



## **Bachelor of Technology (Computer Science)**

### **Program Outcome**

- PO-1) The graduates are able to develop an ability to apply knowledge of mathematics, science and engineering appropriate to the discipline.
- PO-2) The graduates are able to apply mathematical foundations, algorithmic principles and computer science theory in modeling, design and conduct of experiments as well as data interpretation and analysis.
- PO-3) The graduates are able to develop an ability 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.
- PO-4) The graduates are able to develop an ability to identify, formulate and solve real engineering problems and understand the global impact of engineering solutions.
- PO-5) The graduates are able to develop an ability to function effectively on multidisciplinary teams to accomplish a common goal.
- PO-6) The graduates are able to develop an understanding of professional, ethical, legal, security and social issues as well as responsibilities.
- PO-7) The graduates have good knowledge of contemporary issues and are able to communicate effectively with a range of audiences.
- PO-8) The graduates are able to recognize the need for lifelong learning and are able to apply the techniques, skills and modern engineering tools necessary for engineering practice.
- PO-9) The graduates are able to apply the fundamentals of mathematics, science and engineering knowledge to understand, analyze and develop computer programs in the areas related to algorithms, multimedia, big data analysis, machine learning, artificial intelligence and networking for efficient design of computer-based systems of varying complexity.
- PO-10) The graduates are able to apply appropriate techniques and modern engineering hardware and software tools for the design and integration of computer system and related technologies, to engage in lifelong learning for the advancement of technology and its adaptation in multi-disciplinary environments.
- PO-11) The graduates are able to implement professional engineering solutions for the betterment of society keeping the environmental context in mind, be aware of professional ethics and able to communicate effectively.



## Course Outcome

Sr. No.	Course Code	Course Name	Learning Outcomes
<b>SEMESTER-I</b>			
1.	CE - 1102	<b>Organizational Behavior and Industrial Psychology</b>	<p>CO1. The course explains different models used to explain individual behavior, Develops learning about organizational culture, its design. Describe the various problematic issues due to individual behavior and their resolution. Students will understand different perspectives of personality.CO2. To apply differential calculus to notions of curvature. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their disciplines.</p> <p>CO2. Understanding will develop among students about Perception and its various perspectives how it affects individual behavior. Learning Of work related attitude i.e. job commitment and involvement will enhance job satisfaction. Explanation about Motivation its need for enhancing employee performance.</p> <p>CO3. Summarize the factors that affect group dynamics. Basic understanding about benefits of working in groups as well as various stages of group development.</p> <p>CO4. Develops understanding about Concept and need of effective communication in the organizations. Also depict Leadership concept with the help of various leadership theories.</p> <p>CO5. Three Level Structure at any organization, which shows the hierarchy and cross diversified culture at organization. Develops understanding among students about how to behave and act under cross cultural environment.</p> <p>CO6. Change is required for development and organizational effectiveness this is learning outcome for concerned topic as well as global workforce diversity and its management.</p>



Sr. No.	Course Code	Course Name	Learning Outcomes
2.	MA-1101	Mathematics-I	<p>CO1. To apply the essential tools of matrices including eigenvalues, diagonalization in a comprehensive manner. CO2. To understand the properties of light and its application i.e. polarisation, reflection, refraction and scattering.</p> <p>CO2. To apply differential calculus to notions of curvature. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their disciplines.</p> <p>CO3. To apply the effective mathematical tools for the solutions of differential equations.</p> <p>CO4. To apply integral calculus to notions to integrals. Apart from some other applications they will have a basic understanding of Beta and Gamma functions.</p>
3.	CH-1101	Engineering Chemistry	<p>CO1. Industrial use of water, issues related to.</p> <p>CO2. Electrochemistry is multidisciplinary science which can be applied to a variety of fields such as physical, chemical and biological sciences. The Understanding of fundamentals of Electrochemical reaction develops analytical thinking skills and empowers students for analyzing and solving environmental issues, updation of knowledge in the field develop critical thinking aptitude, Current problems related to environment due to pollution and contamination can be better understood.</p> <p>CO3. Understand the terminology associated with engineering thermodynamics and have knowledge of contemporary issues related to chemical engineering thermodynamics. Development of Ability to apply fundamental concepts of thermodynamics to engineering applications, It enhance Ability to estimate thermodynamic properties of substances/compounds (and chemical reactions) in gas and liquid states.</p> <p>CO4. Organic chemistry is integral part of life sciences and chemical sciences. Intended Outcomes for the course upon complete concept understanding- the student will be able to: Demonstrate an intermediate ability to use effective written and/or oral communication through the application of organic chemistry concepts and solving reasoning based problems in reaction mechanism, using the language of chemistry. Understanding of its fundamentals helps in developing</p>



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			<p>critical thinking and analyzing problems. Understanding of Polymers and its synthesis mechanism. Planning of experiments and analyze the experimental data for synthesis of different polymers.</p> <p>CO5. Ability to characterize the fuels, Understanding of thermodynamics and kinetics of combustion of various fuels, Understanding the ability to analyze the combustion mechanisms of various fuels, Understanding energy resources available naturally and synthetically, supply and demand of energy, Ability to understand rational use of energy, conservation practices required, Increase knowledge of latest technologies to conserve the energy and various explorations in the field such as fuel cells and hydrogen energy.</p>
4.	CE-1101	Engineering Mechanics	<p>CO1. Understanding of basic concepts of force system, moments and wrench.</p> <p>CO2. Ability to develop FBDs for various numerical to analyze and solve force system including trusses.</p> <p>CO3. To develop understanding about friction, its type and uses during numerical solving approach.</p> <p>CO4. To understand and use data related to rectangular and cylindrical coordinates. Ability to solve projectile motion numerical.</p> <p>CO5. Ability to develop and analyze MOI based numerical along with General plane motion and circular motion of rigid bodies.</p> <p>CO6. Ability to develop understanding about Impulse and momentum, Collision including numerical solving approach.</p>
<b>SEMESTER-II</b>			
5.	ME-1101	Elements of Mechanical Engineering	<p>CO1. Understanding of basic concepts of different forms of energy and its applications.</p> <p>CO2. Ability to develop basic concepts about thermodynamics and to solve numericals involving heat and work.</p> <p>CO3. To develop understanding about different type of steam generators and their applications.</p>



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			<p>CO4. To understand the basic concepts of prime movers and its various types alongwith the use.</p> <p>CO5. Ability to develop understanding about different types of power plants with relative merits and demerits.</p> <p>CO6. To understand the working procedure of VARS, VCRS alongwith different AC systems.</p> <p>CO7. Ability to develop understanding about Metals and their properties.</p> <p>CO8. Ability to develop understanding about various heat treatment processes.</p>
6.	ME-1103	Workshop	<p>CO1. Understanding of basic concepts and application of different tools used in black smithy section along with job making.</p> <p>CO2. Ability to develop basic concepts about various operative carpentry tools and to perform jobs during practical sessions.</p> <p>CO3. To develop understanding about different types of fitting tools and job making.</p> <p>CO4. To understand the basic concepts of furnce along with pattern making during practical sessions.</p>
7.	HS-1205	Communicative English	<p>CO1. Grip on sentence framing while writing as well as speaking.</p> <p>CO2. How to avoid common mistakes while writing learning objectives.</p> <p>CO3. Participates in different events such as role play, debate, extempore.</p> <p>CO4. Locating main idea, sequence of events and correlating things.</p> <p>CO5. Ability to present thoughts in limited words.</p> <p>CO6. Communication in office.</p> <p>CO7. To describe skills, education, experience and achievements with proper grammar format.</p> <p>CO8. To learn to communicate effectively in business interaction, business documents with proper etiquette.</p>



Sr. No.	Course Code	Course Name	Learning Outcomes
			CO9. How to pronounce well and understand the transcript.
8.	MA-1202	Mathematics-II	CO1. The objective of this course is to familiarize the prospective engineers with techniques in Infinite series , Fourier Analysis, Laplace Transform, Integral calculus, Vector calculus. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their disciplines.
9.	PH-1201	Physics	CO1. To impart knowledge on the concepts of electrostatics, electric potential, energy density and their applications. To impart knowledge on the concepts of magnetostatics, magnetic flux density, scalar and vector potential and its applications. CO2. To understand the properties of light and its application i.e., polarisation, reflection, refraction and scattering. CO3. Understand the meaning of polarization. Understand the property of optical activity of certain materials. CO4. To Understand the Theory of relativity. CO5. To Know the Difference between Classical Mechanics to quantum mechanics. also understand the ab time-dependent and time-independent Schrödinger equation for simple potentials like for instance the harmonic oscillator and hydrogen like atoms, as well as the interaction of an electron with the electromagnetic field quantum mechanical axioms and the matrix representation of quantum mechanics.
10.	EE-1201	Basic Electrical Engineering	CO1. This is the basic unit of basic electrical in which learner shall come to know about fundamental theorems of electrical which shall be useful thorough out the course. Also, learner shall become aware of DC. CO2. This unit is dedicated to fundamentals of ac. Learners shall come to know about all the theorems of ac. CO3. This unit is dedicated to 3-phase ac. Learners shall come to know about industrial use of ac.



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			<p>CO4. This part of syllabus is associated analogy of electrical circuit i.e. magnetic circuit. Learner shall come to know about properties and applications of magnetic circuits.</p> <p>CO5. This part of syllabus is associated analogy of electrical circuit i.e. magnetic circuit. Learner shall come to know about properties and applications of magnetic circuits.</p>
11.	IT-1201	<b>Fundamental of Information Technology</b>	<p>CO1. Have a basic understanding of personal computers and their operations.</p> <p>CO2. Knows the terms of motherboard, CPU, RAM, ROM, BIOS, CMOS and can express with their own words.</p> <p>CO3. Understand basic concepts and terminology of information technology.</p> <p>CO4. Understand the concept of Internet, Basic Internet Terms Getting Connected to Internet, Web Browser E-mail, G-mail Account, search Engines.</p> <p>CO5. Be able to identify issues related to information security.</p> <p>CO6. Understand the computer basics and principles of programming language design. Design flow-chart, algorithm and program logic.</p> <p>CO7. Acquire the knowledge of fundamentals, concepts and constructs of C programming.</p> <p>CO8. Understand the concept of data types, loops, functions, array, pointers, string, structures and files.</p> <p>CO9. Analyze problems, errors and exceptions.</p> <p>CO10. Ability to work with arrays of complex objects.</p> <p>CO11. Understanding a concept of functional hierarchical code organization.</p>
12.	ME-1202	<b>Engineering Graphics</b>	<p>CO1. Understanding of basic concepts of drawing and learn the techniques, skills, and modern engineering tools necessary for engineering practice.</p> <p>CO2. Exposure to engineering communication.</p>



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			<p>CO3. To develop understanding about different types of two dimensional planes.</p> <p>CO4. Exposure to solid objects drawing.</p> <p>CO5. Ability to develop understanding about the concept of section of solids and their graphical representation.</p> <p>CO6. To understand the concept of development of surfaces of different shaped objects.</p> <p>CO7. Ability to develop understanding about intersection concepts of two solid objects.</p> <p>CO8. Exposure to the visual aspects of engineering design.</p> <p>CO9. Exposure to creating working drawings.</p> <p>CO10. Exposure to computer-aided geometric design.</p>
<b>SEMESTER-III</b>			
13.	MA - 1303	Mathematics-III	<p>CO1. The objective of this course is to familiarize the prospective engineers with techniques in ordinary and partial differential equations, complex variables, probability and statistics. It aims to equip the students to deal with advanced level of mathematics and applications that would be essential for their disciplines.</p>





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14.	EC-1303	Digital Electronics	<p>CO1. Learner shall grab the basic Idea, principle and applications of Digital Electronics.</p> <p>CO2. Learner shall get very basic concepts which are highly essential for next modules of this subject. They will be aware of Logic Gates and other basic concepts.</p> <p>CO3. Learner shall get the idea of various types of combinational logic circuits.</p> <p>CO4. This course is dedicated to Logic Families. Learner shall get idea of its various types.</p> <p>CO5. Learner shall get knowledge of Sequential Circuit which output depends on present input as well as future output.</p> <p>CO6. Learner shall get the idea of various types of Timing Circuits especially LM555.</p> <p>CO7. This module is for Memory types. Learners shall get complete idea of Memory.</p>
15.	CS-1301	Object Oriented Programming	<p>After completion of the course the student will be able to:</p> <p>CO1. Specify simple abstract data types and design implementations.</p> <p>CO2. Recognise features such as simple statement, conditional statement, loops and function.</p> <p>CO3. Recognise features of object-oriented design such as encapsulation, constructors, destructors, and composition of systems based on object identity.</p> <p>CO4. Recognise features of object-oriented design such as , polymorphism, inheritance, and composition of systems based on object identity.</p> <p>CO5. Name and apply some common object-oriented design patterns and give examples of their use.</p>



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16.	MA-1304	Numerical Methods & Computational Techniques	CO1. The objective of this course is to familiarize the prospective engineers with techniques in computer language, programming, Iterative Techniques, Polynomial approximation, Numerical integration, Solution of initial value problem. It aims to equip the students to deal with advanced level of mathematics and applications that would be essential for their disciplines.
17.	EC-1301	Basic Electronics	CO1. Basic concepts of components of Electronics shall be provided to Learners. CO2. This Course is dedicated to most basic component of electronics-Diode. Learners shall come to know about its construction, working principles and associated mechanisms. CO3. This module is for various applications of p-n junction diode. Lerner shall become well aware of applications of diode. CO4. Learner shall come to know about all types of special types od diode which has attractive specific applications. CO5. This is one of the very important Module by which learner will come to know about very basic transistor-BJT. CO6. Learner shall come to know about another types of transistors- FET & MOSFET, their construction, working principle and characteristics. CO7. This module is for Amplifiers. Learner shall become aware of its basic concepts. CO8. This module is dedicated to ICs which is one of the revolutionary component of electronics. This component reduced the size of electronic circuit in a great extent. Learners shall get complete idea of fabrication of various components on a single chip. CO9. Oscillators shall be briefly explained for learners.



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<b>SEMESTER-IV</b>			
18.	MA-1405	Discrete Mathematical Structure & Graph Theory	CO1. The objective of this course is to familiarize the prospective engineers with techniques in Set, relation and function, Propositional logic, Algebraic structure, Partially ordered sets, Introduction to Counting and Graph. It aims to equip the students to deal with advanced level of mathematics and applications that would be essential for their disciplines.
19.	EC-1405	Analog Electronics	CO1. This is very basic module of Analog Electronics where learners shall get the idea behind very basic concepts of amplifiers. CO2. This module is dedicated for dedicated to analysis of types of transistor configuration and their analysis. Learners shall get complete idea of High and Low frequency analysis of Transistors. CO3. This module is for series and parallel connection of amplifiers. Along with this learner shall get the idea of Bootstrapping of Emitter Follower too. CO4. This module is important as per short notes point of view. Learner shall be aware of important properties of multistage amplifiers. CO5. This is analytical module. Learners shall come to know about "incremental analysis" of CS amplifiers at Low and High frequencies. CO6. This module is important as per short notes point of view. Learner shall be aware of types of noises in electronics. CO7. Learners shall become well aware of "Power Amplifiers" and "Complementary Symmetry Amplifiers".
20.	CS-1403	Data Structures	CO1. For a given algorithm student will able to analyze the algorithms to determine the time and computation complexity and justify the correctness. CO2. For a given problem of Stacks, Queues and Circular Queue, student will able to implement it and analyze the same to determine the time and computation complexity.



Sr. No.	Course Code	Course Name	Learning Outcomes
			<p>CO3. For a given problem of linked list, circular linked list, doubly linked list, linked stack and linked queue, student will able to implement it and analyze the same to determine the time and computation complexity.</p> <p>CO4. For a given problem of binary tree using linked list or array concept, student will able to implement it and analyze the same to determine the time and computation complexity.</p> <p>CO5. Student will able to write an algorithm Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort ,Linear Search, Binary Search, Hashing and compare their performance in term of Space and Time complexity.</p>
21.	CS-1402	Computer Architecture	<p>CO1. To develop ability of the basic of computer Architecture.</p> <p>CO2. Develop the understanding about addressing and Memory control.</p> <p>CO3. Ability to develop understanding of various memories and data transfer.</p> <p>CO4. Understanding of various concepts of parallelism and architectural classification.</p> <p>CO5. Ability to understand parallel processors and their requirements.</p> <p>CO6. To develop understanding of SIMD Array processors.</p>
22.	CS-1405	System Programming	<p>After completion of the course the student will be:</p> <p>CO1. Able to understand brief concept about system programming.</p> <p>CO2. Capable to know and design algorithm for implementation of different translator.</p> <p>CO3. Able to secure a knowledge to use concept of MACRO and avoid redundan code as well as eliminate daed code in AL.</p> <p>CO4. Able to calculate memory address like absolute address, Relocatable address.</p> <p>CO5. Able to understand all feature of Compiler, To implement one pass, Two pass and multipass compiler.</p>



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			CO6. Able to develop program on different types of editor and its function, find error and perform appropriate action for removal of errors using different test cases.
23.	CE-1401	Organizational Behavior & Industrial Psychology	After completion of the course: CO1. Learner will come to know about functioning of CPU, timing diagram etc. in detail. CO2. Learner will able to get hands on practice by programming 8085 etc. CO3. Learner will become enabled after grabbing the knowledge of addressing mode and instruction set.
<b>SEMESTER-V</b>			
24.	EE-1511	Microprocessor & It's Applications	After completion of the course: CO1. Learner will come to know about functioning of CPU, timing diagram etc. in detail. CO2. Learner will able to get hands on practice by programming 8085 etc. CO3. Learner will become enabled after grabbing the knowledge of addressing mode and instruction set.
25.	CS - 1506	Design & Analysis of Algorithm	CO1. For a given algorithms analyze worst-case running times of algorithms based on asymptotic analysis and justify the correctness of algorithms . 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. CO2. Describe the greedy paradigm and explain when an algorithmic design situation calls for it. For a given problem develop the greedy algorithms. CO3. 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.



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			<p>CO4. Explain the ways to analyze randomized algorithms (expected running time, probability of error). Explain what an approximation algorithm is. Compute the approximation factor of an approximation algorithm (PTAS and FPTAS).</p> <p>CO5. For a given model engineering problem model it using graph and write the corresponding algorithm to solve the problems.</p>
26.	CS - 1529	Introduction to Java Programming Language	<p>After completion of the course:</p> <p>CO1. Student will learn about history and basics of Java.</p> <p>CO2. Student will learn about how to minimize errors in a program, different types of data.</p> <p>CO3. Student will learn about all types of operators used in Java Language.</p> <p>CO4. Student will learn about different ways of accepting inputs from user and displaying output.</p> <p>CO5. Student will learn about basics of Array and String Class.</p> <p>CO6. Student will learn about how to convert Sting Object into Specific data types.</p> <p>CO7. Student will learn about basics of OOPS concept.</p> <p>CO8. Student will learn about different types of methods, may be used in a class body.</p> <p>CO9. Student will learn, how to reuse the code, concepts of polymorphism.</p> <p>CO10. Student will learn to create its own packages.</p> <p>CO11. Student will learn how to control exception occurred in a program.</p> <p>CO12. Student will learn how to implement multitasking.</p> <p>CO13. Student will learn to design GUI using AWT, Swing, Applet.</p> <p>CO14. Student will learn about how to connect frontend language with a backend language.</p>



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27.	CS - 1509	Database System	<p>CO1. Student will able to learn about basics of Operating systems, their types and applications.</p> <p>CO2. Student will able to learn about how to create processes and threads.</p> <p>CO3. Student will able to learn about, Develop algorithms for process scheduling for a given specification of CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time.</p> <p>CO4. Student will able to learn different kinds of representing knowledge into knowledge base od AI machine.</p> <p>CO5. Student will able to types of reasoning done in AI machine and mathematical theorems used in AI applications.</p> <p>CO6. For a given specification of memory organization develop the techniques for optimally allocating memory to processes by increasing memory utilization and for improving the access time.</p> <p>CO7. For a given specification of memory organization develop the techniques for optimally allocating virtual memory to processes by increasing memory utilization and for improving the access time.</p> <p>CO8. Design and implement file management system.</p> <p>CO9. 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.</p>
28.	CS - 1513	Computer Network	<p>CO1. Brief knowledge about component of computer network, hardware as well as software need in communication purpose. Clear understanding about network protocol and functionality of all the layer in OSI model.</p> <p>CO2. Able to know different types of wired as well as wireless medium in computer network and standard used in physical layer of OSI Model.</p> <p>CO3. To be able to define frame structure of MAC layer, develop mechenism for error control and flow control, use of piggybacking concept to reduce communication overhead.</p>



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			<p>CO4. Able to know about slotted ALOHA and ALOHA used in Random access protocol in OSI model.</p> <p>CO5. Complete details about collision in computer network, able to get control over collision detection as well as avoidance during message send and receive.</p> <p>CO6. Clear understanding on routing algorithm, how to find best path during communication of any kind of message, explanation about working principle of switch and bridge.</p> <p>CO7. Details about all designing issues come under network layer of OSI model, how function work in network layer.</p> <p>CO8. Recognize the technological trends of Computer Networking.</p> <p>CO9. Discuss the key technological of link state protocol and other in the Network. Evaluate the challenges in building networks and solutions to TCP/IP, OSPF, different gateway.</p>
<b>SEMESTER-VI</b>			
29.	CS – 1604	<b>Object Oriented Analysis &amp; Design</b>	<p>CO1. Ability to develop understanding of object oriented model.</p> <p>CO2. To understand the concept of various techniques like Association, State diagram, object diagram etc.</p> <p>CO3. To develop the understanding the design methodology.</p> <p>CO4. Develop various case study on relational database.</p>
30.	CS - 1601	<b>Principle of Programming Languages</b>	<p>CO1. An ability to program in different language paradigms and evaluate their relative benefits.</p> <p>CO2. Understand the role of theoretical formalisms, such as operational and denotational semantics.</p> <p>CO3. Knowledge of, and ability to use, language features used in current programming languages.</p> <p>CO4. An understanding of the key concepts in the implementation of common features of programming languages. apply basic principles for formalising concurrent programming languages.</p> <p>CO5. Analyze the role of types in programming languages.</p>





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31.	CS - 1612	Formal Languages & Automata Theory	<p>CO1. Ability to develop basic concepts of computational techniques and ability to design Finite Automata &amp; their various types like Deterministic and Non-Deterministic nature.</p> <p>CO2. Ability to develop understanding and designing Regular languages through Regular Expressions.</p> <p>CO3. To understand the limitations of regular languages and ability to develop understanding about minimization of automata.</p> <p>CO4. Ability to develop understanding and designing of context Free Languages through Context Free Grammar and their applications.</p> <p>CO5. To develop ability to design Push down Automata (PDA) on the given language or for the specific computational Task.</p> <p>CO6. Ability to develop understanding various normal forms and clouser properties.</p> <p>CO7. Ability to develop understanding and designing of Turing Machine and their properties.</p> <p>CO8. Ability to understand various Classes of intractable problem like n type , p type, np type etc.</p>
32.	HS - 1606	Industrial Economics & Accounting	<p>CO1. Basic concept of economics and its relationship with Engineering.</p> <p>CO2. Students will be able to understand concept of Demand can calculate elasticity of demand and knowledge about its application and importance.</p> <p>CO3. After going through this module students will be able to understand 1.the concept of Production its factors and functions 2. Law of variable proportion 3.Entrepreneurship.</p> <p>CO4. Cost analysis helps in understanding the budget of any project , Decision making process, analysing long run and short run cost .price determination etc. To understand and calculate the contribution and minimum output and sales required by any company.</p> <p>CO5. Students will understand the relationship between different market structures price determination under different market structures and concept of demand and</p>



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			supply. CO6. Students can calculate the future value of a multi- period investment and comparison between present worth and future worth. CO7. After going through this module Students will be able to understand basic concept of Accounting, recording transaction details in journal and ledger to understand profit and loss account.
33.	IT - 1614	Software Engineering	CO1. To provide the brief idea of decomposing the given problem into Analysis, Design, Implementation, Testing and Maintenance phases. CO2. Demonstrate knowledge of the engineering and management principles and apply these to one's own work, to manage projects and in multidisciplinary environments. CO3. Apply the knowledge of software engineering to the solution of complex engineering problems related to real life. CO4. Describe data models, life cycle model, Understanding of different software architectural styles, Understanding of implementation issues such as modularity and coding standards. CO5. Understanding of software testing approaches such as unit testing and integration testing and Describe software measurement and software risks. CO6. Understanding of software evolution and related issues such as version and cost management. CO7. Understanding on quality control and how to ensure good quality software
34.	CS - 1607	Web Applications Design & Development	CO1. Implement the isolation property, including locking, time stamping based on concurrency control and Serializability of scheduling. CO2. Describe the dynamic-programming paradigm and explain when an algorithmic design situation calls for it. For a given problems of dynamic-programming. CO3. Develop the dynamic programming algorithms, and analyze it to determine its computational complexity.



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			<p>CO4. Explain the ways to analyze randomized algorithms (expected running time, probability of error).</p> <p>CO5. Enterprise Application Development process, Deploying Web Applications.</p>
35.	CS - 1616	Compiler Design	<p>CO1. Ability to develop basic understanding about phases of compiler.</p> <p>CO2. To develop basic understanding of tokens, lexical analyzer.</p> <p>CO3. Ability to develop understanding and designing of various types of parsers.</p> <p>CO4. To develop basics understanding of Syntax directed Translation.</p> <p>CO5. To develop understanding of Types Checking of various expressions.</p> <p>CO6. To develop and design the concept of symbol table.</p> <p>CO7. Ability to develop intermediate code generation of the specific languages using the concept of Three Address Code.</p> <p>CO8. Ability to develop code using various techniques like DAG, Dynamic programming.</p> <p>CO9. Ability to understand various Error Detection and Recovery techniques.</p> <p>CO10. Ability to develop optimized code on the basis of various concept like code movement, dead code eliminatopn etc.</p>
<b>SEMESTER-VII</b>			
36.	CS- 1715	Distributed Computing	<p>CO1. Explain the principles underlying Evolutionary Computation in Distributed computing and Distributed operating system, analyze the current popular distributed systems such as its feature, encoding decoding method.</p> <p>CO2. To provide hardware and software issues in RPC and its different model.</p> <p>CO3. To know about Shared Memory Techniques.</p>



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			<p>CO4. Have Sufficient knowledge about file access.</p> <p>CO5. Have knowledge of Architecture and Deadlock.</p> <p>CO6. Students will explain and contrast the communication mechanisms between different processes and process migration.</p> <p>CO7. Distributed Systems combine the computational power of multiple file access, replication concept to solve complex problems.</p>
37.	CS - 1717	Artificial Intellegence	<p>CO1. Student will able to learn about basics of AI, Prolog and LISP.</p> <p>CO2. Student will able to learn about different types of searching concepts followed by AI machine to search any knowledge efficiently.</p> <p>CO3. Student will able to learn about different types of algorithms used for developing computer games.</p> <p>CO4. Student will able to learn different kinds of representing knowledge into knowledgebase od AI machine.</p> <p>CO5. Student will able to types of reasoning done in AI machine and mathematical theorems used in AI applications.</p> <p>CO6. Student will able to how to develop a machine for generating and understanding natural languages like English etc.</p> <p>CO7. Student will able to learn different application areas of artificial intelligence and find problem definitions for their projects.</p>
38.	CS - 1722	Distributed Data Base (Elective-I)	<p>CO1. Ability to develop the concept of Distributed Database System.</p> <p>CO2. Ability to develop the concept of various Distributed Database architectural Models.</p> <p>CO3. To develop the ability to design distributed database system.</p> <p>CO4. To develop the ability the concept of semantic data control.</p>



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			<p>CO5. Develop the understanding of Transaction properties and various transaction types.</p> <p>CO6. To develop the understanding reliability of Distributed DBMS.</p> <p>CO7. Ability to develop the parallel database system.</p>
39.	CS - 1718	<b>Cryptography (Elective-II)</b>	<p>CO1. To understand basics of Cryptography.</p> <p>CO2. To be able to secure a message over insecure channel by various means.</p> <p>CO3. To understand various protocols for network security to protect against the threats in the networks.</p> <p>CO4. To understand various protocols for network security to protect against the threats in the networks. Identify and analyze network security attacks and counter measures to prevent those attacks.</p>
40.	CS - 1702	<b>Visual Programming (Elective-III)</b>	<p>CO1. Specify simple abstract data types and design implementations, using abstraction functions to document them.</p> <p>CO2. Recognise features of object-oriented design such as encapsulation, polymorphism, inheritance, and composition of systems based on object identity.</p> <p>CO3. Name and apply some common object-oriented design patterns and give examples of their use.</p> <p>CO4. Design applications with an event-driven graphical user interface.</p> <p>CO5. Implement the isolation property, including locking, time stamping based on concurrency control and Serializability of scheduling.</p> <p>CO6. Design Web applications with an event-driven graphical user interface.</p>
<b>SEMESTER-VIII</b>			
41.	CS-1822	<b>Data Mining &amp; Warehousing</b>	<p>CO1. Understand basic concepts and terminology of data mining and warehousing.</p> <p>CO2. Understand the Decision Trees, Generating Association Rules, K-Mear Algorithm, Genetic learning.</p>



Sr. No.	Course Code	Course Name	Learning Outcomes
			<p>CO3. Recognise features of KDD Process model, Noisy data, Missing data, Data Transformation.</p> <p>CO4. Ability to work with Database and also design the Data warehouse.</p> <p>CO5. Explain the Evaluation criteria, Tools, Computing Test Set Confidence Intervals.</p> <p>CO6. Understand the concept of Feed – Forward Neural Networks, NN Training.</p> <p>CO7. Concept of Statistical Techniques.</p> <p>CO8. How to use the Specialized Techniques.</p>
42.	HS-1804	<b>Personal management &amp; Industrial Relation</b>	<p>CO1. This module will develop understanding about Role and Responsibilities of Personnel Manager and department.</p> <p>CO2. Students will understand the concept of job Analysis, Its two methods Job Description and Job Specification.</p> <p>CO3. Explain The need and Various methods of Training. Develop understanding about Training removes deficiency of skills and knowledge.</p> <p>CO4. Elaborate The objective of Performance Appraisal and how it motivates employees to enhance their skills and make them more effective. Also the post effect of Appraisal system i.e. Promotion, Transfer and separation.</p> <p>CO5. Students will develop understanding about Compensation, types and methods of identifying compensation in the organization.</p> <p>CO6. This module explain health, Safety And welfare of employee in the organization.</p> <p>CO7. This module will develop understanding about industrial relation, reasons for conflict among management and workers and how to resolve conflict through various methods.</p>
43.	IT-1805	<b>Information Security</b>	<p>CO1. To develop basic understanding about the information security, threats and risk and their laws.</p> <p>CO2. To develop understanding of Cryptographic philosophy.</p> <p>CO3. Ability to develop and analyse various cryptographic</p>



Sr. No.	Course Code	Course Name	Learning Outcomes
			methods based on Symmetric and Asymmetric Key cryptography. CO4. To develop understanding of Digital Immune System and the various malicious activity like Virus, Worms.
44.	CS - 1825	Advanced Computer Architecture (Elective-IV)	CO1. State and understand memory hierarchy design, memory access time formula, performance improvement techniques, Loop Parallelization and Pipelining, Parallel Programming Environments. CO2. Understand the Concept of Parallel Processing and its applications, Analyze the performance of different scalar Computers and properties of parallelism. CO3. Understand the Concept and Implementation of memory model. CO4. Analyze the performance of different variable and fixed problem. CO5. Recognise features of Parallel Programming Models, Parallel processor and Compilers. CO6. Analyse the Dependence Analysis of Data Arrays, Code Optimization and Scheduling, concept of deadlock.
45.	CS - 1830	Genetic Algorithms (Elective-V)	CO1. For a given algorithms analyze worst-case running times of algorithms based on asymptotic analysis and justify the correctness of algorithm. 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. CO2. Describe the greedy paradigm and explain when an algorithmic design situation calls for it. For a given problem develop the greedy algorithms. CO3. 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. CO4. Explain the ways to analyze randomized algorithms (expected running time, probability of error). Explain what an approximation algorithm is. Compute the approximation factor of an approximation algorithm (PTAS and FPTAS).



Sr. No.	Course Code	Course Name	Learning Outcomes
			CO5. For a given model engineering problem model it using graph and write the corresponding algorithm to solve the problems.

