SNDT Women’s University Usha Mittal Institute of Technology

**Name of Program: Bachelor of Technology**

**Name of Course: Computer Engineering (CE)**

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| **Program Outcomes** |
| **PO1. Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and engineering specialization to the solution of complex engineering problems.**PO2. Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.**PO3. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.**PO4. Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.**PO5. Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.**PO6. The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues, and the consequent responsibilities relevant to the professional engineering practice.**PO7. Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.**PO8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.**PO9. Individual and teamwork:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.**PO10. Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.**PO11. Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one’s own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.**PO12. Self-Initiated Education:** Recognize the need for personal development and focus on enhancing the ability to engage in independent and life-long learning in the broadest context of technological change. |
| **Program Specific Outcomes** |

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| At the end of the program, the student:**PSO1**. Should be able to understand the concepts and demonstrate knowledge in the field of Data structures and algorithms, Computer Networks, Data base management systems, Operating Systems, Image Processing, Deep Learning, Data Science and Data analytics.**PSO2**. Should be able to design projects using modern design tools to associate the learning from the courses to arrive at solutions to real world problems.**PSO3.** Will be able to use research-based knowledge and research methods for investigation and analysis of Complex problem.**PSO4**. Should possess the skills to communicate in both verbal and written forms, the work already done and the future with necessary road maps, demonstrating the practice of professional ethics and the concerns for societal and environmental wellbeing. |  |
| **Course Outcomes** |  |
| **Semester-I** |  |
| **Course Code** | **Course Name** | **Course Outcomes** |
| BasicScien cecourse (BSC101) | AppliedScience (Physics andChemistry) | 1. Learn about electric and magnetic fields.
2. Learn about scaler and vector fields.
3. Maxwell's equations that define basic laws of electromagnetism. Propagation of electromagnetic waves through free space (Vacuum or Non conducting media).
4. Analyze atomic and molecular structure in terms of wavefunctions, charge densities and energy level diagrams.
5. Obtain quantitative information about energy levels through molecular spectroscopic methods such as electronic, vibrational, rotational, and nuclear magnetic resonance (NMR) spectroscopy.
6. Rationalize periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity
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| Basic Science course (BSC103) | Mathematics–I | The students will learn:1. To apply differential calculus to notions of curvature and to improper integrals. Apart from some other applications they will have a basic understanding of Beta and Gamma functions.
2. The fallouts of Rolle’s Theorem that is fundamental to application of analysis to Engineering problems.
3. The tool of power series and Fourier series for learning advanced Engineering Mathematics.
4. To deal with functions of several variables that are essential in most branches of Engineering.
5. The essential tool of matrices and linear algebra in a comprehensive manner.
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| Engineerin gScienceCourses | Basic Electrical Engineering | 1. To understand and analyze basic electric and magnetic circuits
2. To study the working principles of electrical
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| (ESC101) |  | machines3. To introduce the components of low voltage electrical installations.  |
| Engineerin g Science Courses (ESC102) | Engineering Graphics&Design | 1. To prepare you to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
2. To prepare you to communicate effectively
3. To prepare you to use the techniques, skills, and modern engineering tools necessary for engineering practice
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|  | Applied Science Lab | The physics and chemistry laboratory course will consist of experiments illustrating the principles of physics and chemistry relevant to the study of science and engineering. The students will learn to:1. Analyze& generate experimental skills
2. Learn and apply basic techniques used in chemistry laboratory for preparation, purification and identification.
3. Employ the basic techniques used in chemistry laboratory for analyses suchas chromatography, spectroscopy, volumetric titrations, conductometry.
4. Learn safety rules in the practice of laboratory investigations.
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|  | Basic Electrical EngineeringLab | Get an exposure to common electrical components and their ratings.1. Make electrical connections by wires of appropriate ratings.
2. Understand the usage of common electrical measuring instruments.
3. Understand the basic characteristics of transformers and electrical machines.
4. Get an exposure to the working of power electronic converters.
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|  | Engineering GraphicsDesign | Students prepare for actual work situations through practical training in a new state-of-the-art computer designed CAD laboratory using engineering software |
|  | Induction Program |  |
| **Semester-II** |  |
| **Course Code** | **Course Name** | **Course Outcomes** |
| Basic Science course (BSC102) | Applied Science (Physics and Chemistry) | 1. Imparted knowledge about simple harmonic oscillations, mechanical and electric oscillators.
2. Learn about different kinds of damping in harmonic oscillators. Learn about nondispersive transverse and longitudinal waves in one dimension, acoustic waves and sound waves.
3. Know about interference and diffraction phenomena. They
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|  |  | will also learn about Michelson Interferrometer (also learn why the result was negative. Learn about why they found no significant difference between the speed of light in the direction of movement through the presumed aether, and the speed at right angles.1. Understand how Young's double slit experiment and diffraction grating work.
2. Interaction of radiation with matter, Einstein coefficients, working of different types of Lasers and their application in science, engineering and medicine.
3. Rationalize bulk properties and processes using thermodynamic considerations.
4. Understand the energies existing in a bulk macroscopic system. List major chemical reactions that are used in the synthesis of molecules.
5. Rationalize the terms and concepts involved in Stereochemistry like symmetry operations, chirality, isomerism etc.
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| Basic | Mathematics-II | 1. The mathematical tools needed in evaluating multiple |
| Science |  | integrals and their usage. |
| course |  | 2. The effective mathematical tools for the solutions of |
| (BSC104) |  | differential equations that model physical processes. |
|  |  | 3. The tools of differentiation and integration of functions of |
|  |  | a complex variable that are used in various techniques dealing |
|  |  | engineering problems. |
| Engineerin g Science Courses (ESC103) | Programming for ProblemSolving | 1. To formulate simple algorithms for arithmetic and logical problems.
2. To translate the algorithms to programs (in C language).
3. To test and execute the programs and correct syntax and logical errors.
4. To implement conditional branching, iteration, and recursion.
5. To decompose a problem into functions and synthesize a complete program using divide and conquer approach.
6. To use arrays, pointers, and structures to formulate algorithms and programs.
7. To apply programming to solve matrix addition and multiplication problems and searching and sorting problems.
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|  |  | 8. To apply programming to solve simple numerical method problems, namely rot finding of function, differentiation of function and simple integration. |
| Engineerin g Science Courses (ESC104) | Workshop/Manufac turingPractices | Upon completion of this course, the students will gain knowledge of the different manufacturing processes which are commonly employed in the industry, to fabricate components using different materials. |
| Humanitie | English | After completing this course, students will |

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| sandSocial Sciencesin cluding Manageme ntcoursesHSMC (101) |  | 1. Acquire basic proficiency in English grammar and vocabulary
2. Develop good writing skills
3. Demonstrate skills requires for presentations
4. Acquire skills to participate in interview
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|  | Applied Science Lab | The students will learn to:1. Estimate rate constants of reactions from concentration of reactants/products as a function of time
2. Measure molecular/system properties such as surface tension, viscosity, conductance of solutions, redox potentials, chloride content of water, etc
3. Synthesize a small drug molecule and analyse a salt sample
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|  | Programming for ProblemSolving Lab | 1. To formulate the algorithms for simple problems
2. To translate given algorithms to a working and correct program
3. To be able to correct syntax errors as reported by the compilers
4. To be able to identify and correct logical errors encountered at run time
5. To be able to write iterative as well as recursive programs
6. To be able to represent data in arrays, strings and structures and manipulate them through a program
7. To be able to declare pointers of different types and use them in defining self-referential structures.
8. To be able to create, read and write to and from simple text files.
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|  | Workshop/Manufacturing Practices Lab English Practical | 1. Upon completion of this laboratory course, students will be able to fabricate components with their own hands.
2. They will also get practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes.
3. By assembling different components, they will be able to produce small devices of their interest.
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|  | English Practical | The student will acquire basic proficiency in English including reading and listening comprehension, writing, and speaking skills. |
|  | Environmental Sciences | After completing this course, students will be able to1. Apply the basic knowledge of environmental protection, sustainable development, and improvement.
2. Categorize and scrutinize impact of human development on natural resources. Provide the student with an understanding
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|  |  | of radioactive waste.1. Interpret the impact of environmental problems on socio economic growth and human health.
2. Apply various strategies, technological improvement, and methods for sustainable management of environmental systems and for the remediation of degraded environment.
3. Apply different Science and Technology (S&T) based sustainability solutions and limitations as well as to identify impact of human population on the natural environment and human health.
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| **Semester-III** |  |
| **Course Code** | **Course Name** | **Course Outcomes** |
| ESC 301 | Analog Electronic Circuits | 1. Understand the characteristics of transistors
2. Design and analyze various rectifier and amplifier circuits.
3. Design sinusoidal and non-sinusoidal oscillators.
4. Understand the functioning of OP-AMP and design OP-AMP based circuits.
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| PCC-CS 301 | Data structure & Algorithms | 1. For a given algorithm student will be able to analyze the algorithms to determine the time and space complexity and justify the correctness.
2. For a given Search problem (Linear Search, Binary Search & hashing) student will be able to implement it.
3. For a given problem of Stacks, Queues and linked list student will be able to implement it and analyze the same to determine the time and computation complexity.
4. Compare and contrast the benefits of dynamic and static data structures and its implementations.
5. Student will be able to write an algorithm Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort and compare their performance in term of Space and Time complexity.
6. Student will be able to implement Graph search and traversal algorithms and determine the time and computation complexity.
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| ESC 302 | Digital Electronics | 1. Able to understand the basics concepts and techniques used in digital electronics.
2. Understand and examine the structure of various number systems and its application in digital design.
3. The ability to understand, analyze and design various combinational and sequential circuits.
4. Ability to identify basic requirements for a design application and propose a cost-effective solution.
5. Able to understand Memory Units and recognizes the properties of memory units.
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|  | IT Workshop (Sci | 1)Understand the fundamental concepts of MATLAB/Octave. |

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|  | Lab/Octave/MATL AB) | 2)Understand the syntax and semantics of MATLAB/Octave. 3)Understand the fundamental abstractions in procedural programming - variables/values/types, assignment, control flow (conditionals/loops/error handling)4)Understand the Octave specific compound data types -vectors, matrices, cell arrays and the basic linear algebra underlying them (linear maps, matrix multiplication, factorization) |
| BSC 301 | Mathematics-III (Probability and Statistics) | 1. The ideas of probability and random variables and various discrete and continuous probability distributions and their properties.
2. The basic ideas of statistics including measures of central tendency, correlation, and regression.
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|  | Analog Electronic Circuits Lab | 1. To study and understand the various types of circuits used in Integrated Circuits
2. To understand the design various linear circuit mathematical, logical functions such as addition, subtractions, AND/OR etc. operations
3. Design of analog filters, regulators, oscillators, etc.
4. Design of implementation of A/D and D/A circuits
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|  | Data structure & Algorithms Lab | 1. Design and implement algorithms to solve problems.
2. Choose efficient data structures (Linear & Non-Linear) and apply them to solve problems.
3. Design & implement different searching & sorting algorithms using appropriate data structures.
4. Analyze the efficiency of programs based on time complexity.
5. Prove the correctness of a program using loop invariants, pre- conditions, and post- conditions in programs.
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|  | Digital Electronics Lab | 1. Learn the basics of gates.
2. Construct basic combinational circuits and verify their functionalities.
3. Apply the design procedures to design basic sequential circuits.
4. Learn about counters.
5. Learn about Shift registers.
6. To understand the basic digital circuits and to verify their operation.
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|  | IT Workshop (Sci Lab/MATLAB)Lab | 1. Able to understand the fundamental concepts of Scientific Programming using Matlab/Octave.
2. Understand the syntax and semantics of Matlab/Octave. 3)Understand the fundamental abstractions in procedural programming - variables/values/types, assignment, control flow (conditionals/loops/error handling)
3. Understand the Octave specific compound data types -vectors, matrices, cell arrays and the basic linear algebra underlying them (linear maps, matrix multiplication, factorization)
4. Able to carry out simple numerical computations and analyses
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|  |  | using Octave.6)Able to design simple algorithms to solve problems and write a simple program in Octave to solve scientific and mathematical problems. |
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| **Semester-IV** |  |
| **Course Code** | **Course Name** | **Course Outcomes** |
| PCC- |  | 1. Mathematical reasoning: Students are expected to use |
| CS401 |  | mathematical reasoning to read, comprehend, and construct |
|  |  | mathematical arguments. Students will learn basic concepts of |
|  |  | mathematical logic and proof. |
|  |  | 2. Combinatorial analysis: Students will count or enumerate objects |
|  | Discrete Mathematics | and perform combinatorial analysis.3. Discrete structures: Students will learn the basic concepts of sets, permutations, relations, poset, graphs, trees. |
|  |  | 4. Algebraic structures: Students will learn the concepts of algebraic |
|  |  | structures and its properties like homomorphism, isomorphism. |
|  |  | 5. Groups, Rings: Students are expected to learn different algebraic |
|  |  | structures like semigroups, groups, monoid, rings, field, Boolean |
|  |  | algebra. |
| PC-CS 402423411 | Computer Organization & | 1. How Computer Systems work & the basic principles
2. Instruction Level Architecture, Instruction Execution along with the demonstration of central processing unit including RISC and CISC Architecture
3. The current state of art in memory system design
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|  | Architecture | 4. Understand the organization of memory and memory management hardware. |
|  |  | 5. Elaborate advanced concepts of computer architecture, Parallel Processing, inter process communication and synchronization. pipelining techniques |
| PCC- |  | 1. To learn and understand the fundamentals of Operating |
| CS403443 |  | Systems. Create processes and threads. |
| 412 |  | 2. Develop algorithms for process scheduling for a given |
|  |  | specification of CPU utilization, Throughput, Turnaround Time, |
|  |  | Waiting Time, Response Time. |
|  |  | 3. For a given specification of memory organization develop the |
|  |  | techniques for optimally allocating memory to processes by |
|  | Operating Systems | increasing memory utilization and for improving the access time. |
|  |  | 4. Design and implement a file management system. |
|  |  | 5. For a given I/O devices and OS (specify) develop the I/O |
|  |  | management |
|  |  | functions in OS as part of a uniform device abstraction by |
|  |  | performing operations for synchronization between CPU and I/O |
|  |  | controllers. |
| PCC- |  | 1. For a given algorithms analyze worst-case running times of |
| CS404443 |  | algorithms based on asymptotic analysis and justify the correctness |
| 413 | Design & Analysis | of algorithms. |
|  | of Algorithms | 2. Describe the greedy paradigm and explain when an algorithmic |
|  |  | design situation calls for it. For a given problem develop the greedy |
|  |  | algorithms. |

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|  |  | 1. Describe the divide-and-conquer paradigm and explain when an algorithmic design situation calls for it. Synthesize divide-and- conquer algorithms. Derive and solve recurrence relation.
2. Describe the dynamic-programming paradigm and explain when an algorithmic design situation calls for it. For a given problems of dynamic-programming and develop the dynamic programming algorithms, and analyze it to determine its computational Complexity.
3. For a given model engineering problem model it using graph and write the corresponding algorithm to solve the problems.
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| HSMC 401433411 | Management 1 (Organizational Behaviour/ Finance & Accounting) | 1. Understand fundamental principles of Accounting
2. Identify the main financial statements and their purposes.
3. Complete a Project/ Written Assignment that integrates career orientation and or professional development skills.
4. Develop the ability to use accounting information to solve a variety of business problems
5. The course will help understand and learn the accounting documents, system and procedure.
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| MC48345 1 | Constitution of India | After completing this course, students will be able to1. Understand the constitutional framework and state and central policies
2. Display awareness of fundamental right and duties of a citizen
3. Demonstrate awareness about engineering ethics and responsibilities of an engineer
4. Display awareness about human rights in India
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| 423421 | Computer Organization & Architecture Lab | 1. Components of CPU: Students are expected to identify and assemble CPU
2. Number Representation and Conversion: Students are expected to write programs to convert numbers from binary and hexadecimal number systems.
3. MIPs Assembly Language: Students are expected to write the basic programs of MIPs Assembly Language using Vlab
4. Adder: Students are expected to build and do the binary addition using half adder and full adder in VLAB
5. Memory and CPU Design: Students are expected to design memory module, ALU and CPU using VLAB
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| 443422 | Operating Systems Lab | 1. Study of Kernel and their types.
2. Implementing Scheduling algorithms like FCFS,SJF,RR,Priority based scheduling algorithm.
3. Implementing memory management algorithm like First fit,Best fit,Worst fit
4. Study of Various case studies of operating System like UNIX, LINUX, Windows series etc.
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| 443423 | Design & Analysis of Algorithms Lab | 1. Design and implement recursive algorithms to solve problems of recursive nature.
2. Understand the problem, identify appropriate algorithm design strategy that suits it and then solve the problem using that strategy.
3. Analyze the algorithm after implementing it by using recurrence relation or master’s theorem for reducing functions or by dividing functions.
4. Design & implement searching & sorting algorithms by using appropriate algorithm design strategies and analyze them.
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| **Semester- V** |  |
| **Course Code** | **Course Name** | **Course Outcomes** |
| PCC-CS501 | Database management Systems | 1. Describe the fundamental elements of relational database management systems
2. Able to explain the basic concepts of relational data model, entity-relationship model, relational database design, relational algebra, and SQL.
3. Design ER-models to represent simple database application scenarios
4. Convert the ER-model to relational tables, populate relational database and formulate SQL queries on data.
5. Improve the database design by normalization.
6. Familiar with basic database storage structures and access techniques: file and page organizations, indexing methods including B tree, and hashing.
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| PCC-CS502 | Formal Language & Finite Automata | 1) Acquire a full understanding and mentality of Automata Theory as the basis of all computer science languages design - Have a clear understanding of the Automata theory concepts such as RE's, DFA's, NFA's, Turing machines, Grammar, halting problem, computability, and complexity. 2) Be able to design FAs, NFAs, Grammars, languages modelling, small compilers basics - Be able to design sample automata - Be able to minimize FA's and Grammars of Context Free Languages. 3)Perceive the power and limitation of a computer - Solve the problems using formal language 4) Develop a view on the importance of computational theory. |
| PCC-CS503 | Object Oriented Programming | 1. Describe the procedural and object-oriented paradigm with concepts of streams, classes, functions, data and objects.
2. Understand dynamic memory management techniques using pointers, constructors, destructors, etc
3. Describe the concept of function overloading, operator overloading, virtual functions, and polymorphism.
4. Classify inheritance with the understanding of early and late binding, usage of exception handling, generic programming.
5. Demonstrate the use of various OOPs concepts with the help of programs.
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|  | Elective-I – Machine Learning & Computing | 1. Have a good understanding of the fundamental issues and challenges of machine learning: data, model selection, model complexity, etc.
2. Understand the strengths and weaknesses of many popular machine learning approaches.
3. Appreciate the underlying mathematical relationships within and across Machine Learning algorithms and the paradigms of supervised and un-supervised learning.
4. Be able to design and implement various machine learning algorithms in a range of real-world applications.
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|  | Humanitics-I Effective Technical Communication | 1. Learning the technical phrases and writing styles like descriptive, argumentative etc for developing good technical documents for presentations or disseminating technical documents.
2. Acquisition of technical communication’s generic aspects like Reading Technical Material, Technical Writing, Listening, Thinking and using technical phrases in spoken, Knowing the parts of a technical documents  like screenshots, graphs, tabular data, data analysis, pictorial depiction.
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|  | Open Elective -I Software Engineering | 1)Understand and demonstrate basic knowledge in software engineering.2)Able to identify requirements, analyze and prepare models. 3)Able to plan, schedule and track the progress of the projects. 4)Able to design & develop the software projects.1. Able to identify risks, manage the change to assure quality in software projects.
2. Able to apply testing principles on software projects and understand the maintenance concepts.
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|  | Database Management Systems Lab | 1. Understand various advanced queries execution such as relational constraints, joins, set operations, aggregate functions, trigger, views, and embedded SQL.
2. Use of various software to design and build ER Diagrams, UML, Flow chart for related database systems.
3. Students will be able to design and implement database applications on their own
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|  | Object Oriented Programming lab | 1. Develop solutions for a range of problems using objects and classes.
2. Programs to demonstrate the implementation of constructors, destructors, and operator overloading.
3. Apply fundamental algorithmic problems including type casting, inheritance, and polymorphism.
4. Understand generic programming, templates, file handling
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|  | Elective-I Machine Learning lab |

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| 1. Understandthe mathematical and statistical perspectives of machine learning algorithms through python programming.
2. Designand evaluate the unsupervised models through python in built functions.
3. **Evaluate**the machine learning models pre-processed through various feature engineering algorithms by python programming.
4. Design and applyvarious reinforcement algorithms to solve real time complex problems.
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|  | Open Elective-I Software Engineering Lab | * 1. Able to prepare SRS document, design document, test cases and software configuration management and risk management related document.
	2. Develop function oriented and object-oriented software design using tools like rational rose.
	3. Able to perform unit testing and integration testing.
	4. Apply various white box and black box testing techniques
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| **Semester- VI** |  |
| ESC601 | Microprocessor & Micro controller | 1. Study the Architecture of basic Microprocessors such as 8085/8085 and Microcontroller such as 8051/8751.
2. Study of opcode and programming for simple operations such as addition, subtraction, multiplication etc.
3. Study and interface various peripheral devices to the processer and controllers.
4. Design of applications using processor/controller and peripheral devices for automations.
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|  | Compiler Design | 1. To understand the basics of system programs like editors, compiler, assembler, linker, loader, interpreter and debugger.
2. Describe the various concepts of assemblers and macroprocessors.
3. To understand the various phases of compiler and compare its working with assembler.
4. To understand how linker and loader create an executable program from an object module created by assembler and compiler.
5. To know various editors and debugging techniques.
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|  | Computer Networks | 1. Identify and understand various techniques and modes of transmission
2. Describe data link protocols, multi-channel access protocols and IEEE 802 standards for LAN
3. Describe routing and congestion in network layer with routing algorithms and classify IPV4 addressing scheme
4. Discuss the elements and protocols of transport layer
5. Understand network security and define various protocols such as FTP, HTTP, Telnet, DNS
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|  | Elective -II Artificial Intelligence | 1. Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.
2. Demonstrate awareness and a fundamental understanding of various applications of AI techniques in intelligent agents, expert systems, artificial neural networks, and other machine learning models.
3. Demonstrate proficiency developing applications in an 'AI language', expert system shell, or data mining tool.
4. Demonstrate proficiency in applying scientific method to models of machine learning.
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|  | Elective -III Neural Networks and Deep learning | 1. Identify the deep learning algorithms which are more appropriate for various types of learning tasks in various domains.
2. Implement deep learning algorithms and solve real-world problems
3. Introduce major deep learning algorithms, the problem settings, and their applications to solve real world problem
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|  | Essence and Importance of Indian Knowledge Tradition | 1. To facilitate the students with the concepts of Indian traditional knowledge and to make them understand the importance of roots of knowledge system.
2. It aims at imparting basic principles of thought process, reasoning, and inference.
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|  | Compiler Design Lab | 1. Able to design Lexical analyzer for given language using C and LEX tools.
2. Design and convert BNF rules into YACC form to generate various parsers.
3. Generate machine code from the intermediate code forms
4. Implement Symbol table
 |
|  | Computer Networks Lab | 1. Identify and use various networking components Understand different transmission media and design cables for establishing a network
2. Implement any topology using network devices
3. Understand the TCP/IP configuration for Windows and Linux
4. Implement device sharing on network e) Learn the major software and hardware technologies used on computer networks
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|  | Artificial Intelligence Lab | 1. Construct Machine learning programs for Supervised, Unsupervised and Semi supervised learning models.
2. Apply various pre-processing techniques on different datasets
3. Develop Deep learning programs for Supervised & Unsupervised learning models
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|  | Neural Network and Deep learning lab | 1. Evaluate, in the context of a case study, the advantages and disadvantages of deep learning neural network architectures and other approaches.
2. Implement deep learning models in Python using the PyTorch library and train them with real-world datasets.
3. Design convolution networks for handwriting and object classification from images or video.
4. Design recurrent neural networks with attention mechanisms for natural language classification, generation, and translation.
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| 6329 | Semester Project | 1. Get acquainted to research methodology
2. Survey and analyze the literature.
3. Design , implement , analyze and test the project
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| Semester- VII |  |
|  | Cryptography and Network Security | 1. Understand the most common type of cryptographic algorithmand the Public-Key Infrastructure ·
2. Understand security protocols for protecting data on networks ·
3. Be able to digitally sign emails and files and understand vulnerability assessments and the weakness of using passwords for authentication
4. Be able to perform simple vulnerablility assessments and password audits and configure simple firewall architectures ·
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| 8561 | Cloud Computing | After successful completion of this course, student will be able to1. Define Cloud Computing and memorize the different Cloud service and deployment models
2. Describe importance of virtualization along with their technologies.
3. Apply the fundamental concepts in datacenters to understand the tradeoffs in power, efficiency, and cost.
4. Use and examine different cloud computing services
5. Analyze the components of open stack & Google Cloud platform
6. Describe the key components of Amazon web Service, Google App Engine
7. Design & develop backup strategies for cloud data based on features.
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|  | Computational data Analytics | 1. An understanding of the principles governing an advanced computational focus area (Cyber-security, Machine Intelligence, Systems/Theory, Linguistics and Text analytics).
2. An advanced understanding of and the ability to use analytic techniques in one or more focus areas.
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|  | Natural Language Processing | 1. Understand Natural Language Processing
2. Probabilistic model of defining language and techniques.
3. Applying Hidden Markov model and Speech Recognition.
4. Application of context free grammar and language parsing.
5. Implement probabilistic and language parsing.
6. Analyze the differentiation of semantic and discourse in terms of NLP.
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|  | Cryptography and network security Lab | After successful completion of the lab, students can able to Develop and implement a java interface for encryption and decryption algorithms i.e., AES, MD5 and RSA algorithms |
|  | Cloud Computing lab | Students will able to:1. Implement Virtualization using different types of Hypervisors
2. Study and implement Collaboration with different Software As Services
3. Describe steps to perform on demand Application delivery using Ulteo .
4. Examine the installation and configuration of Open stack cloud
5. Analyze and understand thefunctioning of different googleservices .
6. Implementation of Platform as a Service using Google App Engine

Design & Synthesize Storage as a service using own Cloud |
|  | Data Analytics Lab | 1. Preparing for data summarization, query, and analysis.
2. Applying data modelling techniques to large data sets
3. Creating applications for Data analytics
4. Building a complete business data analytic solution
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|  | Natural Language Processing lab | Students will be able to: * 1. Process the text data at syntactic and semantic level.
	2. Extract the key information from Text data.
	3. Analyze the text content to provide predictions related to a specific domain using language models.
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| 7921 | Project (Stage I) | 1. Able to gather knowledge over the field of research and design or plan about the proposed work.
2. Ability to locate and use technical information from multiple sources.
3. Able to perform a literature search to review current knowledge and developments in the chosen technical area.
4. Understand the software development cycle with emphasis on different processes - requirements, design, and implementation phases.
5. Able to work as a team and to focus on getting a working project done on time with each student being held accountable for their part of the project.
6. Able to deliver a seminar on the general area of work being undertaken and specific contributions to that field and prepare a formal re
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| **Semester- VIII** |  |
|  | Fundamentals of Bitcoins and Cryptocurrency | Students will learn 1. About bitcoin, including its history, development, and context within the modern global economy.
2. The basic cryptographic principles that underlie bitcoin, and gain confidence by demonstrating strong security principles in storing and transacting bitcoin.
3. Key principles such as mining, wallets, and hashing will be introduced.
4. Familiarized with the nascent industry of digital currencies and how they function
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| 8921 | Project (Stage-II) | 1. Able to demonstrate a sound technical knowledge of their selected project topic.
2. Able to design engineering solutions to complex problems utilising a systems approach.
3. Able to produce progress reports or maintain a professional journal to establish work completed, and to schedule additional work within the time frame specified for the project.
4. Able to deliver a seminar on the general area of work being undertaken and specific contributions to that field.
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| 8922 | Project (Stage- III) | 1. Able to demonstrate a sound technical knowledge of their selected project topic.
2. Able to design engineering solutions to complex problems utilising a systems approach.
3. Able to produce progress reports or maintain a professional journal to establish work completed, and to schedule additional work within the time frame specified for the project.
4. Able to deliver a seminar on the general area of work being undertaken and specific contributions to that field.
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|  |  | 1. Prepare a formal report describing the work undertaken and results obtained so far.
2. Able to present the work in a forum involving poster presentations and demonstrations of operational hardware and software.
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