# 1st semester

| Course Name | Physics-I | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **BS-PH-101** | **Semester** | **I** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **BS-PH-101.1** | Explain the basic concepts of Mechanics and Oscillation. | | | | | **L2** |
| **BS-PH-101.2** | Elaborate the concept of optics and introduction to the principle of LASER. | | | | | **L4** |
| **BS-PH-101.3** | Understand Electromagnetism AND Dielectric properties of materials. | | | | | **L2** |
| **BS-PH-101.4** | Understand the Magnetic properties of materials. | | | | | **L2** |
| **BS-PH-101.5** | Familiarize with the basic laws of Quantum Mechanics and introduction to Schrodinger wave equation and its applications. | | | | | **L2** |
| **BS-PH-101.6** | Understand the basic concept of Statistical Mechanics. | | | | | **L2** |

| Course Name | Mathematics –IA | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **BS-M101** | **Semester** | **I** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **BS-M101.1** | Apply the concept integral calculus to determine curvature and evaluation of different types of improper integrals. | | | | | **L3** |
| **BS-M101.2** | Understand the domain of applications of mean value theorems, limit and maxima-minima to engineering problems. | | | | | **L2** |
| **BS-M101.3** | Understand the concept of determinant and learn different types of matrices, concept of rank, system of linear equations, methods of matrix inversion. | | | | | **L2** |
| **BS-M101.4** | Understand linear spaces, its basis and dimension with corresponding applications in the field of computer science. | | | | | **L2** |
| **BS-M101.5** | Learn and apply the concept of Eigenvalues, Eigen vectors, diagonalization of matrices and orthogonalization in inner product spaces for understanding physical and engineering problems | | | | | **L3** |
| **BS-M101.6** | Design and implement mathematical investigations and projects, including data collection, analysis, and interpretation, and apply appropriate mathematical communication and presentation skills. | | | | | **L6** |

| Course Name | Basic Electrical Engineering | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **ES-EE101** | **Semester** | **I** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **ES-EE101.1** | Illustrate & describe the characteristics of the electric and magnetic circuits. | | | | | L2 |
| **ES-EE101.2** | State the working principles of transformers, electrical machines and power converters. | | | | | L3 |
| **ES-EE101.3** | Construct the different types of electrical machines and transformers. | | | | | L3 |
| **ES-EE101.4** | Solve numerical problems of basic electrical circuits (both dc and ac), transformers and electrical machines. | | | | | L3 |
| **ES-EE101.5** | Explain the components of low voltage electrical installations. | | | | | L2 |

| Course Name | Physics-I Laboratory | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **BS-PH-191** | **Semester** | **I** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **BS-PH-191.1** | Understand the general property of matters like Viscosity, Young's Modulus and Modulus of Rigidity. | | | | | **L2** |
| **BS-PH-191.2** | Explain the Optical property. | | | | | **L2** |
| **BS-PH-191.3** | Discuss the Electrical property. | | | | | **L2** |
| **BS-PH-191.4** | Understand Quantum Physics with the help of experiments like Energy band gap of semiconductor, Planck constant and Characteristics of Solar Photovoltaic cell. | | | | | **L2** |
| **BS-PH-191.5** | Analyze Electricity and Magnetism with the help of experiments like the Hall Effect of Semiconductors. | | | | | **L4** |
| **BS-PH-191.6** | Understand the Specific charge of electron | | | | | **L2** |

| Course Name | Basic Electrical Engineering – 1 Laboratory | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **ES-EE-191** | **Semester** | **I** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **ES-EE-191.1** | Understand the basic demonstration and application of electrical instruments and machines | | | | | **L2** |
| **ES-EE-191.2** | Analyze the response of R-L-C series circuit | | | | | **L4** |
| **ES-EE-191.3** | Determine parameters of transformer equivalent circuit and analyze the operational behavior of DC machine and three phase induction motor | | | | | **L2** |
| **ES-EE-191.4** | Study the working principles of synchronous generators and power converters | | | | | **L2** |
| **ES-EE-191.5** | Introduce the components of low voltage electrical installations | | | | | **L2** |

| Course Name | Workshop/Manufacturing Practices | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **ES-ME192** | **Semester** | **I** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **ES-ME192.1** | Utilize the concept of a carpentry shop to make typical jobs. | | | | | **L3** |
| **ES-ME192.2** | Construct typical jobs in Smithy, plastic molding, green sand molding to build the conception of casting. | | | | | **L6** |
| **ES-ME192.3** | Develop the concept of machining making use of Lathe, Milling and Shaping machines by constructing typical jobs. | | | | | **L6** |
| **ES-ME192.4** | Develop the concept of joining processes by welding two MS plates, soldering and wiring exercises. | | | | | **L6** |
| **ES-ME192.5** | Utilize the concept of fitting and glass cutting and make typical jobs. | | | | | **L3** |

# 2nd Semester

| Course Name | Chemistry-I (BS-CH201) | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **BS-CH201** | **Semester** | **II** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **BS-CH201.1** | Analyze microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces. | | | | | **L4** |
| **BS-CH201.2** | Explain bulk properties and processes using thermodynamic considerations. | | | | | **L2** |
| **BS-CH201.3** | Distinguish the range of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques. | | | | | **L4** |
| **BS-CH201.4** | Understand periodic properties such as ionization potential, electron-affinity, oxidation states and electronegativity. | | | | | **L2** |
| **BS-CH201.5** | Analyze different organic molecules in stereo chemical aspect for various purposes | | | | | **L4** |
| **BS-CH201.6** | Develop some important drug molecules and its applications in various medicinal aspects. | | | | | **L6** |

| Course Name | Mathematics –IIA | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **BS-M201** | **Semester** | **II** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **BS-M201.1** | Understanding the ideas of basic probability and to apply the concept in real-life problems and to learn the concept and use of random variables(discrete and continuous) with its distributions. | | | | | **L2** |
| **BS-M201.2** | Understanding and to apply the concept of bivariate distributions. | | | | | **L2** |
| **BS-M201.3** | Understand the basic ideas of statistics with different characterization of a univariate and bivariate data set. | | | | | **L2** |
| **BS-M201.4** | Apply statistical tools for analyzing data samples and drawing inference on a given data set. | | | | | **L3** |
| **BS-M201.5** | Acquire knowledge of different statistical techniques and tools for decision making in engineering projects. | | | | | **L3** |
| **BS-M201.6** | Design and implement mathematical investigations and projects, including data collection, analysis, and interpretation, and apply appropriate mathematical communication and presentation skills. | | | | | **L6** |

| Course Name | Programming for Problem Solving | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **ES-CS201** | **Semester** | **II** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **ES-CS201.1** | Define algorithms for arithmetic and logical problems. | | | | | **L1** |
| **ES-CS201.2** | Translate the algorithms to programs (in C language), correct syntax and logical errors on executing the programs. | | | | | **L2** |
| **ES-CS201.3** | Implement conditional branching, array, iteration and recursion. | | | | | **L3** |
| **ES-CS201.4** | Decompose a problem into functions and synthesize a complete program using divide and conquer approach. . | | | | | **L4** |
| **ES-CS201.5** | Apply the concept of arrays, pointers, structures and their applications with the help of programs. | | | | | **L3** |
| **ES-CS201.6** | Solve matrix addition, multiplication, searching and sorting problems. | | | | | **L3** |

| Course Name | English | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **HM-HU201** | **Semester** | **II** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **HM-HU201.1** | Acquire basic proficiency in English, including reading, listening comprehension, writing, and speaking skills, and demonstrate a basic understanding of English grammar, vocabulary, and syntax. | | | | | **L2** |
| **HM-HU201.2** | Communicate confidently in English, using appropriate grammar, vocabulary, and syntax, and demonstrate effective speaking and presentation skills in different contexts. | | | | | **L3** |
| **HM-HU201.3** | Communicate appropriately in professional and social situations, using appropriate language and tone, and demonstrate effective communication skills in group activities like group discussions, case studies, role play, etc. | | | | | **L3** |
| **HM-HU201.4** | Improve teamwork, leadership skills, and problem-solving skills through group activities like group discussions, case studies, role play, etc. | | | | | **L3** |
| **HM-HU201.5** | Organize and write business correspondence properly and correctly, using appropriate formats, grammar, vocabulary, and syntax, and demonstrate effective writing and editing skills. | | | | | **L3** |
| **HM-HU201.6** | Develop active listening skills, including effective listening strategies, note-taking, and summarizing, and apply these skills to different listening contexts. | | | | | **L6** |

| Course Name | Language Laboratory | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **HM-HU291** | **Semester** | **II** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **HM-HU291.1** | Demonstrate improvement in listening and speaking skills in English language through regular practice and feedback in language laboratory sessions. | | | | | **L3** |
| **HM-HU291.2** | Develop confidence in communication in the English language through various exercises and activities. | | | | | **L6** |
| **HM-HU291.3** | Enhance professional and social communication skills by participating in group activities like group discussions, case studies and role plays. | | | | | **L6** |
| **HM-HU291.4** | Develop problem-solving skills, teamwork and leadership skills through various group activities and exercises. | | | | | **L6** |
| **HM-HU291.5** | Demonstrate ability to write business correspondence properly and correctly by practicing different types of business writing and receiving feedback. | | | | | **L3** |
| **HM-HU291.6** | Use various language learning resources available in language laboratory effectively, such as language software, audio and video resources, and online tools to enhance their language proficiency | | | | | **L3** |

| Course Name | Chemistry-I Laboratory (Gr-A) | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **BS-CH291** | **Semester** | **II** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **BS-CH291.1** | Implement instrumental analytical procedure for the enrichment of modern technical skill. | | | | | **L3** |
| **BS-CH291.2** | Describe intermolecular phenomena using thermodynamic consideration. | | | | | **L2** |
| **BS-CH291.3** | Understand titrimetric methods of water analysis required for environmental context on text. | | | | | **L2** |
| **BS-CH291.4** | Development of physicochemical laboratory methods for the analysis and characterization of different materials. | | | | | **L6** |
| **BS-CH291.5** | Evaluate different surface phenomena by adsorption techniques. | | | | | **L5** |
| **BS-CH291.6** | Estimate essential parameters like oxygen in water by titrimetric methods. | | | | | **L4** |

| Course Name | Programming for Problem Solving | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **ES-CS291** | **Semester** | **II** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **ES-CS291.1** | Apply algorithms for arithmetic and logical problems. | | | | | **L3** |
| **ES-CS291.2** | Translate given algorithms to a working program and correct syntax errors as well as logical errors. | | | | | **L2** |
| **ES-CS291.3** | Solve problems based on iteration as well as recursion | | | | | **L3** |
| **ES-CS291.4** | Apply the concept of arrays, strings and structures in a program. | | | | | **L3** |
| **ES-CS291.5** | Use pointers in defining self-referential structures. | | | | | **L3** |
| **ES-CS291.6** | Demonstrate reading and writing to and from simple text files. | | | | | **L3** |

| Course Name | Engineering Graphics & Design | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **ES-ME291** | **Semester** | **II** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **ES-ME291.1** | Understand the main idea of using dimension for engineering drawing. | | | | | **L2** |
| **ES-ME291.2** | Interpret and construction of various scales and curves which include ellipse, parabola, hyperbola, cycloids etc. | | | | | **L6** |
| **ES-ME291.3** | Analyze and draw the orthographic projections of points, lines, planes, solids and sectional solids. | | | | | **L4** |
| **ES-ME291.4** | Analyze and design two-dimensional objects from three-dimensional objects. | | | | | **L4** |
| **ES-ME291.5** | Estimate and develop the sectional projection and interpenetration of solids. | | | | | **L6** |
| **ES-ME291.6** | Creating the concept of isometric projections of various simple objects. | | | | | **L6** |

# 3rd semester

| Course Name | Analog & Digital Electronics | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **ESC-301** | **Semester** | **III** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **ESC-301.1** | Realize the basic operations of different analog components. | | | | | **L3** |
| **ESC-301.2** | Realize basic gate operations and laws Boolean algebra. | | | | | **L4** |
| **ESC-301.3** | Design and analyze combinational logic circuits | | | | | **L6** |
| **ESC-301.4** | Design and analyze modular combinational circuits with MUX/DEMUX, Decoder, Encoder. | | | | | **L6** |
| **ESC-301.5** | Design and analyze synchronous sequential logic circuits | | | | | **L6** |
| **ESC-301.6** | Understand basic structure of digital computer, stored program concept and different arithmetic and control unit operations. | | | | | **L2** |

| Course Name | Mathematics –III (Differential Calculus) | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **BSC-301** | **Semester** | **III** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **BSC-301.1** | Learn to apply the concept of sequence and convergence of infinite series in many approximation techniques in engineering disciplines. | | | | | **L2** |
| **BSC-301.2** | Apply the knowledge for addressing the real life problems which comprises several variables or attributes and identify extremum points if different surfaces of higher dimensions and concept of vector differentiation. | | | | | **L3** |
| **BSC-301.3** | Learn the methods for evaluating multiple integrals and their applications to different physical problems. | | | | | **L2** |
| **BSC-301.4** | Understand different techniques to solve first and second order ordinary differential equations with its formulation to address the modeling of systems and problems of engineering sciences. | | | | | **L2** |
| **BSC-301.5** | Learn Basics of Graph Theory which are useful to solve engineering problems. | | | | | **L2** |
| **BSC-301.6** | Design and implement mathematical investigations and projects, including data collection, analysis, and interpretation, and apply appropriate mathematical communication and presentation skills. | | | | | **L6** |

| Course Name | Data Structure & Algorithm | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **PCC-CS301** | **Semester** | **III** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **PCC-CS301.1** | Explain how the choices of data structure & algorithm methods impact the performance of an algorithm. | | | | | **L2** |
| **PCC-CS301.2** | Discuss different kinds of operations, algorithms with complexity analysis and applications of stack, queue and linked list. | | | | | **L2** |
| **PCC-CS301.3** | Understand the non-linear data structure like trees and graphs, their definitions, algorithms with complexity analysis and applications. | | | | | **L2** |
| **PCC-CS301.4** | Discuss the computational efficiency of the principal algorithms for sorting, searching, and hashing. | | | | | **L2** |
| **PCC-CS301.5** | Illustrate the benefits of dynamic and static data structures implementations. | | | | | **L3** |

| Course Name | Computer Organisation | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **PCC-CS302** | **Semester** | **III** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **PCC-CS302.1** | Understand basic structure of digital computer, stored program concept and different arithmetic and control unit operations. | | | | | **L2** |
| **PCC-CS302.2** | Demonstrate basic structure of different combinational circuits, multiplexer, decoder, encoder etc. | | | | | **L3** |
| **PCC-CS302.3** | Explain different operations with sequential circuits. | | | | | **L2** |
| **PCC-CS302.4** | Analyze memory organization and memory mapping of different types of memory. | | | | | **L4** |
| **PCC-CS302.5** | Understand the non pipelined architecture, pipelined architecture and various I/O operations. | | | | | **L2** |

| Course Name | Economics for Engineers | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **HS-MC-301** | **Semester** | **III** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **HS-MC-301.1** | Understand Economic Decisions Making and consider that students will learn to find out Engineering Costs & Estimation. | | | | | **L2** |
| **HS-MC-301.2** | Learn Cash Flow and also be able to calculate Rate of Return Analysis. | | | | | **L2** |
| **HS-MC-301.3** | Evaluate Inflation and Price Change, Present Worth Analysis. | | | | | **L6** |
| **HS-MC-301.4** | Learn depreciation and be able to analyze the requirement of replacement. | | | | | **L4** |

| Course Name | Analog & Digital Electronics Lab | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **ESC391** | **Semester** | **III** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **ESC391.1** | Design and test a power amplifier. | | | | | **L6** |
| **ESC391.2** | Design and test various types of oscillator. | | | | | **L6** |
| **ESC391.3** | Design different multivibrators using 555 timer IC. | | | | | **L6** |
| **ESC391.4** | Explain the basic principles of Digital Electronics. | | | | | **L1** |
| **ESC391.5** | Develop Combinational circuits design using logic gates. | | | | | **L6** |
| **ESC391.6** | Develop Sequential Circuits design using logic gates. | | | | | **L6** |

| Course Name | Data Structure & Algorithm Lab | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **PCC-CS391** | **Semester** | **III** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **PCC-CS391.1** | Apply the knowledge of arrays, evaluate the different kinds of operations of stack and queue. | | | | | **L3** |
| **PCC-CS391.2** | Implement stack, queue, addition, and multiplication of polynomials using the concept of linked lists. | | | | | **L3** |
| **PCC-CS391.3** | Solve recursive and non-recursive tree traversal, threaded binary tree traversal, and AVL tree implementation. | | | | | **L3** |
| **PCC-CS391.4** | Demonstrate through a program the applications of tree, sorting, and searching algorithms. | | | | | **L3** |
| **PCC-CS391.5** | Solve different operations of hash tables. | | | | | **L3** |

| Course Name | Computer Organisation Lab | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **PCC-CS392** | **Semester** | **III** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **PCC-CS392.1** | Familiarize with the basic gates and implement a) multiplexer b)encoder c) decoder d) comparator | | | | | **L3** |
| **PCC-CS392.2** | Realize different arithmetic circuits using basic gates. | | | | | **L3** |
| **PCC-CS392.3** | Demonstrate different operations with sequential circuits. | | | | | **L3** |
| **PCC-CS392.4** | Realize various arithmetic and logic operations of ALU with gates. | | | | | **L3** |
| **PCC-CS392.5** | Realize memory cascading | | | | | **L3** |

| Course Name | IT Workshop (Sci Lab/MATLAB/Python/R) | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **PCC-CS393** | **Semester** | **III** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **PCC-CS393.1** | Understand scripting& the contributions of scripting languages. | | | | | **L2** |
| **PCC-CS393.2** | Apply Python syntax and semantics in the use of Python control flow and looping statements. | | | | | **L3** |
| **PCC-CS393.3** | Apply functions and represent compound data using lists, dictionaries, tuples and sets. | | | | | **L3** |
| **PCC-CS393.4** | Solve Python programs for real life applications using Python modules. | | | | | **L3** |

# 4th semester

| Course Name | Discrete Mathematics | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **PCC-CS401** | **Semester** | **IV** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **PCC-CS401.1** | Express a logic sentence in terms of predicates, quantifiers, and logical connectives. | | | | | **L2** |
| **PCC-CS401.2** | Derive the solution for a given problem using deductive logic and prove the solution based on logical inference. | | | | | **L4** |
| **PCC-CS401.3** | Application of Set Theory and Number system. Classify its algebraic structure for a given mathematical problem. | | | | | **L4** |
| **PCC-CS401.4** | Evaluate Boolean functions and simplify expressions using the properties of Boolean algebra. | | | | | **L5** |
| **PCC-CS401.5** | Develop the given problem as graph networks and solve them with techniques of graph theory. | | | | | **L6** |
| **PCC-CS401.6** | Design and implement mathematical investigations and projects, including data collection, analysis, and interpretation, and apply appropriate mathematical communication and presentation skills. | | | | | **L6** |

| Course Name | Computer Architecture | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **PCC-CS402** | **Semester** | **IV** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **PCC-CS402.1** | Describe pipelining concepts with a prior knowledge of stored program methods. | | | | | **L2** |
| **PCC-CS402.2** | Explain about memory hierarchy and mapping techniques. | | | | | **L2** |
| **PCC-CS402.3** | Discuss about parallel architecture like ILP, superscalar, superpipelined and VLIW processor architectures | | | | | **L2** |
| **PCC-CS402.4** | Classify the distributed shared memory architecture and cluster computers. | | | | | **L4** |
| **PCC-CS402.5** | Discuss about non von Neumann architectures: data flow computers, reduction computer architectures, systolic architectures | | | | | **L2** |

| Course Name | Formal Language & Automata Theory | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **PCC-CS403** | **Semester** | **IV** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **PCC-CS403.1** | Understand different formal notations for strings, languages and machines. | | | | | **L2** |
| **PCC-CS403.2** | Design finite automata, pushdown automata and Turing machine from their associated languages and grammars | | | | | **L6** |
| **PCC-CS403.3** | Apply pumping lemmas to show a language is not regular or not context free. | | | | | **L3** |
| **PCC-CS403.4** | Solve different types of grammars for different types of languages. | | | | | **L3** |
| **PCC-CS403.5** | Analyze the hierarchy of formal languages, grammars and machines. | | | | | **L4** |
| **PCC-CS403.6** | Interpret the notions of algorithm, decidability, complexity, and computability. | | | | | **L2** |

| Course Name | Design & Analysis of Algorithms | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **PCC-CS404** | **Semester** | **IV** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **PCC-CS404.1** | Understand the asymptotic notations of an algorithm to analyze the complexity of both recursive and non-recursive algorithms. | | | | | **L2** |
| **PCC-CS404.2** | Develop the solution of optimization problems using Greedy and Dynamic Programming paradigm and evaluate their effectiveness. | | | | | **L6** |
| **PCC-CS404.3** | Apply Backtracking, Branch-and-Bound approaches for finding effective solutions. | | | | | **L3** |
| **PCC-CS404.4** | Create a graph representation to construct a model engineering problem-solving strategy. | | | | | **L6** |
| **PCC-CS404.5** | Understand the fundamentals behind NP completeness and use randomized and approximation algorithms to identify alternative solutions. | | | | | **L2** |

| Course Name | Biology | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **BSC-401** | **Semester** | **IV** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **BSC-401.1** | Apply thermodynamic principles to biological systems and describe how biological observations of the 18th Century lead to major discoveries. | | | | | **L3** |
| **BSC-401.2** | Analysis of classification per section is not what biology is all about but highlights the underlying criteria, such as morphological, biochemical and ecological. | | | | | **L4** |
| **BSC-401.3** | Understanding the concepts of recessiveness and dominance during the passage of genetic material from parent to offspring and identifying DNA as a genetic material in the molecular basis of information transfer. | | | | | **L1** |
| **BSC-401.4** | Analyzing all forms of life have the same building blocks and yet the manifestations are as diverse as one can imagine biological processes at the reductionistic level. | | | | | **L4** |
| **BSC-401.5** | Classify enzymes and distinguish between different mechanisms of enzyme action. | | | | | **L4** |
| **BSC-401.6** | Classify microorganisms. | | | | | **L4** |

| Course Name | Environmental Sciences | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **MC-401** | **Semester** | **IV** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **MC-401.1** | Understand the natural environment and its relationships with human activities. | | | | | **L2** |
| **MC-401.2** | Apply the fundamental knowledge of science and engineering to assess environmental and health risk. | | | | | **L3** |
| **MC-401.3** | Develop guidelines and procedures for health and safety issues obeying the environmental laws and regulations. | | | | | **L6** |
| **MC-401.4** | Acquire skills for scientific problem-solving related to air, water, noise & land pollution. | | | | | **L2** |
| **MC-401.5** | Apply the laws and protection act of India for Environmental Management and Environmental Audit. | | | | | **L3** |
| **MC-401.6** | Analyze the population growth in different perspectives of environmental scenarios. | | | | | **L4** |

| Course Name | Computer Architecture Lab | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **PCC-CS492** | **Semester** | **IV** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **PCC-CS492.1** | Demonstrate, sketch and asses the basics of digital logic base programming with Hardware Description Language. | | | | | **L3** |
| **PCC-CS492.2** | Implement different arithmetic and logical operations using block diagrams. | | | | | **L3** |
| **PCC-CS492.3** | Implement different arithmetic and logical operations using HDL codes. | | | | | **L3** |
| **PCC-CS492.4** | Implement 8-bit Addition, Multiplication and division. | | | | | **L3** |
| **PCC-CS492.5** | Design simple 8-bit Register, ALU and CPUs. | | | | | **L6** |

| Course Name | Design & Analysis of Algorithms Lab | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **PCC-CS494** | **Semester** | **IV** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **PCC-CS494.1** | Implement divide-and-conquer, greedy, branch-and-bound, backtracking, and dynamic programming strategies to solve optimization problems. | | | | | **L6** |
| **PCC-CS494.2** | Analyze and synthesize the various graph-related solution techniques to complicated engineering challenges. | | | | | **L4** |
| **PCC-CS494.3** | Evaluate the ways to analyze randomized algorithms (expected running time, probability of error). | | | | | **L5** |
| **PCC-CS494.4** | Evaluate with proper justification of the approximation factor by applying the approximation algorithms (PTAS and FPTAS) for complex engineering problems. | | | | | **L5** |

# 5th semester

| Course Name | Software Engineering | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **ESC-501** | **Semester** | **V** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **ESC-501.1** | Explain the fundamental concepts of Software Engineering Lifecycle models. | | | | | **L3** |
| **ESC-501.2** | Summarize the software requirement specifications and the SRS documents. | | | | | **L2** |
| **ESC-501.3** | Describe software engineering layer technology and Process framework. | | | | | **L1** |
| **ESC-501.4** | Analyze various design and development solutions | | | | | **L4** |
| **ESC-501.5** | Demonstrate the competence in communication, planning, analysis, design, construction, and development of software as per the requirements. | | | | | **L3** |
| **ESC-501.6** | Demonstrate the use of modern engineering tools necessary for software project management, time management and software reuse. | | | | | **L3** |

| Course Name | Operating Systems | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **PCC-CS502** | **Semester** | **V** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **PCC-CS502.1** | Understand the necessity, development, numerous classification, and design issues of the operating system. | | | | | **L2** |
| **PCC-CS502.2** | Apply different methods for implementing processes and threads as well as the various process scheduling algorithms. | | | | | **L3** |
| **PCC-CS502.3** | Identify different challenges associated with deadlock, concurrency, and different synchronization mechanisms. | | | | | **L1** |
| **PCC-CS502.4** | Analyze several memory management strategies for memory allocations and implementation of virtual memory. | | | | | **L4** |
| **PCC-CS502.5** | Understand I/O management, disc management, and file system structure. | | | | | **L2** |

| Course Name | Compiler Design | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **PCC-CS501** | **Semester** | **V** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **PCC-CS501.1** | Understand different types of translators and different phases of compilers used in programming languages. | | | | | **L2** |
| **PCC-CS501.2** | Explain symbol table organization and role of different phases of compilers. | | | | | **L3** |
| **PCC-CS501.3** | Design lexical analyzer. | | | | | **L6** |
| **PCC-CS501.4** | Construct top-down and bottom-up parser. | | | | | **L6** |
| **PCC-CS501.5** | Analyze code optimization and code generation. | | | | | **L4** |
| **PCC-CS501.6** | Develop a prototype of a mini compiler. | | | | | **L6** |

| Course Name | Object Oriented Programming | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **PCC-CS503** | **Semester** | **V** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **PCC-CS503.1** | Understand the need of object oriented programming, fundamental concepts and will be able to solve computational problems using basic constructs like if-else, control structures, array, strings in Java environment. | | | | | **L2** |
| **PCC-CS503.2** | Understand how to model the real world scenario using class diagrams and be able to exhibit communication between objects using sequence diagrams. | | | | | **L2** |
| **PCC-CS503.3** | Implement relationships between classes. | | | | | **L3** |
| **PCC-CS503.4** | Demonstrate various collection classes. | | | | | **L3** |
| **PCC-CS503.5** | Create and user interfaces and packages | | | | | **L6** |
| **PCC-CS503.6** | Demonstrate programs on exceptions, multithreading and applets. | | | | | **L3** |

| Course Name | Introduction to Industrial Management | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **HSMC-501** | **Semester** | **V** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **HSMC-501.1** | Interpret given organization structure, culture, climate and major provisions of factory acts and laws. | | | | | **L2** |
| **HSMC-501.2** | Explain material requirement planning and store keeping procedure. | | | | | **L2** |
| **HSMC-501.3** | Plot and analyze inventory control models and techniques. | | | | | **L4** |
| **HSMC-501.4** | Prepare and analyze CPM and PERT for given activities. | | | | | **L4** |
| **HSMC-501.5** | List and explain PPC functions. | | | | | **L2** |

| Course Name | Artificial Intelligence | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **PEC-IT50B** | **Semester** | **V** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **PEC-IT501B.1** | Understand the different types of intelligent agents to solve real life problems using AI. | | | | | L2 |
| **PEC-IT501B.2** | Understand different types of searching strategies to solve an optimization problem. | | | | | L2 |
| **PEC-IT501B.3** | Model different knowledge representation techniques and concept learning. | | | | | L3 |
| **PEC-IT501B.4** | Analyze probabilistic reasoning for solving an AI problem. | | | | | L4 |
| **PEC-IT501B.5** | Apply natural language processing in neural networks. | | | | | L3 |
| **PEC-IT501B.6** | Apply reinforcement learning to represent an expert system using domain knowledge | | | | | L3 |

| Course Name | Constitution of India | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **MC-CS 501** | **Semester** | **V** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **MC-CS501.1** | Basic understanding about the Indian Constitution. | | | | | **L2** |
| **MC-CS501.2** | Ability to understand the fundamental rights that are enforceable by law and the role of the state and the judiciary in its protection and Citizenship act. | | | | | **L2** |
| **MC-CS501.3** | Basic understanding of Government and its Administration | | | | | **L2** |
| **MC-CS501.4** | Basic Understanding of the Election Commission. | | | | | **L2** |
| **MC-CS501.5** | Basic Understanding about Parliament and Legislative assembly and opposition leader. | | | | | **L2** |

| Course Name | Software Engineering Lab | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **ESC-591** | **Semester** | **V** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **ESC-591.1** | Summarize quality Frameworks in software engineering. | | | | | **L2** |
| **ESC-591.2** | Develop function oriented and object oriented software design using tools like rational rose. | | | | | **L3** |
| **ESC-591.3** | Apply unit testing and integration testing. | | | | | **L3** |
| **ESC-591.4** | Apply various white box and black box testing techniques. | | | | | **L3** |
| **ESC-591.5** | Demonstrate the knowledge of Project-management, rules and Design. | | | | | **L3** |

| Course Name | Operating Systems Lab | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **PCC-CS592** | **Semester** | **V** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **PCC-CS592.1** | Operates on UNIX / Linux operating systems with various shell commands, including different kernel-level activities. | | | | | **L3** |
| **PCC-CS592.2** | Understanding of shell script. | | | | | **L2** |
| **PCC-CS592.3** | Implement synchronization using semaphore and thread. | | | | | **L3** |
| **PCC-CS592.4** | Understand distributed operating system concepts that includes architecture, Mutual exclusion algorithms, deadlock detection algorithms and agreement protocols. | | | | | **L2** |
| **PCC-CS592.5** | Implement the concept of pipes for improving the efficiency of an operating system in terms of speed up and throughput. | | | | | **L3** |

| Course Name | Object Oriented Programming Lab | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **PCC-CS 593** | **Semester** | **V** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **PCC-CS 593.1** | Understand the need of object oriented programming, fundamental concepts and will be able to solve computational problems using basic constructs like if-else, control structures, array, strings in Java environment. | | | | | **L2** |
| **PCC-CS 593.2** | Understand how to model the real world scenario using class diagrams and be able to exhibit communication between objects using sequence diagrams. | | | | | **L2** |
| **PCC-CS 593.3** | Implement relationships between classes. | | | | | **L3** |
| **PCC-CS 593.4** | Demonstrate various collection classes. | | | | | **L3** |
| **PCC-CS 593.5** | Create and user interfaces and packages | | | | | **L6** |
| **PCC-CS 593.6** | Demonstrate programs on exceptions, multithreading and applets. | | | | | **L3** |

# 6th semester

| Course Name | Database Management Systems | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **PCC-CS601** | **Semester** | **VI** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **PCC-CS601.1** | Understand the different issues involved in the design and implementation of a database system. | | | | | **L2** |
| **PCC-CS601.2** | Create the physical and logical database designs, database modeling, relational, hierarchical, and network models | | | | | **L6** |
| **PCC-CS601.3** | Apply data manipulation language to query, update, and manage a database. | | | | | **L3** |
| **PCC-CS601.4** | Analyze the essential DBMS concepts such as: database security, integrity, concurrency, distributed database, and intelligent database, Client/Server (Database Server), Data Warehousing. | | | | | **L4** |
| **PCC-CS601.5** | Evaluate the different issues involved in the design and implementation of a database system. | | | | | **L5** |

| Course Name | Computer Networks | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **PCC-CS602** | **Semester** | **VI** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **PCC-CS602.1** | Understand the basics of data communication and computer networks. | | | | | **L2** |
| **PCC-CS602.2** | Identify network devices and evaluate their role/functions within a given network. | | | | | **L5** |
| **PCC-CS602.3** | Illustrate the different types of network topologies and protocols. | | | | | **L4** |
| **PCC-CS602.4** | Describe the layers of the OSI model and TCP/IP and explicitly apply the functions for each layer. | | | | | **L3** |
| **PCC-CS602.5** | Classify IP addressing and analyze the building skills of subnetting. | | | | | **L4** |
| **PCC-CS602.6** | Create and administer a network regardless of its size and to be familiar with the basic protocols of computer networks and the way they can be used to assist in network design and implementation. | | | | | **L6** |

| Course Name | Advanced Algorithms | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **PEC-IT601A** | **Semester** | **VI** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **PEC-IT601A.1** | Design advanced methods and analyze their performance. | | | | | **L6** |
| **PEC-IT601A.2** | Determine appropriate algorithms to solve a particular problem. | | | | | **L3** |
| **PEC-IT601A.3** | Understand basic paradigm & data structure for solving advanced algorithmic problems. | | | | | **L2** |
| **PEC-IT601A.4** | Categorize various problems into different classes according to their computational complexities. | | | | | **L2** |
| **PEC-IT601A.5** | Understand recent developments in advanced algorithm design | | | | | **L2** |

| Course Name | Data Warehousing and Data Mining | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **PEC-IT602B** | **Semester** | **VI** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **PEC-IT602B.1** | Understand the principles and architectures of data warehousing and data mining. | | | | | **L2** |
| **PEC-IT602B.2** | Analyze and design various pattern extraction techniques on classification and clustering. | | | | | **L4** |
| **PEC-IT602B.3** | Understand the mining of time series data and mining data streams. | | | | | **L2** |
| **PEC-IT602B.4** | Apply data mining techniques for solving real life problems in various domains. | | | | | **L3** |
| **PEC-IT602B.5** | Understand graph mining, web mining, and distributed data mining. | | | | | **L2** |

| Course Name | Numerical Methods | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **OEC-IT601A** | **Semester** | **VI** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **OEC-IT601A .1** | Analyze error and to understand numerical computation and concept of interpolation. | | | | | **L4** |
| **OEC-IT601A .2** | Apply numerical methods in integration. | | | | | **L3** |
| **OEC-IT601A .3** | Apply numerical methods to solve systems of linear equations. | | | | | **L3** |
| **OEC-IT601A .4** | Apply numerical methods to solve algebraic equations. | | | | | **L3** |
| **OEC-IT601A .5** | Apply numerical methods to solve ordinary differential equations. | | | | | **L3** |
| **OEC-IT601A .6** | Design and implement mathematical investigations and projects, including data collection, analysis, and interpretation, and apply appropriate mathematical communication and presentation skills. | | | | | **L6** |

| Course Name | Research Methodology | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **PROJ- CS601** | **Semester** | **VI** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **PROJ-CS601.1** | Explain fundamental concepts of research methodology. | | | | | L2 |
| **PROJ-CS601.2** | Analyze data with statically packages. | | | | | L4 |
| **PROJ- CS601.3** | Design research problems from various real life problem domains. | | | | | L6 |
| **PROJ-CS601.4** | Explain research ethics, IPR and scholarly publishing. | | | | | L2 |
| **PROJ- CS601.5** | Apply different ways of interpretation and quality report writing. | | | | | L3 |

| Course Name | Database Management Systems Lab | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **PCC-CS691** | **Semester** | **VI** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **PCC-CS691.1** | Create a database and perform basic operations like insertion, deletion, and updation. | | | | | **L6** |
| **PCC-CS691.2** | Retrieve data from the database through query languages like SQL. | | | | | **L3** |
| **PCC-CS691.3** | Execute various advanced queries such as relational constraints, joins, set operations, aggregate functions, trigger, views and embedded SQL. | | | | | **L3** |
| **PCC-CS691.4** | Analyze the database by applying the concept of different DDL, DML, and DCL. | | | | | **L4** |
| **PCC-CS691.5** | Implement PL/SQL stored procedures on a given database. | | | | | **L3** |

| Course Name | Computer Networks Lab | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **PCC- CS692** | **Semester** | **VI** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **PCC-CS692.1** | Understand different networking cables, connectors and networking devices. | | | | | **L2** |
| **PCC-CS692.2** | Understand IP addressing, subnetting | | | | | **L2** |
| **PCC-CS692.3** | Implement UDP and TCP based socket programming in Linux environment. | | | | | **L3** |
| **PCC-CS692.4** | Implement data link layer flow control and error control mechanisms. | | | | | **L3** |
| **PCC-CS692.5** | Apply server setup and configuration of FTP, TELNET, DNS etc. | | | | | **L3** |

# 7th semester

| Course Name | Cyber Security | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **PEC-CS702E** | **Semester** | **VII** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **PEC-CS702E.1** | Understand modern network architectures from a design and performance perspective. | | | | | **L2** |
| **PEC-CS702E.2** | Understand major concepts involved in wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs). | | | | | **L2** |
| **PEC-CS702E.3** | Discuss ethical hacking and social engineering | | | | | **L2** |
| **PEC-CS702E.4** | Apply cyber forensics and auditing techniques for writing computer forensics reports and planning auditing criteria. | | | | | **L3** |
| **PEC-CS702E.5** | Describe cyber ethics and law. | | | | | **L2** |

| Course Name | Operation Research | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **OEC-CS701A** | **Semester** | **VII** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **OEC-CS701A.1** | Learn basic concepts of Operations Research in modeling real life problems in applied engineering. | | | | | **L1** |
| **OEC-CS701A.2** | Apply the algorithm of basic Linear Programming Problems with applications in Transportation and Assignment. | | | | | **L3** |
| **OEC-CS701A.3** | Analyze Network of systems/ flows of activity with PERT/ CPM and Inventory control models. | | | | | **L4** |
| **OEC-CS701A.4** | Understand and apply the concept of Game theory. | | | | | **L1** |
| **OEC-CS701A.5** | Understand the different models of queue. | | | | | **L1** |
| **OEC-CS701A.6** | Design and implement mathematical investigations and projects, including data collection, analysis, and interpretation, and apply appropriate mathematical communication and presentation skills. | | | | | **L6** |

| Course Name | Machine Learning | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **PEC-CS701E** | **Semester** | **VII** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **PEC-CS701E.1** | Understand the concept of how to learn patterns and concepts from data without being explicitly programmed. | | | | | **L2** |
| **PEC-CS701E.2** | Characterize, design and analyze the machine learning algorithms as supervised, unsupervised and reinforcement learning paradigms of machine learning. | | | | | **L4** |
| **PEC-CS701E.3** | Evaluate, select and apply the appropriate ML model/s for real life problems. | | | | | **L5** |
| **PEC-CS701E.4** | Understand the scalable ML like Semi-supervised learning and Bayesian Inference learning. | | | | | **L2** |
| **PEC-CS701E.5** | Explore, and learn Deep learning techniques and various feature extraction strategies. | | | | | **L2** |

| Course Name | Project Management and Entrepreneurship | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **HSMC 701** | **Semester** | **VII** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **HSMC 701.1** | Explain the key terms related to Project Management and Entrepreneurship. | | | | | **L2** |
| **HSMC 701.2** | Analyze various concepts project management, project planning and project scheduling. | | | | | **L4** |
| **HSMC 701.3** | Implement the concept of Time Cost Trade-off Analysis, Resource Allocation and Levelling. | | | | | **L3** |
| **HSMC 701.4** | Discuss project life cycle, project cost and project quality management. | | | | | **L2** |
| **HSMC 701.5** | Explain the overview of Software Project Characteristics and Management and IT in projects. | | | | | **L2** |

| Course Name | Project-II | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **PROJ-CS781** | **Semester** | **VII** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **PROJ-CS781.1** | Conduct a survey on the work done in the chosen domain. | | | | | L5 |
| **PROJ-CS781.2** | Formulate the problem out of the survey. | | | | | L6 |
| **PROJ-CS781.3** | Design some technique towards the solution of the problem defined. | | | | | L6 |
| **PROJ-CS781.4** | Develop leadership capability and team work in collaborative environments. | | | | | L6 |
| **PROJ-CS781.5** | Apply knowledge of the 'real world' situations that a professional engineer can encounter | | | | | L3 |

# 8th semester

| Course Name | Internet of Things | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **PEC-CS801E** | **Semester** | **VIII** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **PEC-CS801E.1** | Understand the vision of IoT from a global context. | | | | | **L2** |
| **PEC-CS801E.2** | Determine the Market perspective of IoT. | | | | | **L3** |
| **PEC-CS801E.3** | Use devices, gateways and data management in IoT. | | | | | **L3** |
| **PEC-CS801E.4** | Apply IoT in Industrial and Commercial Building Automation considering Real World Design Constraints. | | | | | **L3** |
| **PEC-CS801E.5** | Explain various sensor architectures in IoT. | | | | | **L2** |

| Course Name | Cyber Law and Ethics | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **OEC-CS801B** | **Semester** | **VIII** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **OEC-CS801B.1** | Describe the various categories of cybercrime. | | | | | **L2** |
| **OEC-CS801B.2** | Explain security challenges in using mobile devices and cryptographic security for mobile devices. | | | | | **L2** |
| **OEC-CS801B.3** | Apply different tools and methods of cybercrime. | | | | | **L3** |
| **OEC-CS801B.4** | Discuss the concepts of phishing and identity theft. | | | | | **L2** |
| **OEC-CS801B.5** | Understand cybercrime and cyber security. | | | | | **L2** |

| Course Name | E-Commerce & ERP | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **OEC-CS802A** | **Semester** | **VIII** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **OEC-CS802A.1** | Understand various strategies of E-Commerce | | | | | **L2** |
| **OEC-CS802A.2** | Discuss the evolution of ERP systems and business processes supported by it. | | | | | **L2** |
| **OEC-CS802A.3** | Explain the relation between IT and ERP systems. | | | | | **L2** |
| **OEC-CS802A.4** | Illustrate the implementation of ERP systems. | | | | | **L3** |
| **OEC-CS802A.5** | Understand the emerging trends and future of ERP systems. | | | | | **L2** |
| **OEC-CS802A.6** | Discuss about various legal and security issues. | | | | | **L2** |

| Course Name | Project - III | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **PROJ-CS881** | **Semester** | **VIII** | | | **Cognitive Level** |
| **Course Outcome** | | | | | | |
| **PROJ-CS881.1** | Apply advanced programming techniques in identified real world problems. | | | | | **L3** |
| **PROJ-CS881.2** | Analyze the utility of solutions. | | | | | **L4** |
| **PROJ-CS881.3** | Identify the social, health, safety and cultural and legal issues associated with the findings. | | | | | **L1** |
| **PROJ-CS881.4** | Demonstrate the findings to academics, general and industry community and Manage any disputes and conflicts within and outside your team. | | | | | **L3** |