Improve written, oral, and presentation communication skills related to the subject of Electrical Circuits and Machines and engage in a life-long learning.

204: Course Name: C204184-Data Structures and Algorithms

On the completion of the course, student will be able to

C204.1	Discuss the computational efficiency of the principle algorithms such as sorting & searching
C204.2	Implement basic programs using array and pointers
C204.3	Describe how arrays, records, linked structure are represented in memory and used them in algorithm
C204.4	Implement and Compare stack & queue for applications.
C204.5	Explain various terminologies and traversals of trees and use them for applications
C204.6	Explain various terminologies, traversals of graphs and use them for various applications, improve in oral and presentation skills and engage in lifelong learning.



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205: Course Name: C204185-**Digital Electronics**

On the completion of the course, student will be able to

C205.1	Demonstrate the basic logic gates and various variable reduction techniques of digital logic circuit
C205.2	Design various sequential circuits and counters
C205.3	Design synchronous sequential models and state Machines
C205.4	Describe PLDSand Implement hardware circuit to test performance and application
C205.5	Explain the architecture and use of microcontrollers for basic operations and Simulate and verify using simulation software
C205.6	Improve written, oral, and presentation skills related to Digital Electronics and engage in life-long learning.

206: Course Name: C204186-**Electronics Measuring Instruments and Tools**

On the completion of the course, student will be able to

C206.1	Explain various parameter of measuring instrument.
C206.2	Describe specifications, features and capabilities of electronic instruments.
C206.3	Carry out required measurement using various instruments under different setups.
C206.4	Compare performance parameters and select an appropriate instrument for given measurement.
C206.5	Improve written, oral and presentation skills related to Electronics measuring Instruments and Tools and engage in life-long learning

207A, 214A, 307A and 314A: Course Name: C204192-

Audit Course – I: Japanese Language Module-I

On the completion of the course, student will be able to

C207A.1	Have ability of basic communication.
C207A.2	Have the knowledge of Japanese script.
C207A.3	Get introduced to reading, writing and listening skills.
C207A.4	Develop interest to pursue professional Japanese Language course

207B: Course Name: C204192-Audit Course – I: **Road Safety Management**

On the completion of the course, student will be able to

C207B.1	Explain importance of the road safety.
C207B.2	Introduce road safety management techniques.
C207B.3	Analyze preventive measures to avoid accidents.
C207B.4	Create awareness among the public reduce financial penalties through remedial education.



208: Course Name: C207005-**Engineering Mathematics – III**

On the completion of the course, student will be able to

C208.1	Solve higher order linear Differential equations and model L-C-R electrical circuits
C208.2	Explain and Apply Fourier and Z-transform to various engineering problems.
C208.3	Make Use of different Numerical techniques for Differentiation, Integration and solution of Differential equations.
C208.4	Apply vector differential operators to analyze various vector fields.
C208.5	Apply Vector integration to solve problems in Electromagnetic fields.
C208.6	Analyze conformal mappings, transformations and perform contour integration of complex functions.

209: Course Name: C204187-**Integrated Circuits**

On the completion of the course, student will be able to

C209.1	Explain internal structure and characteristics of Op-Amp
C209.2	Determine various performance parameters of op-amp and Explain their significance.
C209.3	Analyze and Implement linear and nonlinear applications of Op-Amp.
C209.4	Design converters, Oscillators and filters using Op-amp.
C209.5	Explain and Apply functionalities of PLL.
C209.6	Improve written, oral, and presentation skills related to Integrated Circuits and engage in life-long learning.

210: Course Name: C204188 - **Control Systems**

On the completion of the course, student will be able to

C210.1	Determine and use models of physical systems in forms suitable for use in the analysis and design of control systems.
C210.2	Explain the relationship between control system parameters and transient behavior
C210.3	Determine the frequency response to evaluate the system stability using graphical and analytical methods
C210.4	Explain analog and digital controllers. Model and analyze the control systems using state space analysis
C210.5	Improve written, oral and presentation skills related to Control Systems and engage in life-long learning.

211: Course Name: C204189 – **Analog Communication**

On the completion of the course, student will be able to

C211.1	Describe, analyse and compare fundamental concepts, various components and modulation schemes of analog Communication systems
C211.2	Describe demodulation techniques and the performance of analog communication receivers
C211.3	Explain and compare different types of noise and performance of



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	communication systems under the presence of noise
C211.4	Develop the ability to compare and contrast the strengths and weaknesses of analog communication systems to describe various pulse and digital modulation techniques
C211.5	Improve written, oral, and presentation skills related to Analog communication and engage in life-long learning
C211.6	Develop project related to fundamental concepts in Analog Communication

212: Course Name: C204190 – Object Oriented Programming

On the completion of the course, student will be able to

C212.1	Describe the principles of object oriented programming and Apply the concepts of data encapsulation, inheritance using C++ and Java.
C212.2	Demonstrate basic program constructs in Java.
C212.3	Use packages, interfaces, multithreading and exception handling to write programs in Java.
C212.4	Describe and use the concepts of Java Applet in Java to develop user friendly program.
C212.5	Improve written, oral, and presentation skills related to OOP and engage in life-long learning.

213: Course Name: C204191 – Employability Skill Development

On the completion of the course, student will be able to

C213.1	Possess skills and preparedness for aptitude tests.
C213.2	Possess essential communication skills (writing, verbal and non-verbal)
C213.3	Master the presentation skill.
C213.4	Develop professional etiquettes and face interviews.
C213.5	Expose the students to leadership and team-building skills.

214B: Course Name: C204193 – Audit Course – II: Cyber Crime & Law

On the completion of the course, student will be able to

C214B.1	Define cybercrime & cyber laws
C214B.2	classify different types of cyber crime
C214B.3	Recognize investigation technique of cybercrime.



T.E E&TC

301: Course Name: C304181 – **Digital Communication**

On the completion of the course, student will be able to

C301.1	Describe the fundamentals of Digital Communication System and prepare mathematical background for communication signal analysis.
C301.2	Explain Time & frequency domain analysis of Digital Communication System
C301.3	Calculate the error performance of a base band & pass band digital communication system in presence of noise & other interferences
C301.4	Discuss the concept of Spread Spectrum Communication System.
C301.5	Improve written, oral & presentation skills related to Digital Communication & engage in lifelong learning.

302: Course Name: C304182 – **Digital Signal Processing**

On the completion of the course, student will be able to

C302.1	Explain fundamentals of Digital signal processing, sampling and aliasing effect, mapping of analog frequencies to digital frequencies.
C302.2	Use different transforms for the analysis of discrete time signals and systems.
C302.3	Compare, Design and Realize digital filters.
C302.4	Describe various real world applications of DSP.
C302.5	Improve written, oral, and presentation skills related to Digital Signal Processing and engage in life-long learning

303: Course Name: C304183 – **Electromagnetics**

On the completion of the course, student will be able to

C303.1	Inform the fundamentals of static and time varying electromagnetic fields, identify the electromagnetic problems and distinguish the different fields.
C303.2	Solve the electromagnetic problems with the use of Maxwell's equations.
C303.3	Apply the knowledge of electromagnetics to derive uniform plane wave Equation.
C303.4	Analyze the transmission line problem, use the Smith chart to calculate Impedances.
C303.5	Improve written, oral, and presentation skills related to the field of Electromagnetics and engage in life-long learning.

304: Course Name: C304184 – **Microcontrollers**

On the completion of the course, student will be able to

C304.1	Explain the architecture and features of Microcontroller 8051
C304.2	Develop interfacing to real world devices using Microcontroller 8051
C304.3	Explain the architecture and features of Microcontroller PIC 18F
C304.4	Develop interfacing to real world devices using Microcontroller PIC 18F
C304.5	Describe the importance of microcontroller in designing embedded application
C304.6	Improve written, oral, and presentation skills related to Microcontrollers and engage in life-long learning.



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305: Course Name: C304185 – **Mechatronics**

On the completion of the course, student will be able to

C305.1	Identify of key elements of Mechatronics system
C305.2	Explain the basic principle of Sensors and Transducers.
C305.3	Select appropriate actuator for Mechatronics application
C305.4	Integrate multidisciplinary knowledge (mechanical, electronics, control and computer engineering) to design Mechatronics system.
C305.5	Improve written, oral, and presentation skills related to Mechatronics and engage in life-long learning.

306: Course Name: C304193 – **Electronics System Design**

On the completion of the course, student will be able to

C306.1	Explain and interpret the specifications
C306.2	Analyze different modules and select optimal design topologies
C306.3	Interpret datasheets and thus select appropriate components and devices to build the circuit schematic.
C306.4	Use an EDA tool for circuit schematic and validate its performance by simulating the same
C306.5	Improve written, oral, and presentation skills related to Electronics System Design.
C306.6	Extend overall responsibility with respect to creating and simulating with new ideas in the field of Electronics System Design and engage in life-long learning

307B: Course Name: C304197 – Audit Course – III: **Cyber and Information Security**

On the completion of the course, student will be able to

C307B.1	Describe basics of cyber laws and various intelligent property issues
C307B.2	Identify fundamentals of information security
C307B.3	Distinguish various security policies and its management

308: Course Name: C304186 – **Power Electronics**

On the completion of the course, student will be able to

C308.1	Describe different power devices, their construction, characteristics and triggering circuits
C308.2	Describe working of AC voltage controllers, resonant converters & analyze controlled rectifiers, inverters, DC choppers, for different loads.
C308.3	Describe the different motor drives & various power electronics applications like UPS, SMPS, etc.
C308.4	Describe working of different protection circuits & EMI minimizing techniques.
C308.5	Improve written, oral & presentation skills related to Power Electronics & engage in lifelong learning.



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**309: Course Name: C304187– Information Theory, Coding Techniques &
Communication Networks**

On the completion of the course, student will be able to

C309.1	Perform information theoretic analysis of communication system and design source coding technique.
C309.2	Explain fundamentals of channel coding.
C309.3	Design channel coding technique and evaluate its error performance.
C309.4	Describe basic concepts of data communication and networking.
C309.5	Improve written, oral & presentation skills related to Information Theory, Coding Techniques and Communication Networks & engage in lifelong learning.

310: Course Name: C304188 – Business Management

On the completion of the course, student will be able to

C310.1	Describe Basics of Management with different management functions
C310.2	Identify different phases of quality and study various tools for quality analysis
C310.3	Explain Structure of finance market and analyse cost-benefit situations
C310.4	Explain Human Resource Management as one of the major tools in industry
C310.5	Elaborate project management with Project Network and Justify the Importance and need of Entrepreneurship
C310.6	Explain Advance marketing techniques with Marketing Management

311: Course Name: C304189 – Advanced Processors

On the completion of the course, student will be able to

C311.1	Explain the ARM processor, its architectures and features.
C311.2	Explain the advance peripherals available on ARM7 base microcontroller.
C311.3	Interface the advance peripherals to LPC2148 of ARM7.
C311.4	Explain the DSP processor, its architecture & features.
C311.5	Improve oral, written and presentation skills related to the Advanced Processor and engage in lifelong learning.

312: Course Name: C304190 – System Programming and Operating System

On the completion of the course, student will be able to

C312.1	Explain the fundamental knowledge of language processing activities and designing of Assembler.
C312.2	Develop comprehensive skills to design Macro Processor, Compiler, Interpreter, Linker, and Loader.
C312.3	Compare and analyze the different implementation approaches of Operating System abstractions.
C312.4	Interpret various OS functions used in Linux (Ubuntu) and Windows for memory management, Input/output and file system.
C312.5	Improve written, oral and presentation skills related to System Programming and Operating System and engage in life-long learning.



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313: Course Name: C304196 – **Employability Skills and Mini Project**

On the completion of the course, student will be able to

C313.1	Plan and execute a Mini Project with team.
C313.2	Implement electronic hardware by learning PCB artwork design, soldering techniques, trouble shooting and necessary software tools etc.
C313.3	Improve written, oral, and presentation skills related to Employability Skills and Mini Project and engage in life-long learning
C313.4	Extend the overall responsibility with respect to creating, simulating and experimenting with new ideas in the field of Employability Skills and Mini Project

314B: Course Name: –Audit Course-IV: Embedded System Design using MSP430

On the completion of the course, student will be able to

C314B.1	Explain Embedded C programming techniques for 16-bit platform
C314B.2	Use Embedded protocols and its interfacing techniques
C314B.3	Describe Embedded Wireless networking concepts and its implementation
C314B.4	Improve oral & presentation communication skills in microcontroller MSP430 and engage in life-long learning

B.E E&TC

401: Course Name: C404181 – **VLSI Design and Technology**

On the completion of the course, student will be able to

C401.1	Construct the fundamental blocks of a VLSI circuits, simulate, synthesis and prototype in PLDs.
C401.2	Analyze sequential circuits and the influence of wires/interconnects on VLSI circuit performance.
C401.3	Design of digital CMOS circuits for specified applications.
C401.4	Overview ASIC issues, evaluate chip level issues and need of testability.
C401.5	Improve written, oral, and presentation skills related to VLSI design and Technology and engage in life-long learning.

402: Course Name: C404182 – **Computer Networks and Security**

On the completion of the course, student will be able to

C402.1	Describe and compare OSI and TCP/IP model.
C402.2	Explain duties of various layers and analyze different protocols involved in computer networking.
C402.3	Analyze the requirements for a given organizational structure and select the appropriate networking architecture.
C402.4	Identify the importance of cryptography and network security.



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C402.5	Improve written, oral, and presentation skills related to Computer Networks and engage in life-long learning.
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403: Course Name: C404183 – **Radiation & Microwave Techniques**

On the completion of the course, student will be able to

C403.1	Define and Calculate various performance parameters of radiating elements and arrays.
C403.2	Describe the Mechanism of energy propagation in a waveguide.
C403.3	Analyze the working of passive microwave components.
C403.4	Describe & Compare the principles of working of Microwave tubes and Devices for generating microwaves.
C403.5	Select & Demonstrate techniques used in a typical Microwave measurement system.
C403.6	Improve written, oral, and presentation skills related to Radiation and Microwave Techniques and engage in life-long learning.

404A: Course Name: C404184 – Elective – I - **Digital Image and Video Processing**

On the completion of the course, student will be able to

C404A.1	Describe the fundamentals of DIP from human visual perception to image formation model.
C404A.2	Demonstrate fundamental concepts of low level image processing
C404A.3	Identify and Design image processing techniques for object segmentation and recognition
C404A.4	Describe video signal representation and different algorithm for video processing.
C404A.5	Improve written, oral, and presentation skills related to DIVP and engage in life-long learning.

404B: Course Name: C404184 – Elective – I – **Internet of Things**

On the completion of the course, student will be able to

C404B.1	Explain the various concepts, terminologies and architecture of IoT systems.
C404B.2	Design and Implementation using various sensors and actuators for applications of IoT system.
C404B.3	Describe various protocols for design of IoT systems.
C404B.4	Use various techniques of data storage and analytics in IoT
C404B.5	Improve written, oral, and presentation skills related to IoT and engage in life-long learning.



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405A: Course Name: C404185 – Elective – II - **Electronic Product Design**

On the completion of the course, student will be able to

C405A.1	Describe the product design from designer and user point of view
C405A.2	Explain the stages involved in hardware and software designing for system development
C405A.3	Describe different testing methods and debugging processes for system.
C405A.4	Explain importance and processes of documentation
C405A.5	Improve written, oral, and presentation skills related to Electronic product design and engage in life-long learning.

405B: Course Name: C404185 – Elective – II - **Artificial Intelligence**

On the completion of the course, student will be able to

C405B.1	Explain Intelligent agents; choose and apply a search strategy to solve problems.
C405B.2	Analyze and solve problems related to certain and uncertain knowledge.
C405B.3	Explain various types of learning and pattern recognition techniques.
C405B.4	Describe the significance of natural language processing.
C405B.5	Improve written, oral, and presentation skills related to Artificial Intelligence and engage in life-long learning.

406: Course Name: C404188 – **Project Stage-I**

C406.1	Undertake an innovative application based Project idea in a diversified field.
C406.2	Conduct Survey and comparative study related to project idea.
C406.3	Estimate budget, design Hardware & Software and prepare project plan.
C406.4	Analyze and simulate project work.
C406.5	Develop projects with emerging technologies by adapting different circumstances considering ethical and social responsibilities.
C406.6	Improve written, oral, and presentation skills related to Project stage I and engage in life-long learning.

407: Course Name: (404196B) – Audit-V - **Human Behavior**

On the completion of the course, student will be able to

C407.1	imbibe importance of Human relationships, harmony in family & Society
C407.2	Inculcate time management and leadership skills among team.



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408: Course Name: C404189 – **Mobile Communication**

On the completion of the course, student will be able to

C408.1	Explain and Apply the concepts of switching technique and traffic engineering.
C408.2	Analyze radio channel, system capacity and propagation mechanisms.
C408.3	Explain the architecture of GSM and its services.
C408.4	Describe and compare the 4G and 5G mobile technologies.
C408.5	Improve written, oral, and presentation skills related to Mobile communication and engage in life-long learning.

409: Course Name: C404190 – **Broadband Communication Systems**

On the completion of the course, student will be able to

C409.1	Analyze the principle of Modal propagation of light through an Optical Fibre and Explain working principles of the key components of a typical Fibre Optic Communication system.
C409.2	Estimate Power and Rise Time Budgets for a typical fibre optic link.
C409.3	Explain the basic working principle of WDM and its components and Optical Amplifiers.
C409.4	Describe Key components, various satellite subsystems and Orbital effects in Satellite Communication Systems.
C409.5	Estimate satellite link budget for up-link, down-link, and overall link and Analyze orbital mechanics, calculation of antenna look angles, C/N and G/T computations.
C409.6	Improve written, oral, and presentation communication skills related to Broadband Communication Systems and engage in a life-long learning.

410A: Course Name: C404191 – Elective – III **Audio Video Engineering**

On the completion of the course, student will be able to

C410A.1	Analyze Composite video signal, TV pictures, TV transmitters and Receivers, Identify various faults in TV systems using various Fault finding meters
C410A.2	Study various color TV systems with greater emphasis on TV standards
C410A.3	Explain working principles and standards of DTV, HDTV, advanced TV systems along with different video, audio compression techniques and advanced display devices
C410A.4	Describe audio recording techniques like CD/ DVD recording, audio standards and acoustic principles
C410A.5	Improve written, oral, and presentation skills related to Audio Video Engineering and engage in life-long learning.



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410B: Course Name: C404191 – Elective – III–Machine Learning

On the completion of the course, student will be able to

C410B.1	Describe the fundamentals concepts of Machine Learning.
C410B.2	Explain supervised learning algorithms.
C410B.3	Describe unsupervised learning algorithms.
C410B.4	Design and analyse various neural network.
C410B.5	Improve written, oral, and presentation skills related to Machine Learning and engage in life-long learning.

410C: Course Name: C404191 – Elective – III - **PLC &Automation**

On the completion of the course, student will be able to

C410C.1	Explain fundamentals of process control & Automation
C410C.2	Design signal conditioning circuit and Explain various types of Transmitter.
C410C.3	Design automation system using PLC Ladder program and Select finalcontrol elements for real time system
C410C.4	Explain Architecture of SCADA, DCS, PLC, HMI, CNC Machine.
C410C.5	Improve written, oral, & presentation communication skills in PLC &Automation and engage in learning beyond the syllabus.

411A: Course Name: C404192 – Elective – IV - **Wireless Sensor Networks**

On the completion of the course, student will be able to

C411A.1	Explain the architecture and features of wireless networks.
C411A.2	Compare various protocols and services provided by wireless technologies
C411A.3	Describe the transmission of voice and data though various networks.
C411A.4	Explain the latest wireless technologies and trends in communication field.
C411A.5	Improve written, oral, and presentation skills related to Wireless Sensor Networks and engage in life-long learning.

411B: Course Name: C404192 – Elective – IV –**Robotics**

On the completion of the course, student will be able to

C411B.1	Explain the history, concept, development and key components of robotics technologies.
C411B.2	Compare and analyze working of different Drivers, Sensors, End Effectors and Actuators used in Robotics.
C411B.3	Describe basic of Kinematics and Dynamics required in Robotics with examples.
C411B.4	Apply different programming methods for development and building a robot.
C411B.5	Improve written, oral, and presentation skills related to Robotics and engage in life-long learning.



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411C: Course Name: C404192 – Elective – IV – **Renewable Energy Systems**

On the completion of the course, student will be able to

C411C.1	Explain various energy reserves of India and potential of different energy sources.
C411C.2	Calculate the solar radiation parameters and performance of different solar collectors and explain working of solar photovoltaic cell.
C411C.3	Calculate different parameters of wind turbine rotor.
C411C.4	Describe the importance and applications of geothermal and ocean energy and power generation using fuel cells
C411C.5	Improve written, oral, and presentation skills related to Renewable Energy Systems and engage in life-long learning.

412: Course Name: C404195 – **Project Stage -II**

C412.1	Undertake an innovative application based Project idea in a diversified field.
C412.2	Survey, Analyze, Estimate Budget and prepare project plan.
C412.3	Design and implement project work.
C412.4	Troubleshoot and debug the project.
C412.5	Develop projects with emerging technologies, adapt to new situations in various fields by considering ethical and social responsibilities
C412.6	Improve written, oral, and presentation skills related to Project Stage II and engage in life-long learning.

413: Course Name: Audit-VI - **Environmental Issues and Disaster Management**

C413.1	Describe effects of different environmental issues like Pollution.
C413.2	Analyze problems associated with natural disaster and describe the ways to handle the disasters.