| 1.1 List of courses offered across all programs during last five years | | | | |
|---|---|---|---|---|
| **Program code** | **Program Name** | **Course code** | **Course Name** | **Course Outcome** |
| 055 | B.Tech(AEIE) | BS-PH101 | Physics-I (Gr-A) | **Course Outcomes** |
| | | | | 1. Basic concepts of mechanics |
| | | | | 2. Bragg's Law and introduction to the principles of lasers, types of lasers and applications. |
| | | | | 3. Various terms related to properties of materials such as, permeability, polarization,etc. |
| | | | | 4. Some of the basic laws related to quantum mechanics as well as magnetic and dielectric properties of materials. |
| | | | | 5. Simple quantum mechanics calculations. |
| 055 | B.Tech(AEIE) | BS-CH101 | Chemistry-1 | **Course Outcomes** |
| | | | | 1. Rationalise periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity. |
| | | | | 2. Analyse microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces. |
| | | | | 3. Rationalise bulk properties and processes using thermodynamic considerations. |
| | | | | 4.Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques. |
| | | | | 5. Evaluate structure, colour and magnetic properties of coordination complexes. |
| | | | | 6. List major chemical reactions that are used in the synthesis of molecules and explain isomerism considering the stereochemical aspect. |
| 055 | B.Tech(AEIE) | BS-M102 | Mathematics –IB | **Course Outcomes:** |

| 1.1 List of courses offered across all programs during last five years | | | | |
|---|---|---|---|---|
| **Program code** | **Program Name** | **Course code** | **Course Name** | **Course Outcome** |
| | | | | Apply the concept and techniques of differential and integral calculus to determine curvature and evaluation of different types of improper integrals. |
| | | | | Understand the domain of applications of mean value theorems to engineering problems. |
| | | | | Learn the tools of power series and Fourier series to analyze engineering problems and apply the concept of convergence of infinite series in many approximation techniques in engineering disciplines. |
| | | | | Apply the knowledge for addressing the real life problems which comprises of several variables or attributes and identify extremum points of different surfaces of higher dimensions. |
| | | | | Understand different types of matrices, their eigen values, eigen vectors, rank and also their orthogonal transformations which are essential for understanding physical and engineering problems. |
| 055 | B.Tech(AEIE) | ES-EE101 | Basic Electrical Engineering | **Course Outcomes** |
| | | | | To understand and analyze basic electric and magnetic circuits |
| | | | | To study the working principles of electrical machines and power converters. |
| | | | | To introduce the components of low voltage electrical installations |
| 055 | B.Tech(AEIE) | ES-ME191 | Engineering Graphics & Design(Gr-A) | **Course Outcomes** |
| | | | | Introduction to engineering design and its place in society |

| 1.1 List of courses offered across all programs during last five years | | | | |
|---|---|---|---|---|
| **Program code** | **Program Name** | **Course code** | **Course Name** | **Course Outcome** |
| | | | | Exposure to the visual aspects of engineering design |
| | | | | Exposure to engineering graphics standards |
| | | | | Exposure to solid modelling |
| 055 | B.Tech(AEIE) | ES-ME192 | Workshop/Manufacturing Practices(Gr-B) | **Laboratory Outcomes** |
| | | | | Upon completion of this laboratory course, students will be able to fabricate components with their own hands. |
| | | | | They will also get practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes. |
| | | | | By assembling different components, they will be able to produce small devices of their interest. |
| 055 | B.Tech(AEIE) | BS-PH201 | Physics - 1(Gr-B) | **Course Outcomes** |
| | | | | 1. Basic concepts of mechanics |
| | | | | 2. Bragg's Law and introduction to the principles of lasers, types of lasers and applications. |
| | | | | 3. Various terms related to properties of materials such as, permeability, polarization,etc. |
| | | | | 4. Some of the basic laws related to quantum mechanics as well as magnetic and dielectric properties of materials. |
| | | | | 5. Simple quantum mechanics calculations. |
| 055 | B.Tech(AEIE) | BS-M202 | Mathematics-II | **Course Outcomes:** |
| | | | | Learn the methods for evaluating multiple integrals and their applications to different physical problems. |

| 1.1 List of courses offered across all programs during last five years | | | | |
|---|---|---|---|---|
| **Program code** | **Program Name** | **Course code** | **Course Name** | **Course Outcome** |
| | | | | Understand different techniques to solve first and second order ordinary differential equations with its formulation to address the modelling of systems and problems of engineering sciences. |
| | | | | Learn different tools of differentiation and integration of functions of a complex variable that are used with various other techniques for solving engineering problems. |
| | | | | Apply different types of transformations between two 2- dimensional planes for analysis of physical or engineering problems. |
| 055 | B.Tech(AEIE) | ES-CS201 | Programming for problem solving | **Course Outcomes** |
| | | | | To formulate simple algorithms for arithmetic and logical problems. |
| | | | | To translate the algorithms to programs (in C language). |
| | | | | To test and execute the programs and correct syntax and logical errors. |
| | | | | To implement conditional branching, iteration and recursion. |
| | | | | To decompose a problem into functions and synthesize a complete program using divide and conquer approach. |
| | | | | To use arrays, pointers and structures to formulate algorithms and programs. |
| | | | | To apply programming to solve matrix addition and multiplication problems and searching and sorting problems. |

| 1.1 List of courses offered across all programs during last five years | | | | |
|---|---|---|---|---|
| **Program code** | **Program Name** | **Course code** | **Course Name** | **Course Outcome** |
| | | | | To apply programming to solve simple numerical method problems, namely rot finding of function, differentiation of function and simple integration. |
| 055 | B.Tech(AEIE) | BS-CH201 | Chemistry-1(Gr-A) | **Course Outcomes** |
| | | | | 1. Rationalise periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity. |
| | | | | 2. Analyse microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces. |
| | | | | 3. Rationalise bulk properties and processes using thermodynamic considerations. |
| | | | | 4.Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques. |
| | | | | 5. Evaluate structure, colour and magnetic properties of coordination complexes. |
| | | | | 6. List major chemical reactions that are used in the synthesis of molecules and explain isomerism considering the stereochemical aspect. |
| 055 | B.Tech(AEIE) | ES-CS291 | Programming for problem solving | **Laboratory Outcomes** |
| | | | | To formulate the algorithms for simple problem |
| | | | | To translate given algorithms to a working and correct program |
| | | | | To be able to correct syntax errors as reported by the compilers |
| | | | | To be able to identify and correct logical errors encountered at run time |

| 1.1 List of courses offered across all programs during last five years | | | | |
|---|---|---|---|---|
| **Program code** | **Program Name** | **Course code** | **Course Name** | **Course Outcome** |
| | | | | To be able to write iterative as well as recursive programs |
| | | | | To be able to represent data in arrays, strings and structures and manipulate them through a program |
| | | | | To be able to declare pointers of different types and use them in defining self-referential structures. |
| | | | | To be able to create, read and write to and from simple text files. |
| 055 | B.Tech(AEIE) | HM-HU 201 | English | **Course Outcomes** |
| | | | | The student will acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills. |
| 055 | B.Tech(AEIE) | HM-HU 291 | Language Laboratory | Course Outcomes |
| | | | | The student will acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills. |
| 055 | B.Tech(AEIE) | BS-CH291 | Chemistry-1 (Gr-A) Lab | Determine the strength of an acid using conductometric method. |
| | | | | Determine the strength of an acid using pH-metric methods. |
| | | | | Evaluate partition coefficient of a substance between two immiscible liquids and evaluate the amount of acetic acid absorbed by charcoal. |
| | | | | Measure some physical property like surface tension and viscosity of different solutions at room temperature |

| 1.1 List of courses offered across all programs during last five years | | | | |
|---|---|---|---|---|
| **Program code** | **Program Name** | **Course code** | **Course Name** | **Course Outcome** |
| | | | | Estimate the amount of an ion present in a given solution using argentometric methods and amount of dissolved oxygen (in mg/l) present in a given water sample using volumetric method. |
| | | | | Determine the cell constant and conductance of different solutions |
| 055 | B.Tech(AEIE) | ES-ME291 | Engineering Graphics & Design(Gr-A) | **Course Outcomes** |
| | | | | Introduction to engineering design and its place in society |
| | | | | Exposure to the visual aspects of engineering design |
| | | | | Exposure to engineering graphics standards |
| | | | | Exposure to solid modelling |
| 055 | B.Tech(AEIE) | ES-ME292 | Workshop/Manufacturing Practices(Gr-B) | Laboratory Outcomes |
| | | | | Upon completion of this laboratory course, students will be able to fabricate components with their own hands. |
| | | | | They will also get practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes. |
| | | | | By assembling different components, they will be able to produce small devices of their interest. |
| 055 | B.Tech(AEIE) | BS-M301 | Mathematics-III(Probability, Transformations and Numerical Methods) | **Course Outcomes:** |

| 1.1 List of courses offered across all programs during last five years | | | | |
|---|---|---|---|---|
| **Program code** | **Program Name** | **Course code** | **Course Name** | **Course Outcome** |
| | | | | Learn the concepts of the theory of Probability with the purpose of providing mathematical models of situations affected or even directed by chance effects. Solve the problems related to Probability distribution, both discrete and continuous. |
| | | | | Find the Laplace transform of a function by definition and by use of a table and the inverse Laplace transform of a function. |
| | | | | Describing the techniques of Fourier transform and using them to transform a problem into one that can be more easily solved. |
| | | | | Apply numerical methods to obtain approximate solutions of mathematical problems. |
| 055 | B.Tech(AEIE) | PC-EI301 | Network Analysis | **Course Outcomes:** |
| | | | | To apply the knowledge of various components in circuit analysis. |
| | | | | To solve and analyze the circuits using different network theorems. |
| | | | | To solve electrical circuits using graph theory. |
| | | | | To analyze the electrical circuits containing passive elements under resonance conditions. |
| | | | | To use mathematical tools to analyze electrical networks in time domain and frequency domain. |
| | | | | To find solutions of electrical circuits applying the knowledge of two port parameters. |
| 055 | B.Tech(AEIE) | PC-EI302 | Sensors & Transducers | **Course Outcomes:** |

| 1.1 List of courses offered across all programs during last five years | | | | |
|---|---|---|---|---|
| **Program code** | **Program Name** | **Course code** | **Course Name** | **Course Outcome** |
| | | | | Apply basic concepts to distinguish different sensors and transducers and also compare the methods of measurements |
| | | | | Identify suitable transducer by comparing different industrial standards and procedures for most complex measurement of several physical parameters |
| | | | | Estimate the performance of different transducers and interpret the data accurately |
| | | | | Develop the skill to identify and analyze the complex technical problems and also capable to give a socio-economic solution to that problem |
| | | | | Acquire the knowledge of independent thinking to design real life electronics and instrumentation measurement systems helpful for humanities |
| | | | | Build the fundamental concept of latest technological trends like smart sensors, bio-sensors, PLC and Internet of Things. |
| 055 | B.Tech(AEIE) | PC-EI303 | Analog Integrated Circuits | **Course Outcomes:** |
| | | | | Apply the knowledge more effectively during the study of analog integrated circuits. |
| | | | | Analyze and design simple circuits containing non-linear elements such as Transistors using the concepts of load lines, operating points and incremental analysis. |
| | | | | Understand the Mid – band analysis of RC coupled amplifier circuits using small - signal equivalent circuits to determine gain, input impedance and output impedance. |

| 1.1 List of courses offered across all programs during last five years | | | | |
|---|---|---|---|---|
| **Program code** | **Program Name** | **Course code** | **Course Name** | **Course Outcome** |
| | | | | Learn how operational amplifiers are modelled and analysed. |
| | | | | Design Op-Amp circuits to perform operations such as amplification, integration and differentiation on electronic signals |
| | | | | Learn how negative feedback is used to stabilize the gain of an Op-Amp-based amplifier and how positive feedback can be used to design an oscillator |
| | | | | Acquire experience in building and trouble-shooting simple analog electronic circuits. |
| | | | | Analyze where and how analog components are used. |
| 055 | B.Tech(AEIE) | PC-EI304 | Digital Electronic Circuits | **Course Outcomes:** |
| | | | | Apply different type of codes and number systems which are used in digital computing and communication systems. |
| | | | | Develop different types Logic circuit simplification using various mapping and mathematical methods. |
| | | | | Analyze, design and implement combinational including arithmetic logic circuits. |
| | | | | Analyze, design and implement sequential logic circuits. |
| | | | | Built the fundamental knowledge and analyze the operation of various A/D and D/A converters. |
| | | | | Identify various types of memory elements, PLDs , digital logic families and apply the knowledge in different types of digital circuits for real world application. |
| 055 | B.Tech(AEIE) | PC-EI391 | Circuits and Network Lab | **Course Outcomes:** |

| 1.1 List of courses offered across all programs during last five years | | | | |
|---|---|---|---|---|
| **Program code** | **Program Name** | **Course code** | **Course Name** | **Course Outcome** |
| | | | | To identify various circuit components for their appropriate use in the experiments. |
| | | | | To apply the concepts of circuit laws and theorems for analysis and verification of laboratory measurements. |
| | | | | To develop the software skill for analysis and design of circuit based simulations. |
| | | | | To acquire technical writing skill for effective representation of experimental works. |
| | | | | To effectively communicate among fellow group members for proper distribution and execution of laboratory assignments. |
| 055 | B.Tech(AEIE) | PC-EI392 | Sensors & Transducers Lab | **Course Outcomes:** |
| | | | | Identify standard experimental methods and apply the theoretical knowledge to evaluate performance characteristics of different transducers. |
| | | | | Determine experimental procedures for different types of sensors and transducers. |
| | | | | Evaluate probable reasons of irregularity between experimental data and theoretical values and also interpret the experimental data. |
| | | | | Apply appropriate techniques to connect different types of sensors and source and sink devices keeping in mind technical, economical, safety issues. |
| | | | | Analyse graphical presentations of experimental data and solve different complex technical problems. |
| | | | | Design sensor based mini instrumentation systems. |

| 1.1 List of courses offered across all programs during last five years | | | | |
|---|---|---|---|---|
| **Program code** | **Program Name** | **Course code** | **Course Name** | **Course Outcome** |
| 055 | B.Tech(AEIE) | PC-EI393 | Analog Circuit Design Lab | **Course Outcomes:** |
| | | | | Set up standard experimental methods and select proper instruments to evaluate performance characteristics of different electronic circuits. |
| | | | | Determine experimental procedures for different types of electronic circuits. |
| | | | | Evaluate possible reasons of inconsistency between experimental observations and theoretical values and interpret the experimental data. |
| | | | | Investigate different types of instruments connections keeping in mind technical, economical, safety issues. |
| | | | | Analyse graphical presentations of experimental data and solve different complex technical problems. |
| | | | | Design mini electronic based systems. |
| 055 | B.Tech(AEIE) | PC-EI394 | Digital Circuits Design Lab | **Course Outcomes:** |
| | | | | Identify the operation of various basic logic gates ICs to implement different digital circuits. |
| | | | | Implement logic circuits for various code conversion, magnitude comparator and parity bit generator. |
| | | | | Demonstrate the basic operation of different combinational circuits including arithmetic circuits. |
| | | | | Demonstrate the basic operation of different flip-flops as a basic element of sequential circuits. |

| 1.1 List of courses offered across all programs during last five years | | | | |
|---|---|---|---|---|
| **Program code** | **Program Name** | **Course code** | **Course Name** | **Course Outcome** |
| | | | | Evaluate the applications of flip-flops as binary registers and counters used in large digital integrated circuits. |
| | | | | Design mini digital electronic circuit based systems. |
| 055 | B.Tech(AEIE) | PC-EI401 | Electrical & Electronic Measurement | **Course Outcomes:** |
| | | | | Identify various types of errors which may occur during measurement and take necessary steps to minimize them. |
| | | | | Demonstrate the working of various instruments used for measurement of different parameters like voltage, current, power, energy, resistance, capacitance, inductance, frequency, phase etc. inindustry. |
| | | | | Select the appropriate analog and digital instruments for measurement of different electrical and electronic engineering parameters and select appropriate passive or active transducers for measurement of physical phenomenon. |
| | | | | Analyze and solve the varieties of problems and issues in the field of electrical and electronic measurements. |
| | | | | Calibrate and standardize various measuring instruments. |
| | | | | Believe about the improvement of existing technology in terms of accuracy, precision, resolution, cost, durability and user friendliness. |
| 055 | B.Tech(AEIE) | PC-EI402 | Industrial Instrumentation | **Course Outcomes:** |

| 1.1 List of courses offered across all programs during last five years | | | | |
|---|---|---|---|---|
| **Program code** | **Program Name** | **Course code** | **Course Name** | **Course Outcome** |
| | | | | Acquire the knowledge of use of temperature, pressure, flow and level sensors and transducers in the field of Instrumentation. |
| | | | | Explain the operation of transducers for temperature, pressure, fluid flow and level measurement. |
| | | | | Describe the specification of different process instruments and advantages and disadvantages. |
| | | | | Identify, formulate and solve engineering problems related to measurement of process parameters. |
| | | | | Select and design suitable instruments to meet the requirements of industrial applications. |
| | | | | Comprehend the methods of hazard identification and safety measures. |
| 055 | B.Tech(AEIE) | PC-EI403 | Microprocessor and Microcontroller | **Course Outcomes:** |
| | | | | To construct and analyze assemble language program in 8085 and 8086 microprocessor to solve various complex engineering problem. |
| | | | | To evaluate processing time of program and devise technique to reduce execution time to improve microprocessor performance. |
| | | | | To design interfacing circuits to the microprocessor to communicate with external devices,which can be associated with public safety, health, security and other societal andenvironmental concerns. |

| 1.1 List of courses offered across all programs during last five years | | | | |
|---|---|---|---|---|
| **Program code** | **Program Name** | **Course code** | **Course Name** | **Course Outcome** |
| | | | | To design memory devices using memory chips and utilize the knowledge in memory based devices used in academics and industry. |
| | | | | To study 8051 microcontroller for using it in real life applications. |
| | | | | To learn architecture and programming of programmable peripheral devices such as 8255, 8254 to use them in larger industrial and societal application. |
| 055 | B.Tech(AEIE) | ES-CS401 | Data Structure & Algorithms | **Course Outcomes:** |
| | | | | Acquaint with the different properties of algorithm and recognize various types of data structure along with the relevance of their application for solving real world problems. |
| | | | | Comprehend the concept of linked list along with its difference from array and its many applications for solving different problems. |
| | | | | Know the concept of ADT (like stack, queue) and recognize its significance for mapping various real life problems to the programming ground to get the solutions of the corresponding problems. |
| | | | | Create the concept of non-linear data structure like graph, tree and their appliance in various problems in societal issues. |
| | | | | Know different searching and sorting approaches and select proper data structure and algorithm by analyzing time complexity and space complexity for specific problems. |
| 055 | B.Tech(AEIE) | BS-BIO401 | Biology | **Course Outcomes:** |

| 1.1 List of courses offered across all programs during last five years | | | | |
|---|---|---|---|---|
| **Program code** | **Program Name** | **Course code** | **Course Name** | **Course Outcome** |
| | | | | Describe how biological observations of 18th Century that lead to major discoveries. |
| | | | | Convey that classification per se is not what biology is all about but highlight the underlying criteria, such as morphological, biochemical and ecological. |
| | | | | Highlight the concepts of recessiveness and dominance during the passage of genetic material from parent to offspring. |
| | | | | Convey that all forms of life have the same building blocks and yet the manifestations are as diverse as one can imagine. |
| | | | | Classify enzymes and distinguish between different mechanisms of enzyme action. |
| | | | | Identify DNA as a genetic material in the molecular basis of information transfer. |
| | | | | Analyse biological processes at the reductionistic level. |
| | | | | Apply thermodynamic principles to biological systems. |
| | | | | Identify and classify microorganisms. |
| 055 | B.Tech(AEIE) | HM-HU401 | Values & Ethics in Profession | **Course Outcomes:** |
| | | | | An understanding of professional, ethical, legal, security and social issues and responsibilities g) An ability to communicate effectively with a range of audiences. |
| | | | | An ability to address contemporary issues and analyze the local and global impact of computing and engineering solutions on individuals, organizations and society |

| 1.1 List of courses offered across all programs during last five years | | | | |
|---|---|---|---|---|
| **Program code** | **Program Name** | **Course code** | **Course Name** | **Course Outcome** |
| | | | | Recognition of the need for and an ability to engage in continuing professional learning(lifelong learning) |
| 055 | B.Tech(AEIE) | PC-EI491 | Electrical & Electronics Measurement Lab | **Course Outcomes:** |
| | | | | Identify different analogue & digital instruments both AC and DC, source and sink devices,their specifications, constructions using basic knowledge of electrical measurement. |
| | | | | Perform the experiments, interpret measured data and compare the measured value with the true value of a quantity, calculate error in measurement, draw calibration & error curve usingappropriate techniques. |
| | | | | Develop the concept of calibration and understand the limitations of the different measuring instruments. |
| | | | | Review and analyse different methods of measurement of frequency, self-inductance,Capacitance and resistance using AC and DC bridges and provide valid concluding remarks. |
| | | | | Learn the necessity of safety measures of using different instruments and handling of high voltage AC. |
| | | | | Work as a member in a team, communicate with each other, and share their independent thinking to perform the experiment successfully. |
| 055 | B.Tech(AEIE) | PC-EI492 | Microprocessor and Microcontroller Lab | **Course Outcomes:** |

| 1.1 List of courses offered across all programs during last five years | | | | |
|---|---|---|---|---|
| **Program code** | **Program Name** | **Course code** | **Course Name** | **Course Outcome** |
| | | | | To construct and apply the assembly level programming of microprocessor and microcontroller. |
| | | | | To develop the programming logic and concept with the help of algorithm or flowchart. |
| | | | | To troubleshoot assembly language program along with interactions between software and hardware. |
| | | | | To practice the interfacing of microprocessor with peripheral devices for various applications. |
| | | | | To develop the ability to communicate effectively with fellow group members for dividing and sharing the assignments among themselves. |
| 055 | B.Tech(AEIE) | ES-CS491 | Data Structure & Algorithms Lab | Course Outcomes: |
| | | | | To know the concept of linear data structure like array along with its applications for solving various mathematical problems concerned with different topics like the operations of matrices. |
| | | | | To recognize the various types of ADT like stack & queue with their operations and also their applications in the conversion among infix, prefix & postfix notations. |
| | | | | To comprehend the significance of recursion for solving problems like Tower of Hanoi. |
| | | | | To be acquainted with the concept of linked list with its classification and the relevance of the usage of such concepts according to the nature of the problems. |

| 1.1 List of courses offered across all programs during last five years | | | | |
|---|---|---|---|---|
| **Program code** | **Program Name** | **Course code** | **Course Name** | **Course Outcome** |
| | | | | To be aware with various algorithms applied for searching and sorting purposes with the differences regarding their working principles. |
| | | | | To understand the significance of non-linear data structures by the implementations of operations done by Binary Search Tree(BST) etc. and also find the importance of hashing in case of any searching problems. |
| 055 | B.Tech(AEIE) | HM-HU481 | Advanced Language Lab | **Course Outcomes:** |
| | | | | To distinguish between various contexts of human communication, e.g., one-to-one, small group, organizational, formal, informal, media, family, intercultural communication, technologically mediated communication, etc. |
| | | | | To use knowledge of interview processes in answering typical HR questions and to demonstrate proper interview etiquette. |
| | | | | To analyze a given topic, enumerate main points and deliver a structured speech with proper introduction and conclusion. |
| | | | | To utilize the key skills like active listening, managing conflict, collaborative communication, and proper body language successfully while discussing any given topic in a group. |
| | | | | To defend opinions with evidence and argument while speaking to an audience or discussing a topic in a group. |

| 1.1 List of courses offered across all programs during last five years | | | | |
|---|---|---|---|---|
| **Program code** | **Program Name** | **Course code** | **Course Name** | **Course Outcome** |
| | | | | To employ effective presentation skills to speak about general and academic topics in front of an audience and transfer this skill successfully to higher semester seminars and future career. |
| 055 | B.Tech(AEIE) | PC-EI501 | Control System | **Course Outcomes:** |
| | | | | The modeling of linear-time-invariant systems using transfer function and state-space representations. |
| | | | | The concept of stability and its assessment for linear-time invariant systems. |
| | | | | Characterization of plants and control loops. |
| | | | | The need for compensation, & the methods used for compensation techniques. |
| | | | | Linearization of non-linear system |
| | | | | Performance indices for optimal control. |
| 055 | B.Tech(AEIE) | PC-EI502 | Communication Techniques | **Course Outcomes:** |
| | | | | Analyze and compare different analog modulation schemes for their efficiency and bandwidth. |
| | | | | Analyze the behavior of a communication system in presence of noise. |
| | | | | Investigate pulsed modulation system and analyze their system performance. |
| | | | | Analyze different digital modulation schemes and can compute the bit error performance. |
| 055 | B.Tech(AEIE) | PC-EI503 | Electromagnetic Theory | **Course Outcomes:** |
| | | | | To understand the basic laws of electromagnetism. |
| | | | | To obtain the electric and magnetic fields for simple configurations under static conditions. |

| 1.1 List of courses offered across all programs during last five years | | | | |
|---|---|---|---|---|
| **Program code** | **Program Name** | **Course code** | **Course Name** | **Course Outcome** |
| | | | | To analyze time varying electric and magnetic fields. |
| | | | | To understand Maxwell's equation in different forms and different media. |
| | | | | To understand the propagation of EM waves. |
| | | | | To impart knowledge on the concepts of Electrostatic fields, electrical potential,energy density and their applications. Magneto static fields, magnetic flux density, vectorpotential and its applications. Different methods of emf generation and Maxwell'sequations Electromagnetic waves and characterizing parameters |
| 055 | B.Tech(AEIE) | PE-EI501 | Optical Instrumentation | **Course Outcomes:** |
| | | | | Recognize the structures of Optical fiber and their properties. |
| | | | | Understand the principles fiber-optic communication, the components and the bandwidth advantages. |
| | | | | Understand the properties of the optical fibers and optical components. |
| | | | | Understand operation of lasers, LEDs, and detectors |
| | | | | Realize the application of Laser. |
| | | | | Understand the basic principle of Holography. |
| 055 | B.Tech(AEIE) | PE-EI502 | Introduction to MEMS | **Course Outcomes:** |
| | | | | Ability to understand the working principle of MEMS devices and their application. |
| | | | | Students will be able to explain micro-sensors, micro-actuators, their types and applications. |

| 1.1 List of courses offered across all programs during last five years | | | | |
|---|---|---|---|---|
| **Program code** | **Program Name** | **Course code** | **Course Name** | **Course Outcome** |
| | | | | Students will be able to explain about fabrication processes for producing micro-sensors and actuators. |
| | | | | Ability to understand and analyze linear and digital electronic circuits |
| 055 | B.Tech(AEIE) | PE-EI503 | Embedded System | **Course Outcomes:** |
| | | | | To acquire knowledge about microcontrollers embedded processors and their applications. |
| | | | | Foster ability to understand the internal architecture and interfacing of different peripheral devices with Microcontrollers. |
| | | | | Foster ability to write the programs for microcontroller. |
| | | | | Foster ability to understand the role of embedded systems in industry. |
| | | | | Design processor and controller based intelligent systems for real life problems. |
| 055 | B.Tech(AEIE) | PE-EI504 | Power Electronics & Drives | **Course Outcomes:** |
| | | | | At the end of this course students will demonstrate the ability to Understand the differences between signal level and power level devices. |
| | | | | Analyse controlled rectifier circuits. |
| | | | | Learn about the control of various converters. |
| | | | | Analyse the operation of DC-DC choppers. |
| | | | | Analyse the operation of voltage source inverters. |
| | | | | Develop capability to choose a suitable DC and AC Motor and Power Electronic Converter |
| | | | | Develop design knowledge on how to design the speed control and current control loops of a DC Motor drive |

| 1.1 List of courses offered across all programs during last five years | | | | |
|---|---|---|---|---|
| **Program code** | **Program Name** | **Course code** | **Course Name** | **Course Outcome** |
| 055 | B.Tech(AEIE) | OE-EI501 | Object Oriented Programming Language | **Course Outcomes:** |
| | | | | Develop Java programs using OOP principles. |
| | | | | Develop Java programs with the concepts inheritance and interfaces. |
| | | | | Build Java applications using exceptions and I/O streams. |
| | | | | Develop Java applications with threads and generics classes. |
| | | | | Develop interactive Java programs using swings |
| 055 | B.Tech(AEIE) | OE-EI502 | Data Base Management System | **Course Outcomes:** |
| | | | | For a given query write relational algebra expressions for that query and optimize the developed expressions |
| | | | | For a given specification of the requirement design the databases using ER method and normalization. |
| | | | | For a given specification construct the SQL queries for Open source and Commercial DBMS -MYSQL, ORACLE, and DB2. |
| | | | | For a given query optimize its execution using Query optimization algorithms |
| | | | | For a given transaction-processing system, determine the transaction atomicity,consistency, isolation, and durability. |
| | | | | Implement the isolation property, including locking, time stamping based on concurrency control and Serializability of scheduling. |
| 055 | B.Tech(AEIE) | PC-EI591 | Control System Lab | **Course Outcome:** |
| | | | | To understand the different ways of system representations such as Transfer |

| 1.1 List of courses offered across all programs during last five years | | | | |
|---|---|---|---|---|
| **Program code** | **Program Name** | **Course code** | **Course Name** | **Course Outcome** |
| | | | | function representation and state space representations and to assess the system dynamic response. |
| | | | | To assess the system performance using time domain analysis and methods for improving it. |
| | | | | To assess the system performance using frequency domain analysis and techniques for improving the performance. |
| | | | | To design various controllers and compensators to improve system performance. |
| 055 | B.Tech(AEIE) | OE-EI591 | Object Oriented Programming Language Lab | **Course Outcome:** |
| | | | | Gain the basic knowledge on Object Oriented concepts. |
| | | | | Ability to develop applications using Object Oriented Programming Concepts. |
| | | | | Ability to implement features of object oriented programming to solve real world problems. |
| | | | | Understand advanced features of C++ specifically stream I/O, templates and operator overloading |
| | | | | Understand how to apply the major object-oriented concepts to implement object oriented programs in C++, encapsulation, inheritance and polymorphism |
| 055 | B.Tech(AEIE) | OE-EI592 | Data Base Management System Lab | **Course Outcome:** |
| | | | | Understand, appreciate and effectively explain the underlying concepts of database technologies. |
| | | | | Design and implement a database schema for a given problem-domain. |

| 1.1 List of courses offered across all programs during last five years | | | | |
|---|---|---|---|---|
| **Program code** | **Program Name** | **Course code** | **Course Name** | **Course Outcome** |
| | | | | Normalize a database. |
| | | | | Populate and query a database using SQL DML/DDL commands. |
| | | | | Programming PL/SQL including stored procedures, stored functions, cursors, packages. |
| | | | | Design and build a GUI application using a 4GL |
| 055 | B.Tech(AEIE) | PC-EI592 | Industrical Instrumentation Lab | **Course Outcome:** |
| | | | | Illustrate the different methods for the measurement of length and angle |
| | | | | Elucidate the construction and working of various industrial devices used to measure pressure,level and flow. |
| | | | | Explicate the construction and working of various industrial devices used to measure temperature, level, vibration, viscosity and moisture. |
| | | | | Ability to analyze, formulate and select suitable sensor for the given industrial applications |
| | | | | Demonstrate a working knowledge of safety practices used in the measurement and control of real time processes. |
| | | | | Demonstrate skills in trouble shooting problems with the measurement and control of industrial processes. |
| 055 | B.Tech(AEIE) | PC-EI601 | Process Control | **Course Outcome:** |
| | | | | Construct the block diagram of feedback control loop and demonstrate its various components. |

| 1.1 List of courses offered across all programs during last five years | | | | |
|---|---|---|---|---|
| **Program code** | **Program Name** | **Course code** | **Course Name** | **Course Outcome** |
| | | | | Analyze the different process characteristics with suitable examples. |
| | | | | Classify different types of controllers according to their feature and use. |
| | | | | Apply the concept of controller tuning in practical processes. |
| | | | | Illustrate the construction and use of different types of control valves. |
| | | | | Differentiate between different control schemes such as feedforward control, cascade control, ratio control, etc. |
| | | | | Construct LADDER program to operate batch processes. |
| 055 | B.Tech(AEIE) | PC-EI602 | Biomedical Instrumentation | **Course Outcomes:** |
| | | | | Inspect common biomedical signals. |
| | | | | Describe the origin of various bio-potentials and explain the role of bio-potential electrodes. |
| | | | | Explain the measurement principles for blood flow, blood pressure. |
| | | | | Indentify various imaging techquines. |
| | | | | Illustrate the application of biotelemetry system. |
| 055 | B.Tech(AEIE) | OE-EI601 | Internet of Things(IoT) | **Course Outcome:** |
| | | | | Understand the application areas of IOT. |
| | | | | Realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks. |
| | | | | Understand building blocks of Internet of Things and characteristics. |
| | | | | Application of IoT in Industrial and Commercial Building Automation and Real World Design Constraints. |

| 1.1 List of courses offered across all programs during last five years | | | | |
|---|---|---|---|---|
| **Program code** | **Program Name** | **Course code** | **Course Name** | **Course Outcome** |
| | | | | Building state of the art architecture in IoT. |
| 055 | B.Tech(AEIE) | OE-EI602 | Artificial Intelligence(AI) | **Course Outcome:** |
| | | | | Explain what constitutes "Artificial" Intelligence and how to identify systems with Artificial Intelligence. |
| | | | | Explain how Artificial Intelligence enables capabilities that are beyond conventionaltechnology, for example,chess-playing computers, self-driving cars, roboticvacuum cleaners. |
| | | | | Use classical Artificial Intelligence techniques, such as search algorithms, minimax algorithm. |
| | | | | Ability to apply Artificial Intelligence techniques for problem solving. |
| 055 | B.Tech(AEIE) | OE-EI603 | Digital signal Processimg | **Course Outcome:** |
| | | | | Distinguish different types of signals, can acquire a brief idea about analog and digital signals and their conversion techniques , criterion for stability of a system. |
| | | | | To evaluate different types of mathematical operation on signals. |
| | | | | Learn a good idea about Z-transform and importance of analog to digital domain transformation technique. |
| | | | | Appropriately distinguish between Fourier series and Fourier transformation, properly compute it, |
| | | | | Know different types of filters, distinguish between analog and digital filter, methods to transform from one type to another types of filter. |

| 1.1 List of courses offered across all programs during last five years | | | | |
|---|---|---|---|---|
| **Program code** | **Program Name** | **Course code** | **Course Name** | **Course Outcome** |
| | | | | Acquire a clear idea of different filter designing techniques and their realization methods. |
| 055 | B.Tech(AEIE) | HM-HU601 | Economics for Engineers | **Course Outcome:** |
| | | | | Understand the Principles of Engineering Economy and the Engineering Decision-making process. Apply the appropriate type of Estimating Model to determine Engineering Cost. |
| | | | | Understand the basic concept of Time value of money and apply such formulas to analyze Situations of both Single cash flow and multiple cash flow. Apply such knowledge to Evaluate financial feasibility of different types of investment situations in Engineering Projects. |
| | | | | Understand the causes and Effect of Inflation & Deflation and Use the Price Indexes in Engineering Economic Analysis. |
| | | | | Understand the basic concept of Probability and expected value and of Depreciation and Obsolescence. Also apply the Fundamental methods of calculation of depreciation. |
| | | | | Understand Replacement Analysis Replacement Map and determine Minimum Cost Life of aNew Asset. |
| | | | | Understand Accounting Function, Balance Sheet ,Income Statement and apply such knowledge in calculation of Financial Ratios and apply Cost Accounting Principles for Direct and Indirect Cost Allocation. |
| 055 | B.Tech(AEIE) | MC-ES601 | Indian Constitution and Cultures | **Course Outcome:** |

| 1.1 List of courses offered across all programs during last five years | | | | |
|---|---|---|---|---|
| **Program code** | **Program Name** | **Course code** | **Course Name** | **Course Outcome** |
| | | | | Identify the authority to redress the problems in their profession or society |
| | | | | Describe: |
| | | | | The features of Indian Constitution |
| | | | | Workings of the various Legislative, Executive and Judicial bodies in the country |
| | | | | Appreciate the democratic workings at the grassroots level |
| | | | | Understand the jurisdiction and procedures of our courts |
| 055 | B.Tech(AEIE) | PC-EI691 | Process Control Lab | **Course Outcome:** |
| | | | | Analyze the operation of different types of control action. |
| | | | | Apply the concept of controller tuning in practical processes. |
| 055 | B.Tech(AEIE) | PC-EI692 | Instrumentation System Design Lab | **Course Outcome:** |
| | | | | Learn the issues related to practical implementation of applications using electronic circuits. |
| | | | | Design sensors and suitable signal conditioning circuit |
| 055 | B.Tech(AEIE) | OE-EI691 | Internet of Things Lab(IoT) | **Course Outcome:** |
| | | | | Gather engineering knowledge related to IoT. |
| | | | | Students can analysisthe problem and able to design/develop the solutions |
| 055 | B.Tech(AEIE) | OE-EI692 | Artificial Intelligence Lab(AI) | **Course Outcome:** |
| | | | | Apply Artificial Intelligence techniques for problem solving |
| 055 | B.Tech(AEIE) | PE-EI701 | Mechatronics & Robotics | **Course Outcomes (CO):** |
| | | | | Understand the basic concept of Mechatronics system. Engineering for designing the mechatronics system. |

| 1.1 List of courses offered across all programs during last five years | | | | |
|---|---|---|---|---|
| **Program code** | **Program Name** | **Course code** | **Course Name** | **Course Outcome** |
| | | | | Analyzethe different mathematical modelling of the liquid level, pneumatic systems, hydraulic systems and thermal systems for actuation of mechatronics systems. |
| | | | | Understand the working of robot design with coordinate system. |
| | | | | Apply the knowledge of different parts of robots for real time application and robot design. |
| | | | | Understand and applythe robot kinematics in real time problem. |
| | | | | Apply the knowledge in different application for mankind. |
| 055 | B.Tech(AEIE) | PE-EI702 | Digital Control System | **Course Outcomes (CO):** |
| | | | | Understand the discrete representation of continuous systems with mathematical modelling. |
| | | | | Analyze discrete system. |
| | | | | Analyze stability of discrete time system. |
| | | | | Analyze state space approach of discrete time system. |
| | | | | Design the controller for discrete time system. |
| | | | | Understand the Fuzzy logic control. |
| 055 | B.Tech(AEIE) | PE-EI703 | Analytical Instrumentation | **Course Outcomes (CO):** |
| | | | | Understand why Analytical Instrumentation is useful for industrial application. |
| | | | | Analyse Moisture, Viscosity with different method of measurement. |
| | | | | Analyse Gas and Oxygen with various methods. |
| | | | | Analyse Liquid with various practical experiments. |

| 1.1 List of courses offered across all programs during last five years | | | | |
|---|---|---|---|---|
| **Program code** | **Program Name** | **Course code** | **Course Name** | **Course Outcome** |
| | | | | Understand and analyse Spectroscopy is significantindetermining composition, temperature,density, motion etc., |
| | | | | Understand and analyse how Chromatography used for separation of mixture. |
| 055 | B.Tech(AEIE) | PE-EI704 | Non Destructive Testing | **Course Outcomes (CO):** |
| | | | | Understand why Non Destructive Testing (NDT) is useful for industry or clinical process. |
| | | | | Understand and analyze different techniques of NDT General, Visual, Chemical and Mechanical system. |
| | | | | Understand and analyze Ultrasonic wave used in NDT. |
| | | | | Understand and analyze Ultrasonic method in Industry and Medical measurement techniques. |
| 055 | B.Tech(AEIE) | OE-EI701 | Telemetry & wireless Sensor Network | **Course Outcomes (CO):** |
| | | | | Understand the basic concept of telemetry and communication modulation code |
| | | | | Understand Frequency-division multiplexing (FDM) and Time-division multiplexing (TDM) in practical field. |
| | | | | Understand and working of the sensor network and its application in Industry. |
| | | | | Understand and working of the Mobile Ad-hoc Networks and wireless sensor networks. |
| | | | | Understand and apply routing protocol in Industry. |
| | | | | Understand the WSNs Communication techniques. |
| 055 | B.Tech(AEIE) | OE-EI702 | Non-Conventional Energy System | **Course Outcomes (CO):** |

| 1.1 List of courses offered across all programs during last five years | | | | |
|---|---|---|---|---|
| **Program code** | **Program Name** | **Course code** | **Course Name** | **Course Outcome** |
| | | | | Understand the basic concept of Non-Conventional Energy source and application in real life. |
| | | | | Understand and explain Solar Energy generation and application. |
| | | | | Understand and apply Electricity Generation from Wind Energy |
| | | | | Understand and apply Electricity Generation from Bio Energy and Bio diesel techniques. |
| | | | | Understand and explain Electricity generation from Tidal, Wave and Thermal energy. |
| | | | | Understand the audit and energy conservation. |
| 055 | B.Tech(AEIE) | ES-CS701 | Computer Networks | **Course Outcomes (CO):** |
| | | | | Understand research problem formulation. |
| | | | | Analyse research related information |
| | | | | Follow research ethics |
| | | | | Understand that today's world is controlled by Computer, Information Technology but tomorrow's worldwill be ruled by ideas, concept, and creativity. |
| | | | | Understanding that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual property right to be promoted among students in general & engineering in particular. |
| | | | | Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better product and in turn brings about,economic growth and social benefits. |

| 1.1 List of courses offered across all programs during last five years | | | | |
|---|---|---|---|---|
| **Program code** | **Program Name** | **Course code** | **Course Name** | **Course Outcome** |
| 055 | B.Tech(AEIE) | PE-EI801 | Power Plant Instrumentation | **Course Outcomes (CO):** |
| | | | | **Create** an overall perception about different types of power plant like Thermal, Hydel and Nuclear along with the measuring instruments associated with these particular types of process. |
| | | | | **Evaluate** instruments parameter to get overall control of a power plant by knowing the working principle of each blocksuch as Turbine, Condensers, Generators, Coal handling, Water treatment,Feed water, combustion air and flue gases. |
| | | | | **Analyze** the feedback signal for different control unit of power plant such as Boiler control,Furnace draft control, Steam temperature control and Feed water control etc. The supervisory control and monitoring is accompanying with different control loop for enhanced closed loop responses. |
| | | | | **Apply** all type of safety interlock to ensure zero accident by incorporating protective gears,emergency measures and Alarm systems. Moreover, the pollution due to the power plant is also measured, monitor and control for the environmental safety. |
| | | | | **Understand** the data handling processing, logging, acquisition, accounting, display and storage of data from Power plant. The coupling between the turbine and generator along with transmission through three phasesare considered as an output side of the power plant. |

| 1.1 List of courses offered across all programs during last five years | | | | |
|---|---|---|---|---|
| **Program code** | **Program Name** | **Course code** | **Course Name** | **Course Outcome** |
| | | | | **Describes** the modelling and simulation of power plant in HMI section using DCS and PLC for better closed loop control. |
| 055 | B.Tech(AEIE) | PE-EI802 | Nano Electronics | **Course Outcomes (CO):** |
| | | | | Identify the concept, advantages and challenges of Nanoelectronics |
| | | | | Describe the characteristics of carrier distribution and transport in nanoscale structures |
| | | | | Identify different types of nano diodes, nano transistors and their junction physics |
| | | | | Describe the construction and operation of various nano display, logic and memory devices |
| | | | | Compose different nano-photonics devices for optical fiber sensor systems |
| | | | | Design various nanofiber sensors for industrial applications like temperature, pressure,displacement, fluid flow, rotation, etc. |
| 055 | B.Tech(AEIE) | OE-EI801 | Digital Image Processing | **Course Outcomes (CO):** |
| | | | | Mathematically represent the various types of images and analyze them. |
| | | | | Process these images for the enhancement of certain properties or for optimized use of the resources. |
| | | | | Analyze images in the frequency domain using various transforms. |
| | | | | Design and implement the algorithms related to morphological image processing. |

| 1.1 List of courses offered across all programs during last five years | | | | |
|---|---|---|---|---|
| **Program code** | **Program Name** | **Course code** | **Course Name** | **Course Outcome** |
| | | | | Design and implement algorithms that perform basic image processing (e.g. noise removal and image enhancement). |
| | | | | Design and implement algorithms for advanced image analysis (e.g. image compression, image segmentation). |
| 055 | B.Tech(AEIE) | OE-EI802 | Big Data Analysis | **Course Outcomes (CO):** |
| | | | | Students will to build and maintain reliable, scalable, distributed systems with Apache Hadoop. |
| | | | | Students will be able to write Map-Reduce based Applications Learning with MLlib. 5 NoSQL What is it?, Where It is Used Types of NoSQL databases, Why NoSQL?, Advantages of NoSQL, Use of NoSQL in Industry, SQL vsNoSQL, NewSQL 05 12 6 Data Base for the Modern Web Introduction to MongoDB key features, Core Server tools, MongoDB through the JavaScript's Shell, Creating and Querying through Indexes, Document-Oriented, principles of schema design, Constructing queries onDatabases, collections and Documents, MongoDB Query Language. 08 15 |
| | | | | Students will be able to design and build MongoDB based Big data Applications and learn MongoDB query language |
| | | | | Students will learn difference between conventional SQL query language and NoSQL basic concepts |
| | | | | Students will learn tips and tricks for Big Data use cases and solutions. |
| 055 | B.Tech(AEIE) | HM-HU801 | Project Management & Enterpreneurship | **Course Outcomes (CO):** |

| 1.1 List of courses offered across all programs during last five years | | | | |
|---|---|---|---|---|
| **Program code** | **Program Name** | **Course code** | **Course Name** | **Course Outcome** |
| | | | | To understand the basic concept of management, diagnose the management issues in organizations,explain and analyze key principles of management planning, leading and controlling in business organizations |
| | | | | To explain the ethical standards and external environmental aspects of the organizations, list and exercise social responsibility and sustainability in the practical context and maintaining good governance for organization |
| | | | | To explain the basic concept, tools and environmental framework of marketing management and its importance on the organization in order to develop the effective marketing communications strategy |
| | | | | To explain the basic concept and functions of human resource management, human resource development and their applications in the organization, training and knowledge of human factors in engineering and various job designs |
| | | | | To evaluate various kinds of skills in inter-personal communication, team work, leading people, and handling conflict in organizations |
| | | | | To understand individual personalities and interpersonal skills needed for effective communications in a diverse business environment |