

Course Outcomes are narrower statements that describe what students are expected to know, and be able to do at the end of each course/subject. While the POs define the departmental outcomes, the COs are more oriented towards the subjects and are mostly defined by the faculties consulting higher authorities. The COs are more like statements that relate to the skills, knowledge, and behaviour the students acquire as they go through a specific course within a program. They collectively contribute to the program outcomes. They are to be mapped to the POs, and not necessarily to a single one.

Two or more COs can be mapped to a PO and a CO can be mapped to one or more PO(s). COs are mapped to different POs based on their influence on them

Course Outcome (CO)	Name of the Course and Code Number	
CO No.	C101	English-I (6H101)
1	C101.1	Appraise their knowledge base in English
2	C101.2	Know the aspects of language skills - LSRW
3	C101.3	Acquire basic sentence construction skill
4	C101.4	Acquire the vocabulary and grammar skills
5	C101.5	Know the features of spoken language
6	C101.6	Acquire the basic correspondence ability by using the medium of letters
CO No.	C102	Engineering Mathematics – I (6H111)
1	C102.1	Represent function in series form using Maclaurin’s series; evaluate limits, continuity & differentiability for two variable functions, also able to find maxima and minima of a function.
2	C102.2	Solve first order first degree ordinary differential equations.
3	C102.3	Solve higher order linear differential equation with constant coefficients.
4	C102.4	Evaluate iterated multiple integration and the technique of change of variables.
5	C102.5	Solve the problems on gradient, curl and divergence of a vector field,
6	C102.6	Compute area and volume integrals using Gauss, Stoke’s and Gauss divergence theorems
CO No.	C103	Engineering Physics – I (6H121)
1	C103.1	Describe application of Physical Optics using Interference, Diffraction.
2	C103.2	Describe characteristics, action significance Lasers and Applications of Lasers.Explain Fiber Optics Principle, Acceptance Angle, its types, other features and applications of optical Fibre in communication system, Fiber Optic Sensors and Medical Endoscopy.
3	C103.3	Explain concepts of Statistical mechanics such as Maxwell – Boltzmann Statistics, Bose – Einstein Statistics, Fermi – Dirac Statistics, Distribution function and Density of states.
4	C103.4	Explain Free electron theories of Metals and Electrical Conductivity from quantum free electron theory of metals.
5	C103.5	Describe principles of Quantum Mechanics and explain

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		Heisenberg's Uncertainty Principle and Schrodinger's Time Independent Wave Equation – Physical Significance of the Wave Function.
6	C103.6	Describe Band Theory of Solids with Bloch Theorem, Kronig-Penny Model (Qualitative Treatment), E-K Curve, Formation in Solids and Classification of Materials into Conductors, Semi Conductors and Insulators.
CO No.	C104	Engineering Chemistry (6H131)
1	C104.1	Explain the domestic and industrial problems caused by hard water and understand the municipal water treatment.
2	C104.2	Discuss and express the important fundamental concepts used in electrochemistry and use electrochemical techniques/data analysis to obtain information on a redox system. Student also understands the practical importance of electrochemistry for solving challenges such as those faced in modern power sources.
3	C104.3	Apply the electrochemical process methods for consumer and industrial batteries, which are Ni-Cd, Lead Acid and Li-ion/polymer. It also includes the reusable alkaline for comparison.
4	C104.4	Comprehend the concepts and types of corrosion and how these can be anticipated and prevented. Student will able to apply concepts of corrosion on engineering materials.
5	C104.5	Explain the necessity of Protective coating for protection against corrosion and the methods to do the same.
6	C104.6	Student will get principles in separation of metals and material using the principle of Phase Rule student also use the preparation methods for alloys and applications of Alloys
CO No.	C105	Computer Programming (6F101)
1	C105.1	Explain basic fundamentals of Computer Systems, computing environments, Computer Languages – Machine Languages. Writing/ Drawing simple Algorithms and flowcharts.
2	C105.2	Describe C language Programs, Structure of a C Program, Comments, the greeting program, identifiers, constants, variables, types, expressions and keywords.
3	C105.3	Describe write programs using control structures such as Pre-test and post-test loops, while, do while, for, break and continue statements, comma expression. Write programs using functions. Write programs using recursion.
4	C105.4	Write programs implementing application on arrays.
5	C105.5	Write programs using Pointers and string handling functions.
6	C105.6	Write programs using Enumerated, Structure, Union types and files.
CO No.	C106	Engineering Drawing – I (6B101)
1	C106.1	Construct polygons, perform scaling and draw curves for constructions. Describe Projections or Views. Explain with examples Projections of Planes with regular Planes, traces,

Course Outcome (CO)	Name of the Course and Code Number	
		Oblique planes and Auxiliary plane, Explain Projections of Solids using Regular Solids, solids of revolution and Axis inclined to both planes. Explain Sections of Solids with Prism, Cylinder, Pyramid, Cone and Auxiliary views. Draw Intersection of Similar and Dis-similar Solids using Line, Cutting plane method, Intersection of Prism Vs Prism, Cylinders Vs Cylinder and Cylinder Vs Prism.
CO No.	C107	English language Communication skills lab (6H171)
1	C107.1	Pronounce the different phonemes of English language, using the right stress on word accent, intonation, and rhythm. Get rid of stage fear and speak extempore without inhibitions. Use language effectively to face interviews, group discussions, public speaking. Get abreast with the latest mode of technical aspects of computer knowledge enabling them in resume preparation, report writing, format-making etc. Communicate effectively
CO No.	C108	Engineering Physics Lab-I (6H181)
1	C108.1	Determine wave length of monochromatic source of light by using Newton's Rings and refractive index of a material prism by using spectrometer. Determine wave length of given laser source of light using Diffraction grating. Determine Dispersive power of a glass Prism and Cauchy's constant by using spectrometer. Experiment on R C Circuit and L C R series for calculating resonance and Planck's constant. Determine Numerical Aperture and Acceptance angle of a given optical fiber cable.
CO No.	C109	Engineering Chemistry Lab (6H186)
1	C109.1	Describe the principle and theory in determination of Hardness of a water sample. Experiment the method of preparation for organic compounds. Apply the knowledge to find the estimation of compounds. Determine the Viscosity of lubricants.
CO No.	C110	C Programming Lab (6F171)
1	C110.1	Write algorithms and flowcharts to convert temperature Celsius to its equivalent Fahrenheit, calculate roots and Fibonacci series. Write programs using control statements while, do-while, and for loops and solve mathematical series summations. Write programs in menu driven style. Write programs implementing functions, recursion with return values for example Fibonacci, GCD, LCM, pascal triangle, large and smallest in a set of numbers. Write a program to implementing applications on arrays, matrices addition, multiplication and compute symmetric, lower triangular, upper triangular, diagonal, scalar, or unit of a matrix. Write

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		programs on complex numbers and implement programs on student data or employee's information using files.
CO No.	C111	Engineering workshop-I (6B171)
1	C111.1	Perform House wiring and install Tube light, connection of Calling Bell as per circuit diagram and connection of stair case as per circuit diagram. Practice of disassembly and assembly of various home appliances such as Fans, Mixers, Air blower, Iron box and Rice cooker. Perform Welding as and when needed i.e Lap Joint, Butt Joint and welding of T-Joint
CO No.	C112	IT Workshop – I (6F172)
1	C112.1	1. Identify peripherals of a computer, describe types of Operating System, Install computer with dual boot operating systems. Assembling and Disassemble computer system. Install and Use Microsoft Windows 7 for programming and application development. Install Linux and Install Applications in Linux and Windows. Troubleshoot Software and hardware problems along with configurations setting for application and computer security for software development. Describe and practice Cyber ethics
CO No.	C113	Seminar on current affairs /Technical Topic (6E191)
1	C113.1	Identify current general, political and technology related topics. Arrange and present seminar in effective manner. Collect, survey and organize content in presentable manner. Demonstrate oratory skills with the aid of Power Point Presentations. Exhibit interview facing skills and team leading qualities
CO No.	C114	English – II (6H202)
1	C114.1	Appraise their knowledge base in English
2	C114.2	Know the aspects of language skills -LSRW
3	C114.3	Acquire basic sentence construction skill
4	C114.4	Acquire the vocabulary and grammar skills
5	C114.5	Know the features of spoken language
6	C114.6	Acquire the basic correspondence ability by using the medium of letters
CO No.	C115	Engineering Mathematics – II (6H213)
1	C115.1	Evaluate the rank of matrix, and able to find the solution to a linear system.
2	C115.2	Find eigen values and eigen vectors and their applications to find higher powers and inverse of a matrix.
3	C115.3	Form partial differential equations and find the solution to first order linear and nonlinear partial differential equations.

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4	C115.4	Solve the problems in evaluating Laplace and inverse Laplace transforms and its applications to solve ordinary differential equation with constant coefficients.
5	C115.5	Solve problems on Z-transform and its application to solve difference equations.
6	C115.6	Find the Fourier series of a function; solve the problems in finding Fourier transformations and their applications.
CO No.	C116	Engineering Physics – II (6H222)
1	C116.1	Describe elements and features of Crystallography and Crystal Structures.
2	C116.2	Describe the defects in crystals and Structure analysis of Crystals using XRD.
3	C116.3	Explain Semiconductor fundamentals, its properties and Hall Effect in semiconductors with its applications.
4	C116.4	Explain fabrication of Semiconductor Devices with PN Junction and working of PN Junction and its I-V Characteristics.
5	C116.5	Describe Magnetic Properties, application of Ferro Magnetic materials, Super conductivity and its types and BCS theory of Superconductivity
6	C116.6	Discuss significance, features characteristics applications of Nanotechnology and Nano Materials.
CO No.	C117	Data Structures (6E201)
1	C117.1	Demonstrate the concepts of Abstract data type and also applications of stack and Queues
2	C117.2	Select the data structure that efficiently model the information in a problem
3	C117.3	Design programs using variety of data structures including Trees, AVL Trees and Graphs and their applications.
4	C117.4	Solve problems and also assess efficiency trade off among searching and sorting using time complexity of each algorithm and also the applications of hashing and hash tables.
5	C117.5	Describe the concepts of OOPs and implement programs using objects, classes, constructors and destructors.
6	C117.6	Apply concepts of OOPs to write program on over loading functions and concepts of inheritance.
CO No.	C118	Engineering Drawing – II (6B202)
1	C118.1	Draw the various types of scales for different applications and using various types of units. Approve the practical applications of development of various solids and draw their developments. Appraise the three-dimensional representations of simple and complex objects through isometric projection principle given their orthographic, representation. Convert pictorial (Isometric) views to orthographic views. Identify the

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		applications and draw the perspective views of various drawing entities. Choose computer aided drafting technique and commands for generation of basic entities of drawing
CO No.	C119	Environmental and Applied Chemistry (6H232)
1	C119.1	Explain methodologies that facilitate greater control over product and as a consequence enable novel polymer architectures. Conductivity of polymers also helps in electro chemistry. If a company works with plastics, rubbers, resins, adhesives, composites, coatings, fibers or packaging, a good understanding of polymer chemistry will benefit
2	C119.2	Describe the concept, Structure and Function of Eco system in order to save the environment.
3	C119.3	Use the techniques in sustainable development with regard to Water Wasteland reclamation, Environmental management and green technology
4	C119.4	Identify the natural resources available and how to save the resources.
5	C119.5	Apply techniques in preparation and use of energy sources in industries.
6	C119.6	Apply the knowledge of control measures of Urban and Industrial waste to reduce the pollution.
CO No.	C120	Elements of Mechanical Engineering (6BC04)
1	C120.1	Acquire and elaborate the knowledge of basic concepts of thermodynamics and analyze the p-v & t-s diagrams of the different cycles.
2	C120.2	Identify & analyse the function of components used in the steam power plant & gas power plant, & how the power generation takes place in steam and gas power plant.
3	C120.3	Acquire the knowledge about the working of hydraulic pumps and hydraulic turbines and identify and understand the functions of components used in VCR and VAR systems and their working principles
4	C120.4	Acquire the knowledge to identify the different casting methods and welding methods and their applications
5	C120.5	Comprehend the various methods used in metal forming and press working
6	C120.6	Apply the knowledge to identify the different machine tools and their construction.
CO No.	C121	Gender Sensitization, Values, Ethics and Yoga (6ZC03)
1	C121.1	Develop students' sensibility with regards to issues of gender in contemporary India and to help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
2	C121.2	Provide a critical perspective on the socialization of men,

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		women and transgenders, to acknowledge women's role at home and at work and to have a wider understanding of ethics.
3	C121.3	Reflect the views critically on gender violence, understand engineering ethics and an engineer's responsibility for safety and risk.
4	C121.4	Perceive gender literacy and understand the importance of gender perspective.
5	C121.5	Describe rules and principles set by the society in a customary way.
6	C121.6	Describe and appreciate the importance of personality development through yoga for a holistic life.
CO No.	C122	Data structure Lab (C, C++) (6E271)
1	C122.1	Write programs to implement Stacks, Queues and circular queues, tree traversals. Inorder, preorder and post order, searching and sorting operations. Write programs on Binary trees, C++ to implement classes and operator overloading.
		Level of Attainment
CO No.	C123	Engineering Physics Lab – II (6H282)
1	C123.1	Determine the Energy gap (E _g) of a semiconductor. Describe the characteristics of a Thermistor. Describe the Characteristics of a laser Diode. Determine the frequency of an electrically vibrating tuning fork - using Melde's apparatus. Describe and determine frequency of A.C signal generator – using Sonometer. Determine rigidity modulus of a given material wire – using Torsional pendulum and acceleration due to gravity and radius of gyration - using compound pendulum. Verify of laws of Transverse Vibration of a stretched string - using Sonometer. Describe the characteristics of LED and determine forward resistance of a given LED. Determine of magnetic induction flux density along the axis of a circular coil using Stewart and Gee's Experiment.
CO No.	C124	IT Workshop – II (6F273)
1	C124.1	Apply MS –Office features for documentation and formatting data. Create Project report document using formatting styles, tables, fonts footnotes spell check and Track changes. Create Newsletters and prepare Power Point Presentations. Describe and use Excel spread sheets and applying formulas for calculations. Use and Apply HTML Features for Formatting Tags, linking of pages using Anchor Tags, Table tags.
CO No.	C125	Seminar on Science and its impact / Technical Topic (6E292)
1	C125.1	Deliver lecture on emerging technologies. Collect, survey and organize Content in presentable manner Demonstrate

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		ability to lead and explain concepts and innovative ideas. Demonstrate team leading qualities. Demonstrate public speaking skills and exchange new information that would not have been available otherwise. Develop debating and interview skills.
		Level of Attainment
		II YEAR I SEMESTER
CO No.	C201	Functional Communicative English (6H373)
1	C201.1	Acquire higher competence in communicative English, the skill of presenting seminars, mastery in applying various sub-skills of reading, develop interpersonal communication skills, participate in group tasks using effective language and enhance written communication from the employability perspective
CO No.	C202	Engineering Mathematics – III (6H316)
1	C202.1	Find the roots of algebraic and transcendental equations and can solve problems of numerical integration.
2	C202.2	Find the Interpolating polynomial for the given tabular values.
3	C202.3	Find the numerical solution of ordinary differential equations of IVPs.
4	C202.4	Evaluate improper integrals using special functions; understand the basic concepts of Bessel's function and its properties.
5	C202.5	Analyze the complex functions with reference to their analyticity, integration using Cauchy's integral theorem and find the Taylor's and Laurent's series expansion of complex functions. Also evaluate the real integrals by using residue theorem
6	C202.6	Solve problems in conformal mapping.
CO No.	C203	Elements of Electronics Engineering (6CC09)
1	C203.1	Understand the operation of semiconductor diode and its application as rectifier.
2	C203.2	Understand the Fundamentals of BJT operation, Characteristics and different biasing circuits.
3	C203.3	Understand the Fundamentals of SCR, JFET operation and their Characteristics.
4	C203.4	Understand the Analysis and design of Amplifier and Oscillators.
5	C203.5	Understand the Basic regulator circuits and voltage multipliers.
6	C203.6	Explore the various number systems.
CO No.	C204	Switching Theory and Logic Design (6CC02)
1	C204.1	Demonstrate an ability to understand number systems and apply the rules of Boolean algebra to simplify Boolean

Course Outcome (CO)	Name of the Course and Code Number	
		expressions.
2	C204.2	Simplify of Boolean expressions using K-map.
3	C204.3	Demonstrate and ability to design MSI combinational circuits such as full adders, multiplexers, decoders, encoders. Code converters.
4	C204.4	An ability to design basic memory units (latches and flip-flops).
5	C204.5	Explain the functioning of the sequential circuits such as counters and registers.
6	C204.6	Compare and simulate the digit an ability to design digital design using PLD's such as ROM's, PLA's, PAL s. and design digital controllers using Algorithmic State Machine Charts
CO No.	C205	Computer Organization and Microprocessor Interfacing (6D308)
1	C205.1	Understand basic operational concepts of computer and data processing.
2	C205.2	Comprehend the use of instruction codes - registers and types for executing the programs at the machine level in a specified architecture
3	C205.3	Understand different control unit design and algorithms for various operations
4	C205.4	Summarize the basic architecture and internals of 8086 processor.
5	C205.5	write assembly language programming and debug to 8086.
6	C205.6	Interface various devices to 8086 processor like keyboard, LED display, Stepper Motor, ADC etc.
CO No.	C206	Object Oriented Programming through Java (6E302)
1	C206.1	Describe fundamentals of JAVA, its Classes, and Objects and write simple programs using constructors.
2	C206.2	Explain Write simple programs using inheritance, interface and packages.
3	C206.3	Explain and write programs using Packages, I/O Stream and collections.
4	C206.4	Describe and write programs to implement Exception handling and Multithreading.
5	C206.5	Describe and write programs using AWT, Swings and develop applications using event handling.
6	C206.6	Describe and develop applications using Applets and develop client server programs using networking concepts.
CO No.	C207	Mathematical Foundations of Computer Science (6F302)
1	C207.1	Study and explain the significance of truth tables
2	C207.2	Distinguish between Statement Logic and Predicate Logic.
3	C207.3	Design elementary deterministic and randomised algorithms

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		to solve computational problems using relations, Lattices and Boolean Algebra Concepts
4	C207.4	Understand and assess the use of group concepts in the applications
5	C207.5	Explain and justify the uses of trees concepts
6	C207.6	Identify the role of graphs concepts in Engineering Applications
CO No.	C208	Computer Organization and Microprocessor Interfacing Lab (6DC87)
1	C208.1	Design memory units such as counters and registers. Design any type of VLSI, embedded systems, industrial and real time applications by knowing the concepts of Microprocessor and Digital Logic circuits.
CO No.	C209	Electronics Engineering Lab (6CC76)
1	C209.1	Identify, Specify and test R, L, C Components (Colour Codes), Potentiometers, Switches, Coils, Relays. Identify, Specify and test Active Devices, Diodes, BJTs, Low power JFETs, MOSFETs, Power Transistors, LEDs, LCDs, SCR, UJT. Describe operation of Multimeters, Function Generator and Regulated Power Supplies. Explain and use CRO for experiments. Explain and demonstrate working of PN Junction diode characteristics. plain and demonstrate working Half and Full wave Rectifier with and without filters. Demonstrate working and applications of FET, CE and RC Phase Shift Oscillator.
CO No.	C210	Object Oriented Programming through Java Lab (6E372)
1	C210.1	Write programs to generate Prime numbers, Roots of quadratic equation and Fibonacci series. Write small application such as banking system. Write programs on operator, function overloading and dynamic method dispatch. Write programs to implement interface and packages. Explain and write programs to implement threads. Write prog rams to implement applets and event handling. Write an application to implement client and server scenario.
CO No.	C211	Seminar on Technology and its Impact/Technical topic (6E393)
1	C211.1	Deliver lecture on emerging technologies. Explain domain knowledge to resolve real time technical issues. Demonstrate ability to lead and explain concepts and innovative ideas. Demonstrate team leading qualities. Demonstrate public speaking skills. Exchange new information that would not have been available otherwise. Develop debating and interview skills.

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CO No.	C212	Probability and Statistics (6HC18)
1	C212.1	Able to find the probability of an event.
2	C212.2	Will able to solve problems on discrete and continuous probability distributions.
3	C212.3	Find the sampling distributions and estimate the population parameters.
4	C212.4	Solve the problems on correlation and regression.
5	C212.5	Test of hypothesis and are able solve problems.
6	C212.6	Know the fundamentals of Design of experiments and quality control.
CO No.	C213	Managerial Economics and Financial Analysis (6ZC01)
1	C213.1	Understand the basics of Business Economics at Micro level and Demand analysis in particular.
2	C213.2	Understand Production patterns and various Costs involved.
3	C213.3	Understand different types of Markets, Business organizations and Pricing strategies.
4	C213.4	Enrich students with basic concepts of Financial Accounting.
5	C213.5	Understand basic concepts of Depreciation and Final accounts.
6	C213.6	Increase Competence of Analyzing Financial Statements
CO No.	C214	Elements of Electrical Engineering (6AC41)
1	C214.1	Understand the principles of electrical engineering.
2	C214.2	Understand the principles of single and three phase AC circuits.
3	C214.3	Understand the principle and operation of DC machine along with its applications.
4	C214.4	Understand the principle and operation of single-phase transformer along with its applications.
5	C214.5	Understand the principle and operation of three phase induction motor with its applications.
6	C214.6	Understand the principle and operation of different measuring instruments along with its applications.
CO No.	C215	Design and Analysis of Algorithms (6FC04)
1	C215.1	Analyze worst-case running times of algorithms using asymptotic analysis.
2	C215.2	Describe the divide-and-conquer paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize divide and-conquer algorithms. Derive and solve recurrences describing the performance of divide-and-conquer algorithms.
3	C215.3	Explain the dynamic-programming paradigm with the suitable applications. Recite algorithms that employ this paradigm.

Course Outcome (CO)	Name of the Course and Code Number	
		Synthesize dynamic programming algorithms, and analyze them.
4	C215.4	Comprehend the greedy paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize greedy algorithms, and analyze them.
5	C215.5	Explain what amortized running time is and what it is good for. Describe the different Methods of amortized analysis (aggregate analysis, accounting, potential method). Perform amortized analysis.
6	C215.6	Describe Backtracking, Branch and Bound algorithms and Concept of P and NP Problems
CO No.	C216	Operating Systems (6EC03)
1	C216.1	Describe the basic functionalities and structure of the Operating System
2	C216.2	Explain the concepts and implementations of: Processes, Process Scheduling. Describe, contrast and compare various types of Operating systems like Windows and Linux.
3	C216.3	Comprehend the concepts of Synchronization and Deadlocks in the Operating System
4	C216.4	Discuss the concepts of Memory Management (Physical and Virtual memory)
5	C216.5	Explain the concepts of File System with regard to directory and disk management algorithms.
6	C216.6	Students understand the concepts of I/O systems, protection and security in a case study given
CO No.	C217	Database Management Systems (6FC03)
1	C217.1	Explain importance, significance, models, Database languages, architecture and design of Data Base Systems.
2	C217.2	Describe Relational Model's – Integrity Constraints, Querying fundamentals, Logical data base Design and Views of databases along with application of Relational Algebra.
3	C217.3	Apply queries in SQL Query using Nested Queries Set, Comparison Operators, Aggregative Operators, Logical connectivity's with Joins statements and develop applications.
4	C217.4	Describe and apply Schema refinement through all forms of Normalization to eliminate database redundancy.
5	C217.5	Describe Transaction Concept and apply Atomicity, Durability, Concurrent and integrity in order to ensure reliability and Recovery and Backup of databases.
6	C217.6	Describe External Storage Organization mechanisms and apply Indexing in databases for optimizing Query operation to enhance system performance.

Course Outcome (CO)	Name of the Course and Code Number	
CO No.	C218	Operating Systems Lab (6E475)
1	C218.1	Implement CPU Scheduling algorithms., Implement the file allocation strategies. Implement deadlock detection and avoidance algorithms. Implement page replacement algorithms.
CO No.	C219	Electrical Engineering Lab (6AC91)
1	C219.1	Understand the working of single-phase transformer under different conditions. Understand the performance of three phase induction motor. Understand the different speed control methods of DC motor. Understand the performance of DC motor with and without loading. Understand the no-load characteristics of DC shunt generator. Understand the applications of Thevenin's Theorem in circuit analysis.
CO No.	C220	Database Management Systems Lab (6F474)
1	C220.1	Create tables for a database and apply Queries using ANY, ALL, IN, EXISTS, NOTEXISTS, UNION, INTERSET, Constraints., Write Queries using Aggregate functions such as [COUNT, SUM, AVG, MAX, MIN, GROUP BY, HAVING], Conversion functions and use string functions for a given application. Explain and write programs using PL/SQL programs using exceptions, COMMIT, ROLLBACK and SAVEPOINT in PL/SQL block. Develop programs using WHILE LOOPS, FOR LOOPS, nested loops using BUILT-IN Exceptions and write Procedures. Write Programs for stored functions invoke functions in SQL Statement and write Programs for packages specification. Describe and write programs using features of CURSORS and its variables and also implement Triggers.
CO No.	C221	Comprehensive Viva Voce – I (6E473)
1	C221.1	Comprehend the concepts in the core and elective courses. Exhibit technical knowledge to face interviews. Exhibit lifelong Learning skills for higher education and to pursue Professional practice
CO No.	C222	Technical Seminar (6E494)
1	C222.1	Deliver lecture on emerging technologies. Explain domain knowledge to resolve real time technical issues. Demonstrate ability to lead and explain concepts and innovative ideas. Demonstrate team leading qualities. Demonstrate public speaking and lifelong learning skills for higher studies and to pursue professional practice. Exchange new information that would not have been available otherwise. Develop debating and interview skills.

Course Outcome (CO)	Name of the Course and Code Number	
CO No.	C324	Summer Industry Internship (6E580)
1	C324.1	Use the concepts learned in the courses, so far, in conceptualizing, designing and executing the modules of the projects, Exhibit the interest in learning the modern tools and technologies through the bridge courses arranged in the college, beyond the curriculum and hence developing the software. Inculcate an enthusiasm to use the creative ideas to build the innovative projects and prototypes which are meeting the current needs of the market and society as a whole, improve their communicative skills and team skills largely improve and to be work as an individual and in a team.
CO No.	C301	STATISTICAL COMPUTING METHODS FOR DATA SCIENCE (6HC17)
1	C301.1	Calculate mean, median, mode of frequency distribution and to make important decisions for few samples which are taken from a large data.
2	C301.2	Solve the problems on density estimations to perform regression analysis of various kinds of data.
3	C301.3	Solve cross validation on classification problems
4	C301.4	Solve problems of regression in high dimensions, interpreting results in high dimensions
5	C301.5	Solve the problems on time series analysis
6	C301.6	Use R Programming software to solve problems
	C301.7	
CO No.	C302	Introduction to Data Science (6EC10)
1	C302.1	Implement Data analysis techniques for solving practical problems.
2	C302.2	Perform Data analysis on variety of data using R
3	C302.3	Exercise appropriate manipulation techniques on lists and vectors using operators in R. Comprehend the significance and use the iterative programming and functions in R
4	C302.4	Apply the suitable visualization techniques to output analytical results.
5	C302.5	Learn and describe the various Dimensionality Reduction techniques available
6	C302.6	Apply regression analysis techniques to model the relationship between variable and interpret the results.
CO No.	C303	Software Engineering and OOAD(6FC07)
1	C303.1	Identify software process and software engineering practices to select and justify approaches for a given project and its constraints and distinguish lifecycles for developing software product.
2	C303.2	Discuss the importance and principles of Unified Modelling

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		Language, its building blocks and to relate UML paradigm for problem solving.
3	C303.3	Define and design models for the requirements stated in the software project.
4	C303.4	Know what and how to gather the requirements for a project.
5	C303.5	Design class, object and interactive diagrams and know their significance.
6	C303.6	Design advanced behavioural and architectural modelling and work on case studies.
CO No.	C304	Data Communications(6C448)
1	C304.1	Discuss the basic concepts Internet protocols and Layers on OSI an TCP/IP protocol.
2	C304.2	Get Familiarize with the physical layer and transmission modes.
3	C304.3	Explore the various types of transmission media
4	C304.4	Comprehend the purpose and use of Data Link layer in communication.
5	C304.5	Identify the concept of multiple access in Wireless LANs.
6	C304.6	Discuss the components used in LAN connections.
CO No.	C305	Data Warehousing and Data Mining (6EC29)
1	C305.1	Describe the fundamentals of Data Warehousing and issues of mining with respect to architectures, technologies such as OLAP, Data Cube.
2	C305.2	Identify the techniques used in the data pre-processing and the Data Mining Query language primitives.
3	C305.3	Learn the significance and methods used for Characterization and the comparison of different classes of mining.
4	C305.4	Apply the algorithms for mining Association rules in large databases.
5	C305.5	Discuss and apply the models of classification and use those models for prediction of the new samples.
6	C305.6	Apply various clustering techniques available for numerous applications. identify the optimal clustering technique for a particular application
PE -I	C306	Python Programming (6FC08)
1	C306.1	Get familiarise with different Python versions and their specifications
2	C306.2	Build the fundamentals of python programming using primitive data types.
3	C306.3	Learn to write applications that include functions, modules, packages along with respective exceptional handling mechanism
4	C306.4	Implement programs using advanced OO features of Python
5	C306.5	Develops web-based applications to deal with data

Course Outcome (CO)	Name of the Course and Code Number	
		communication between client and server modules and also process data that is stored in possible databases.
6	C306.6	Create applications using SciPy / Tkinter / Plotpy modules.
CO No.	C307	Quantitative Aptitude (6H576)
1	C307.1	The questions given on testing divisibility, prime number and questions of HCF and LCM. The questions given on averages, percentage and profit and loss. The questions given on ratio and proportion. The questions given on simple and compound interest. The questions given on time and work, time and distance. The questions given on mensuration and data sufficiency.
CO No.	C308	Effective English Communication and soft skills (6HC74)
1	C308.1	Students become skilled at identifying their strengths and weaknesses and realize the ways to overcome their weaknesses. Students become skilled at enhancing their soft skills and behavioural patterns. Students become skilled at solving problems and taking effective decisions. Students become skilled at managing the stress and conflicts. Students become skilled at facing interviews confidently and effectively. Students become skilled at cultivating appropriate etiquette and manners to deal with personal and professional life
CO No.	C309	Group Project (6E575)
1	C309.1	Implement the concepts learned in the courses, so far, in conceptualizing. Designing and executing the modules of the projects. Exhibit the interest in learning the modern tools and technologies through the bridge courses arranged in the college, beyond the curriculum, and hence developing the software. Inculcate an enthusiasm to use the creative ideas to build the innovative projects which are meeting the current needs of the market and society as a whole. Improve their communication skills and team skills largely improve. Work as an individual and in a team.
CO No.	C311	Data Warehousing and Data Mining Lab (6E579)
1	C311.1	Ability to understand the various kinds of tools used for ETL operations and Data mining. Demonstrate the classification, clustering and etc. in large data sets. Ability to add mining algorithms as a component to the exiting tools. Ability to apply mining techniques for realistic data.
CO No.	C310	Object Oriented Analysis and Design and Python Programming Lab (6F589)
1	C310.1	The student will be able to relate Unified Modelling Language paradigm for problem solving. The student will be

Course Outcome (CO)	Name of the Course and Code Number	
		able to design Unified Modelling Language (UML) diagrams that represent number of modelling views. The student will be able to understand a case study and model it in different views i.e. Use case view, logical view, component view, Deployment and generate the documentation. The student will be able to write applications using OO features of Python. The student will be able to write applications that include functions, modules, and packages along with respective exceptional handling mechanism using Python. The student will be able to develop web-based applications to deal with data communication between client and server modules and also process data that is stored in possible databases. The student will be able to acquire hands on exposure on numpy, Plotpy and Scipy modules.
CO No.	C312	Technical literature Review and Seminar- I (6E595)
1	C312.1	Identify a topic from the current technologies of their choice in the computer science domain and the allied fields, after surveying in the internet resources, journals and technical magazines in the library. Organize the contents of the presentation and also write the report of the research paper. Present the technical topic in front of the panel and the fellow students, using the oratory skills and also submit the report of the research paper. Interact through answering the questions and also can add some points to the seminar.
CO No.	C313	BIG DATA ANALYTICS (6EC12)
1	C313.1	Discuss the importance of big data
2	C313.2	Interpret the challenges with big data, Elaborate the knowledge about the technological developments in big data environment
3	C313.3	Assess about nosql data environment.
4	C313.4	Capability of understanding the usage of big data in context to cloud and other technologies
5	C313.5	Justify about map reduce work flows
6	C313.6	Implement data Analysis with Hadoop and related tools
		Professional Elective-IV
CO No.	C314	MACHINE LEARNING(6EC13)
1	C314.1	Formulate machine learning techniques corresponding to various applications.
2	C314.2	Discuss the concepts of Classification and regression models and their applicability
3	C314.3	Learn the popular clustering algorithms and their parameters
4	C314.4	Describe basic computational Learning Theory using PAC Learnability and Instance Based Learning
5	C314.5	Apply machine learning algorithms for solving problems of moderate complexity using Gradient Descent Algorithm,

Course Outcome (CO)	Name of the Course and Code Number	
		Random Forest Algorithm for Predictive Analytics
6	C314.6	Discuss the Explanation based Learning and Inductive analytical approach to learning.
		Open Elective-I
CO No.	C315	Basics of Entrepreneurship (6ZC22)
1	C315.1	The students will acquire basic knowledge on Skills of Entrepreneurship.
2	C315.2	The students will understand the techniques of selecting the customers through the process of customer segmentation.
3	C315.3	Identify different Business models and their validity
4	C315.4	Analyze basic cost structure and pricing policies.
5	C315.5	Acquire knowledge about the project management and its techniques.
6	C315.6	The students' get exposure on marketing strategies for the Start up.
CO No.	C316	Web Technologies(6FC09)
1	C316.1	Describe WWW features. Demonstrate use of HTML tags
2	C316.2	Develop dynamic programs involving Java scripts, popup windows in JavaScript along with Event Handling.
3	C316.3	Develop scripts using XML and XSLT and to read XML document using parsers, DOM parser and SAX parser.
4	C316.4	Use Web Servers and servers in a JAVA along with the Installation and testing of Software Development Kit, Tomcat Server and Tomcat. Develop servlets programs and describe security issues while using web applications
5	C316.5	Develop programs with JSP and MVC. Develop JSP Application.
6	C316.6	Write programs on JDBC, using JDBC API and Struts framework, Explain role of from bean, action and struts-config.xml in a struts application.
CO No.	C317	Computer Networks (6EC06)
1	C317.1	Identify the different types of network topologies and protocols useful for real time applications and transmission medias.
2	C317.2	Discuss design issues of data link layer and solve problems on Checksum and flow control.
3	C317.3	Describe Channel allocation issues, MAC protocols such as ALOHA, CSMA and CSMA/CD and MAC addresses with IEEE 802.X and wireless LAN.
4	C317.4	Comprehend network layer design issues, routing algorithms and Internetworking concepts.
5	C317.5	Identify network layer sub netting concepts, its protocols of control and congestion and QOS.
6	C317.6	Demonstrate concepts and services and protocols of transport,

Course Outcome (CO)	Name of the Course and Code Number	
		Application layers along with the network security issues.
CO No.	C318	Theory of Computation (6E517)
1	C318.1	Discuss principles of Finite state machine, finite automation models, and transition diagrams.
2	C318.2	Design NFA, DFA and FSM transition with suitable examples expressions which are useful in text editors.
3	C318.3	Describe regular languages, regular expressions, grammars and derivations of strings with suitable examples.
4	C318.4	Describe context free grammars, syntax analysis useful in designing compilers.
5	C318.5	Comprehend computational functions and type of Turing machine.
6	C318.6	Describe computational theory, Chomsky hierarchy, LR(0), Correspondence, reducibility and solve problems on NP problems.
CO No.	C319	Logical Reasoning (6H677)
1	C319.1	Questions given on series completion and analogy, odd one out in classification and coding and decoding, blood relations, directions and Arithmetical reasoning, Venn diagrams, cubes and dice, clocks and calendar.
CO No.	C320	Web Technologies Lab (6FC82)
1	C320.1	Describe WWW features and demonstrate/ use of HTML tags. Develop dynamic programs involving Java scripts, popup windows in JavaScript along with Event Handling. Develop scripts using XML and XSLT and to read XML document using parsers, DOM parser and SAX parser. Develop Java servlets using Apache Tomcat Server for user authentications. Develop JDBC Application using JSP and ODBC Connectivity.
CO No.	C321	Computer Networks Lab (6EC74)
1	C321.1	Implement and analyze framing methods of data link layer. Implement and analyze framing methods of data link layer. Illustrate and implement error detection & correction techniques. Implement different Routing Algorithm. Demonstrate basic Network Commands, Demonstrate the use of Wireshark and NS-2 tools
CO No.	C322	Comprehensive Viva Voce – II (6E677)
1	C322.1	Assess the relevant courses they have undergone till the completion of that academic year. Comprehend the concepts in the core subjects and the elective subjects, to make them ready to face technical interviews which improve their employability skills.

Course Outcome (CO)	Name of the Course and Code Number	
CO No.	C323	Technical Literature Review and Seminar – II (6E696)
1	C323.1	Identify a topic from the current technologies of their choice in the computer science domain and the allied fields, after surveying in the internet resources, journals and technical magazines in the library. Organize the contents of the presentation and also write the report of the research paper. Present the technical topic in front of the panel and the fellow students, using the oratory skills and also submit the report of the research paper. Interact through answering the questions and also can add some points to the seminar
		Open Elective-II
CO No.	C401	INNOVATION & DESIGN THINKING (6ZC24)
1	C401.1	Identify the inputs required for innovation and also gain familiarity on Entrepreneurship.
2	C401.2	Develop creative methods of ideation and the importance of protecting the ideas.
3	C401.3	Compare and Categorize design thinking and types of thinking.
4	C401.4	Discover familiarity on emerging technologies like Internet of things (IOT).
5	C401.5	Discover the process of building the startup.
6	C401.6	Imagine and plan on various startup funding and also to branding building for the startup.
		Open Elective-III
CO No.	C402	ADVANCED ENTREPRENEURSHIP (6ZC23)
1	C402.1	Determine the stages of Startup and the turbulence environment it undergoes and the stages related to growth of the Startup.
2	C402.2	Compare various business models and critically evaluating the effectiveness of the business models.
3	C402.3	Discover method of business traction and the need of customer relationship management.
4	C402.4	Survey the various channels of revenue building and exploration of new revenue avenues.
5	C402.5	Examine the need of sales planning and sales management and also financial modeling
6	C402.6	Discover the legal implications effecting the company's prospects and the issues related to intellectual property rights.
CO No.	C403	ARTIFICIAL INTELLIGENCE AND DEEP LEARNING (6EC15)
1	C403.1	Classify the different types of AI agents
2	C403.2	Identify various AI search algorithms (uninformed, informed, heuristic, constraint satisfaction, genetic algorithms)
3	C403.3	Describe and interpret the fundamentals of knowledge

Course Outcome (CO)	Name of the Course and Code Number	
		representation (logic-based, frame-based, semantic nets), inference and theorem proving
4	C403.4	Justify how to build simple knowledge-based systems
5	C403.5	Apply concepts of convolutional networks in day-to-day applications.
6	C403.6	Build Reinforcement Learning-Markov Decision Processes (MDP) and the related concepts
CO No.	C404	CLOUD COMPUTING (6FC14)
1	C404.1	Describe the characteristics of cloud
2	C404.2	Describe the cloud services.
3	C404.3	Classify different architectures for cloud applications, Creation and running of python programs, running amazon ec2 instance
4	C404.4	Compare Data Intensive applications and future trends of Internet Clouds supporting Mobile Computing, Ubiquitous Computing and Social Networking
5	C404.5	Build MapReduce and image processing app on cloud.
6	C404.6	Apply cloud security architecture.
CO No.	C405	Information Security (6FC11)
1	C405.1	Explain various security attacks and security services.
2	C405.2	Describe encryption using cryptographic techniques and key elements of cryptographic principles for confidentiality of data.
3	C405.3	Explain and comprehend privacy to emails using PGP and S/MIME.
4	C405.4	Discuss IP security Architecture and its role in security framework.
5	C405.5	Discuss SSL and compare SSL with TLS, explain how to secure credit card details in online transactions.
6	C405.6	Describe design issues of Firewall and concepts of Intrusion Detection Systems
CO No.	C406	Compiler Design (6EC07)
1	C406.1	Explain Overview of compiler its Environment phases and features of Lexical Analyzer, LEX tool
2	C406.2	Describe and apply Context free grammar, Top down parsing technique, LMD, RMD, Recursive decent parsing with back tracking, Ambiguous grammar, Elimination of left recursion, Left factoring, unambiguous grammar, Predictive parsing, LL(1).
3	C406.3	Demonstrate and solve problems on SLR, CLR, LALR, operator precedence parser, LR (O), LR(1), LR(K) grammar and use YACC tool.
4	C406.4	Describe and use Semantic Analysis concepts to design compiler: and describe Intermediate code generation such as

Course Outcome (CO)	Name of the Course and Code Number	
		3-address code form, DAG, polish notation.
5	C406.5	Explain Symbol tables, structure languages, hashing, tree structures representation, static, runtime stack and heap allocations, storage allocation for arrays and in strings and records.
6	C406.6	Explain data flow analysis, Code generation and apply generic code generation algorithm.
CO No.	C407	Software Automation and Testing (6EC11)
1	C407.1	Describe concepts of Software testing
2	C407.2	Describe and apply the concepts Flow graphs, Path testing and Data Flow Testing.
3	C407.3	Practice Software testing strategy and Environment with economics and apply Software Metrics useful in software development and maintenance.
4	C407.4	Software Testing Methodology, finding defects hard to find, Verification and validation, Functional and structural, Workbench concept, Eight Consideration of software testing methodology, checklist. Describe Agile computing with agile testing
5	C407.5	Demonstrate Software Testing Techniques such as JADs, Pareto Analysis, Regression Tasting, Structured walkthroughs, Thread testing, Performance testing and White box testing.
6	C407.6	Describe Graph matrices and applications, and practice and apply automated testing tools such load Runner, UFT and QTP.
CO No.	C408	Intellectual Property Rights (6GC49)
1	C408.1	Demonstrate a breadth of knowledge in Intellectual property
2	C408.2	Compare and describe overview of Patents, Searching, filling and drafting of Patents
3	C408.3	Compare copyright & GI.
4	C408.4	Demonstrate Trade Mark & Trade Secret,
5	C408.5	Comprehend Integrated Circuit and Industrial Design.
6	C408.6	Demonstrate Knowledge about different national and international: Conventions and Treaties Governing the IPRs
CO No.	C409	Industry Oriented Mini Project (6E781)
1	C409.1	Use the concepts learned in the courses, so far, in conceptualizing, designing and executing the modules of the projects, Exhibit the interest in learning the modern tools and technologies through the bridge courses arranged in the college, beyond the curriculum, and hence developing the software, Inculcate an enthusiasm to use the creative ideas to build the innovative projects which are meeting the current needs of the market and society as a whole, Improve their communicative skills and team skills largely improve, Work

Course Outcome (CO)	Name of the Course and Code Number	
		as an individual and in a team.
CO No.	C410	Software Testing and Automation Lab (6EC75)
1	C410.1	Prepare Test Plan document and write Test Cases for Small scale Project (Like for their B. Tech IV Year Project or Post-Graduate Projects), they learn how to Analyze SRS document in order to prepare Test Plan Document. Demonstrate skills to use modern software testing tools (EX: UFT, TestLink, Bugzilla, Selenium, Test Director and Quality Center) and test application (web, Window application) by using the tools. Demonstrate the ability to differentiate between different Testing tools present in the market (like functional testing tools, Test Management Tools, Bug Tracking Tools and Performance Testing Tools) and prepare Test Plan document and write Test Cases for Small scale Project (Like for their B. Tech IV Year Project or Post-Graduate Projects).
CO No.	C411	Compiler Design and Information Security Lab (6EC76)
1	C411.1	Implement the lexical analyzer using JLex, flex or lex or other lexical analyzer generating tools. Design top-down parser for the given language. Design bottom-up parser for the above language. Implement symmetric key encryption algorithms. Implement asymmetric key encryption algorithms. Implement hashing and key exchange algorithms.
CO No.	C412	Project – I (6E780)
1	C412.1	Develop plans with relevant people to achieve the project's goals. Break work down into tasks and determine handover procedures. Identify links and dependencies, and schedule to achieve deliverables. Estimate the human and physical resources required, and make plans to obtain the necessary resources. Allocate roles with clear lines of responsibility and accountability with team spirit. Design and develop the software or prototype to meet societal needs.
CO No.	C413	Technical Literature Review and Seminar –III (6E797)
1	C413.1	Identify a topic from the current technologies of their choice in the computer science domain and the allied fields, after surveying in the internet resources, journals and technical magazines in the library. Arrange the contents of the presentation and also write the report of the research paper. Present the technical topic in front of the panel and the fellow students, using the oratory skills and also submit the report of the research paper. Interact through answering the questions and also can add some points to the seminar

Course Outcome (CO)	Name of the Course and Code Number	
IV YEAR II SEMESTER		
CO No.	C414	Mobile Computing (6EC14)
1	C414.1	Identify vast application areas for mobile / wireless communication / computing. They also understand the working principle of GSM technology.
2	C414.2	Discuss various media access control methods that are meant for wireless communication along with SDMA, FDMA, TDMA and CDMA.
3	C414.3	Identify IP mobile primitives in Network layer in the wireless communication and recognize suitable solutions for the same.
4	C414.4	Explain the issues in the Transport layer in wireless communication and identifying suitable solutions for the same
5	C414.5	Discuss MANETs with examples and explain hoarding, client server computing along with the data delivery mechanisms.
6	C414.6	Discuss protocols and tools such as WAP, Blue Tooth and explain emerging mobile operating systems
CO No.	C415	Management Science (6ZC02)
1	C415.1	Outlines the significance of management, defines the basic concepts and applicability of management principles in changing paradigms.
2	C415.2	Demonstrates the procedures of the work study method and work measurement, Project management.
3	C415.3	Infers the need to understand the importance of materials management and quality control techniques.
4	C415.4	Relates the knowledge of two functional areas of business, human resource management and marketing management.
5	C415.5	Explains the different dimensions of behaviour, personality, perception, attitudes overall to gain insights into organizational behaviour.
6	C415.6	Distinguish some aspects related to strategic planning and strategic implementation to gain competitive advantage over competitors
CO No.	C416	Project – II (6E884)
1	C416.1	Develop plans with relevant people to achieve the project's goals. Break work down into tasks and determine handover procedures. Identify links and dependencies, and schedule to achieve deliverables. Estimate the human and physical resources required, and make plans to obtain the necessary resources. Allocate roles with clear lines of responsibility and accountability with team spirit. Design and develop the software or prototype to meet societal needs.
CO No.	C417	Comprehensive Viva Voce - III (6E885)
1	C417.1	Assess the relevant courses they have undergone till the

Course Outcome (CO)	Name of the Course and Code Number	
		completion of that academic year. Comprehend the concepts in the core subjects and the elective subjects, to make them ready to face technical interviews which improve their employability skills. They are asked to comprehend the concepts in the core subjects and the elective subjects, to make them ready to face technical interviews which improve their employability skills. Assessment is done in the relevant courses they have undergone till the completion of that academic year.
CO No.	C418	Technical Literature Review and Seminar – IV (6E898)
1	C418.1	1. Identify a topic from the current technologies of their choice in the computer science domain and the allied fields, after surveying in the internet resources, journals and technical magazines in the library. Arrange the contents of the presentation and also write the report of the research paper. Present the technical topic in front of the panel and the fellow students, using the oratory skills and also submit the report of the research paper. Interact through answering the questions and also can add some points to the seminar

Course Outcomes Vs Program Specific Outcomes - Correlation - 2017 -21 Batch					
	NBA Codes	Course (Course Code) - Correlation	PSO 1	PSO 2	PSO 3
B. TECH I YEAR I SEMESTER					
CO No.	C105	Computer Programming (6F101)	M		
1	C105.1	Explain basic fundamentals of Computer Systems, computing environments Computer Languages – Machine Languages. Writing/ Drawing simple Algorithms and flowcharts.	1		
2	C105.2	Describe C language Programs, Structure of a C Program, Comments, the greeting program, identifiers, constants, variables, types, expressions and keywords.	2		
3	C105.3	Describe write programs using control structures such as Pre-test and post-test loops, while, do while, for, break and continue statements, comma expression. Write programs using functions. Write programs using recursion.	2		
4	C105.4	Write programs implementing application on arrays.	2		

5	C105.5	Write programs using Pointers and string handling functions.	3		
6	C105.6	Write programs using Enumerated, Structure, Union types and files.	3		
			2		
CO No.	C110	C Programming Lab (6F171)	M		
1	C110.1	Write algorithms and flowcharts to convert temperature Celsius to its equivalent Fahrenheit, calculate roots and Fibonacci series. Write programs using control statements while, do-while, and for loops and solve mathematical series summations. Write programs in menu driven style. Write programs implementing functions, recursion with return values for example Fibonacci, GCD, LCM, pascal triangle, large and smallest in a set of numbers. Write a program to implementing applications on arrays, matrices addition, multiplication and compute symmetric, lower triangular, upper triangular, diagonal, scalar, or unit of a matrix. Write programs on complex numbers and implement programs on student data or employee's information using files.	2		
			2		
	C112	IT Workshop – I (6F172)	M		
1	C112.1	1. Identify peripherals of a computer, describe types of Operating System, Install computer with dual boot operating systems. Assembling and Disassemble computer system. Install and Use Microsoft Windows 7 for programming and application development. Install Linux and Install Applications in Linux and Windows. Troubleshoot Software and hardware problems along with configurations setting for application and computer security for software development. Describe and practice Cyber ethics	2		
			2		
CO No.	C113	Seminar on current affairs /Technical Topic (6E191)			L
1	C113.1	Identify current general, political and technology related topics. Arrange and present seminar in an effective manner. Collect, survey and organize content in presentable manner. Demonstrate oratory skills with the aid of Power Point Presentations. Exhibit interview facing skills and team leading qualities			1
					1

B. TECH I YEAR II SEMESTER					
CO No.	C117	Data Structures (6E201)	M		
1	C117.1	Demonstrate the concepts of Abstract data type and also applications of stack and Queues	1		
2	C117.2	Select the data structure that efficiently model the information in a problem	2		
3	C117.3	Design programs using variety of data structures including Trees, AVL Trees and Graphs and their applications.	2		
4	C117.4	Solve problems and also assess efficiency trade off among searching and sorting using time complexity of each algorithm and also the applications of hashing and hash tables.	3		
5	C117.5	Describe the concepts of OOPs and implement programs using objects, classes, constructors and destructors.	3		
6	C117.6	Apply concepts of OOPs to write program on over loading functions and concepts of inheritance.	2		
			2		
CO No.	C122	Data structure Lab (C, C++) (6E271)	H		L
1	C122.1	Write programs to implement Stacks, Queues and circular queues, tree traversals. Inorder, preorder and post orde, searching and sorting operations. Write programs on Binary trees, C++ to implement classes and operator overloading.	3		1
			3		1
CO No.	C124	IT Workshop – II (6F273)	H		
1	C124.1	Apply MS –Office features for documentation and formatting data. Create Project report document using formatting styles, tables, fonts footnotes spell check and Track changes. Create Newsletters and prepare Power Point Presentations. Describe and use Excel spread sheets and applying formulas for calculations. Use and Apply HTML Features for Formatting Tags, Linking of pages using Anchor Tags, Table tags.	3		
		Level of Attainment	3		

CO No.	C125	Seminar on Science and its impact / Technical Topic (6E292)			L
1	C125.1	Deliver lecture on emerging technologies. Collect, survey and organize Content in presentable manner. Demonstrate ability to lead and explain concepts and innovative ideas. Demonstrate team leading qualities. Demonstrate public speaking skills and exchange new information that would not have been available otherwise. Develop debating and interview skills.			1
					1
B. TECH II YEAR I SEMESTER					
CO No.	C206	Object Oriented Programming through Java (6E302)	H		
1	C206.1	Describe fundamentals of JAVA, its Classes, and Objects and write simple programs using constructors.	2		
2	C206.2	Explain Write simple programs using inheritance, interface and packages.	3		
3	C206.3	Explain and write programs using Packages, I/O Stream and collections.	3		
4	C206.4	Describe and write programs to implement Exception handling and Multithreading.	3		
5	C206.5	Describe and write programs using AWT, Swings and develop applications using event handling.	3		
6	C206.6	Describe and develop applications using Applets and develop client server programs using networking concepts.	3		
			3		
CO No.	C207	Mathematical Foundations of Computer Science (6F302)	H		
1	C207.1	Study and explain the significance of truth tables	1		
2	C207.2	Distinguish between Statement Logic and Predicate Logic.	2		
3	C207.3	Design elementary deterministic and randomised algorithms to solve computational problems using relations, Lattices and Boolean Algebra Concepts	3		
4	C207.4	Understand and assess the use of group concepts in the applications	3		
5	C207.5	Explain and justify the uses of trees concepts	3		
6	C207.6	Identify the role of graphs concepts in Engineering Applications	3		
			3		

CO No.	C210	Object Oriented Programming through Java Lab (6E372)	H		L
1	C210.1	Write programs to generate Prime numbers, Roots of quadratic equation and Fibonacci series. Write small application such as banking system. Write programs on operator, function overloading and dynamic method dispatch. Write programs to implement interface and packages. Explain and write programs to implement threads. Write programs to implement applets and event handling. Write an application to implement client and server scenario.	3		1
			3		1
CO No.	C211	Seminar on Technology and its Impact/Technical topic (6E393)			M
1	C211.1	Deliver lecture on emerging technologies. Explain domain knowledge to resolve real time technical issues. Demonstrate ability to lead and explain concepts and innovative ideas. Demonstrate team leading qualities. Demonstrate public speaking skills. Exchange new information that would not have been available otherwise. Develop debating and interview skills.			2
					2
B. TECH II YEAR II SEMESTER					
CO No.	C215	Design and Analysis of Algorithms (6FC04)	H		
1	C215.1	Analyze worst-case running times of algorithms using asymptotic analysis.	3		
2	C215.2	Describe the divide-and-conquer paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize divide and-conquer algorithms. Derive and solve recurrences describing the performance of divide-and-conquer algorithms.	3		
3	C215.3	Explain the dynamic-programming paradigm with the suitable applications. Recite algorithms that employ this paradigm. Synthesize dynamic programming algorithms, and analyze them.	3		
4	C215.4	Comprehend the greedy paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize greedy algorithms, and analyze them.	3		

5	C215.5	Explain what amortized running time is and what it is good for. Describe the different Methods of amortized analysis (aggregate analysis, accounting, potential method). Perform amortized analysis.	3		
6	C215.6	Describe Backtracking, Branch and Bound algorithms and Concept of P and NP Problems	3		
			3		
CO No.	C216	Operating Systems (6EC03)	H		
1	C216.1	Describe the basic functionalities and structure of the Operating System	2		
2	C216.2	Explain the concepts and implementations of: Processes, Process Scheduling. Describe, contrast and compare various types of Operating systems like Windows and Linux.	3		
3	C216.3	Comprehend the concepts of Synchronization and Deadlocks in the Operating System	3		
4	C216.4	Discuss the concepts of Memory Management (Physical and Virtual memory)	3		
5	C216.5	Explain the concepts of File System with regard to directory and disk management algorithms.	3		
6	C216.6	Students understand the concepts of I/O systems, protection and security in a case study given	3		
			3		
CO No.	C217	Database Management Systems (6FC03)	H		
1	C217.1	Explain importance, significance, models, Database languages, architecture and design of Data Base Systems.	1		
2	C217.2	Describe Relational Model's – Integrity Constraints, Querying fundamentals, Logical data base Design and Views of databases along with application of Relational Algebra.	2		
3	C217.3	Apply queries in SQL Query using Nested Queries Set, Comparison Operators, Aggregative Operators, Logical connectivity's with Joins statements and develop applications.	3		
4	C217.4	Describe and apply Schema refinement through all forms of Normalization to eliminate database redundancy.	3		
5	C217.5	Describe Transaction Concept and apply Atomicity, Durability, Concurrent and integrity in order to ensure reliability and Recovery and Backup of databases.	3		

6	C217.6	Describe External Storage Organization mechanisms and apply Indexing in databases for optimizing Query operation to enhance system performance.	3		
			3		
CO No.	C218	Operating Systems Lab (6E475)	H		
1	C218.1	Implement CPU Scheduling algorithms., Implement the file allocation strategies. Implement deadlock detection and avoidance algorithms. Implement page replacement algorithms.	3		
			3		
CO No.	C220	Database Management Systems Lab (6F474)	H		M
1	C220.1	Create tables for a database and apply Queries using ANY, ALL, IN, EXISTS, NOTEXISTS, UNION, INTERSET, Constraints., Write Queries using Aggregate functions such as [COUNT, SUM, AVG, MAX, MIN, GROUP BY, HAVING], Conversion functions and use string functions for a given application. Explain and write programs using PL/SQL programs using exceptions, COMMIT, ROLLBACK and SAVEPOINT in PL/SQL block. Develop programs using WHILE LOOPS, FOR LOOPS, nested loops using BUILT-IN Exceptions and write Procedures. Write Programs for stored functions invoke functions in SQL Statement and write Programs for packages specification. Describe and write programs using features of CURSORS and its variables and also implement Triggers.	3		2
			3		2
CO No.	C221	Comprehensive Viva Voce – I (6E473)	H		
1	C221.1	Comprehend the concepts in the core and elective courses. Exhibit technical knowledge to face interviews. Exhibit lifelong Learning skills for higher education and to pursue Professional practice	3		
			3		
CO No.	C222	Technical Seminar (6E494)			M

1	C222.1	Deliver lecture on emerging technologies. Explain domain knowledge to resolve real time technical issues. Demonstrate ability to lead and explain concepts and innovative ideas. Demonstrate team leading qualities. Demonstrate public speaking and lifelong learning skills for higher studies and to pursue professional practice. Exchange new information that would not have been available otherwise. Develop debating and interview skills.			3
					3
B. TECH III YEAR I SEMESTER					
CO No.	C324	Summer Industry Internship (6E580)	H	L	M
1	C324.1	Use the concepts learned in the courses, so far, in conceptualizing, designing and executing the modules of the projects, Exhibit the interest in learning the modern tools and technologies through the bridge courses arranged in the college, beyond the curriculum and hence developing the software. Inculcate an enthusiasm to use the creative ideas to build the innovative projects and prototypes which are meeting the current needs of the market and society as a whole, improve their communicative skills and team skills largely improve and to be work as an individual and in a team.	3	1	2
			3	1	2
CO No.	C301	STATISTICAL COMPUTING METHODS FOR DATA SCIENCE (6HC17)	M	M	
1	C301.1	Calculate mean, median, mode of frequency distribution and to make important decisions for few samples which are taken from a large data.		2	
2	C301.2	Solve the problems on density estimations to perform regression analysis of various kinds of data.		2	
3	C301.3	Solve cross validation on classification problems		2	
4	C301.4	Solve problems of regression in high dimensions, interpreting results in high dimensions		2	
5	C301.5	Solve the problems on time series analysis		2	
6	C301.6	Use R Programming software to solve problems	2	2	
			2	2	
CO No.	C302	Introduction to Data Science (6EC10)	H	M	
1	C302.1	Implement Data analysis techniques for solving practical problems.	2	2	
2	C302.2	Perform Data analysis on variety of data using R	3	2	

3	C302.3	Exercise appropriate manipulation techniques on lists and vectors using operators in R. Comprehend the significance and use the iterative programming and functions in R	3	2	
4	C302.4	Apply the suitable visualization techniques to output analytical results.	3	2	
5	C302.5	Learn and describe the various Dimensionality Reduction techniques available	2	2	
6	C302.6	Apply regression analysis techniques to model the relationship between variable and interpret the results.	3	2	
			3	2	
CO No.	C303	Software Engineering and OOAD(6FC07)	H		
1	C303.1	Identify software process and software engineering practices to select and justify approaches for a given project and its constraints and distinguish lifecycles for developing software product.	2		
2	C303.2	Discuss the importance and principles of Unified Modelling Language, its building blocks and to relate UML paradigm for problem solving.	2		
3	C303.3	Define and design models for the requirements stated in the software project.	3		
4	C303.4	Know what and how to gather the requirements for a project.	3		
5	C303.5	Design class, object and interactive diagrams and know their significance.	3		
6	C303.6	Design advanced behavioural and architectural modelling and work on case studies.	3		
			3		
CO No.	C305	Data Warehousing and Data Mining(6EC29)	H		
1	C305.1	Describe the fundamentals of Data Warehousing and issues of mining with respect to architectures, technologies such as OLAP, Data Cube.	3		
2	C305.2	Identify the techniques used in the data pre-processing and the Data Mining Query language primitives.	3		
3	C305.3	Learn the significance and methods used for Characterization and the comparison of different classes of mining.	3		
4	C305.4	Apply the algorithms for mining Association rules in large databases.	3		

5	C305.5	Discuss and apply the models of classification and use those models for prediction of the new samples.	3		
6	C305.6	Apply various clustering techniques available for numerous applications. identify the optimal clustering technique for a particular application	3		
			3		
PE -I	C306	Python Programming (6FC08)	H	M	
1	C306.1	Get familiarise with different Python versions and their specifications	1	1	
2	C306.2	Build the fundamentals of python programming using primitive data types.	2	2	
3	C306.3	Learn to write applications that include functions, modules, packages along with respective exceptional handling mechanism	3	2	
4	C306.4	Implement programs using advanced OO features of Python	3	3	
5	C306.5	Develops web-based applications to deal with data communication between client and server modules and also process data that is stored in possible databases.	3	2	
6	C306.6	Create applications using SciPy/Tkinter/Plotpy modules.	3	3	
			3	2	
CO No.	C309	Group Project (6E575)	M	L	M
1	C309.1	Implement the concepts learned in the courses, so far, in conceptualizing. Designing and executing the modules of the projects. Exhibit the interest in learning the modern tools and technologies through the bridge courses arranged in the college, beyond the curriculum, and hence developing the software. Inculcate an enthusiasm to use the creative ideas to build the innovative projects which are meeting the current needs of the market and society as a whole. Improve their communication skills and team skills largely improve. Work as an individual and in a team.	2	1	2
			2	1	2
CO No.	C311	Data Warehousing and Data Mining Lab (6E579)	H		H
1	C311.1	Ability to understand the various kinds of tools used for ETL operations and Data mining. Demonstrate the classification, clustering and etc. in large data sets. Ability to add mining algorithms as a component to the exiting tools. Ability to apply mining techniques for realistic data.	3		3

			3		3
CO No.	C310	Object Oriented Analysis and Design and Python Programming Lab (6F589)	H		M
1	C310.1	The student will be able to relate Unified Modelling Language paradigm for problem solving. The student will be able to design Unified Modelling Language (UML) diagrams that represent number of modelling views. The student will be able to understand a case study and model it in different views i.e. Use case view, logical view, component view, Deployment and generate the documentation. The student will be able to write applications using OO features of Python. The student will be able to write applications that include functions, modules, and packages along with respective exceptional handling mechanism using Python. The student will be able to develop web-based applications to deal with data communication between client and server modules and also process data that is stored in possible databases. The student will be able to acquire hands on exposure on numpy, Plotpy and Scipy modules.	3		2
			3		2
CO No.	C312	Technical literature Review and Seminar- I (6E595)			H
1	C312.1	Identify a topic from the current technologies of their choice in the computer science domain and the allied fields, after surveying in the internet resources, journals and technical magazines in the library. Organize the contents of the presentation and also write the report of the research paper. Present the technical topic in front of the panel and the fellow students, using the oratory skills and also submit the report of the research paper. Interact through answering the questions and also can add some points to the seminar.			3
					3
B. TECH III YEAR II SEMESTER					
CO No.	C313	BIG DATA ANALYTICS (6EC12)	M	H	
1	C313.1	Discuss the importance of big data	1	3	
2	C313.2	Interpret the challenges with big data, Elaborate the knowledge about the technological developments in big data environment	2	3	
3	C313.3	Assess about nosql data environment.	3	3	
4	C313.4	Capability of understanding the usage of big data in context to cloud and other technologies	3	3	

5	C313.5	Justify about map reduce work flows		3	
6	C313.6	Implement data Analysis with Hadoop and related tools		3	
			2	3	
		Professional Elective-IV			
CO No.	C314	MACHINE LEARNING(6EC13)	H	H	
1	C314.1	Formulate machine learning techniques corresponding to various applications.	3	3	
2	C314.2	Discuss the concepts of Classification and regression models and their applicability	3	3	
3	C314.3	Learn the popular clustering algorithms and their parameters		3	
4	C314.4	Describe basic computational Learning Theory using PAC Learnability and Instance Based Learning		3	
5	C314.5	Apply machine learning algorithms for solving problems of moderate complexity using Gradient Descent Algorithm, Random Forest Algorithm for Predictive Analytics		3	
6	C314.6	Discuss the Explanation based Learning and Inductive analytical approach to learning.	3	3	
			3	3	
CO No.	C316	Web Technologies(6FC09)	H		
1	C316.1	Describe WWW features. Demonstrate use of HTML tags	2		
2	C316.2	Develop dynamic programs involving Java scripts, popup windows in JavaScript along with Event Handling.	3		
3	C316.3	Develop scripts using XML and XSLT and to read XML document using parsers, DOM parser and SAX parser.	3		
4	C316.4	Use Web Servers and servers in a JAVA along with the Installation and testing of Software Development Kit, Tomcat Server and Tomcat. Develop servlets programs and describe security issues while using web applications	3		
5	C316.5	Develop programs with JSP and MVC. Develop JSP Application.	3		
6	C316.6	Write programs on JDBC, using JDBC API and Struts framework, Explain role of from bean, action and struts-config.xml in a struts application.	3		
			3		

CO No.	C317	Computer Networks (6EC06)	H		L
1	C317.1	Identify the different types of network topologies and protocols useful for real time applications and transmission medias.	2		1
2	C317.2	Discuss design issues of data link layer and solve problems on Checksum and flow control.	3		
3	C317.3	Describe Channel allocation issues, MAC protocols such as ALOHA, CSMA and CSMA/CD and MAC addresses with IEEE 802.X and wireless LAN.	3		
4	C317.4	Comprehend network layer design issues, routing algorithms and Internetworking concepts.	3		
5	C317.5	Identify network layer sub netting concepts, its protocols of control and congestion and QOS.	3		
6	C317.6	Demonstrate concepts and services and protocols of transport, Application layers along with the network security issues.	3		
			3		1
CO No.	C318	Theory of Computation (6E517)	H		
1	C318.1	Discuss principles of Finite state machine, finite automation models, and transition diagrams.	2		
2	C318.2	Design NFA, DFA and FSM transition with suitable examples expressions which are useful in text editors.	3		
3	C318.3	Describe regular languages, regular expressions, grammars and derivations of strings with suitable examples.	3		
4	C318.4	Describe context free grammars, syntax analysis useful in designing compilers.	3		
5	C318.5	Comprehend computational functions and type of Turing machine.	3		
6	C318.6	Describe computational theory, Chomsky hierarchy, LR(0), Correspondence, reducibility and solve problems on NP problems.	3		
			3		
CO No.	C320	Web Technologies Lab (6FC82)	H		M
1	C320.1	Describe WWW features and demonstrate / use of HTML tags. Develop dynamic programs involving Java scripts, popup windows in JavaScript along with Event Handling. Develop scripts using XML and XSLT and to read XML document using parsers, DOM parser and SAX parser. Develop Java servlets using Apache Tomcat Server for user authentications. Develop	3		2

		JDBC Application using JSP and ODBC Connectivity.			
		Level of Attainment	3		2
CO No.	C321	Computer Networks Lab (6EC74)	H		M
1	C321.1	Implement and analyze framing methods of data link layer. Implement and analyze framing methods of data link layer. Illustrate and implement error detection & correction techniques. Implement different Routing Algorithm. Demonstrate basic Network Commands, Demonstrate the use of Wireshark and NS-2 tools	3		2
			3		2
CO No.	C322	Comprehensive Viva Voce – II (6E677)	H		
1	C322.1	Assess the relevant courses they have undergone till the completion of that academic year. Comprehend the concepts in the core subjects and the elective subjects, to make them ready to face technical interviews which improve their employability skills.	3		
			3		
CO No.	C323	Technical Literature Review and Seminar – II (6E696)			H
1	C323.1	Identify a topic from the current technologies of their choice in the computer science domain and the allied fields, after surveying in the internet resources, journals and technical magazines in the library. Organize the contents of the presentation and also write the report of the research paper. Present the technical topic in front of the panel and the fellow students, using the oratory skills and also submit the report of the research paper. Interact through answering the questions and also can add some points to the seminar			3
					3
B. TECH IV YEAR I SEMESTER					
CO No.	C403	ARTIFICIAL INTELLIGENCE AND DEEP LEARNING (6EC15)	M	H	
1	C403.1	Classify the different types of AI agents	2	3	
2	C403.2	Identify various AI search algorithms (uninformed, informed, heuristic, constraint satisfaction, genetic algorithms)	2	3	
3	C403.3	Describe and interpret the fundamentals of knowledge representation (logic-based, frame-based, semantic nets), inference and theorem proving	2	3	

4	C403.4	Justify how to build simple knowledge-based systems		3	
5	C403.5	Apply concepts of convolutional networks in day-to-day applications.	2	3	
6	C403.6	Build Reinforcement Learning-Markov Decision Processes (MDP) and the related concepts	2	3	
			2	3	
CO No.	C404	CLOUD COMPUTING (6FC14)		H	
1	C404.1	Describe the characteristics of cloud		2	
2	C404.2	Describe the cloud services.		3	
3	C404.3	Classify different architectures for cloud applications, Creation and running of python programs, running amazon ec2 instance		3	
4	C404.4	Compare Data Intensive applications and future trends of Internet Clouds supporting Mobile Computing, Ubiquitous Computing and Social Networking		3	
5	C404.5	Build MapReduce and image processing app on cloud.		3	
6	C404.6	Apply cloud security architecture.		3	
				3	
CO No.	C405	Information Security (6FC11)	H		
1	C405.1	Explain various security attacks and security services.	3		
2	C405.2	Describe encryption using cryptographic techniques and key elements of cryptographic principles for confidentiality of data.	3		
3	C405.3	Explain and comprehend privacy to emails using PGP and S/MIME.	3		
4	C405.4	Discuss IP security Architecture and its role in security framework.	3		
5	C405.5	Discuss SSL and compare SSL with TLS, explain how to secure credit card details in online transactions.	3		
6	C405.6	Describe design issues of Firewall and concepts of Intrusion Detection Systems	3		
			3		
CO No.	C406	Compiler Design (6EC07)	H		
1	C406.1	Explain Overview of compiler its Environment phases and features of Lexical Analyzer, LEX tool	2		

2	C406.2	Describe and apply Context free grammar, Top down parsing technique, LMD, RMD, Recursive decent parsing with back tracking, Ambiguous grammar, Elimination of left recursion, Left factoring, unambiguous grammar, Predictive parsing, LL(1).	3		
3	C406.3	Demonstrate and solve problems on SLR, CLR, LALR, operator precedence parser, LR (O), LR(1), LR(K) grammar and use YACC tool.	3		
4	C406.4	Describe and use Semantic Analysis concepts to design compiler and describe Intermediate code generation such as 3-address code form, DAG, polish notation.	3		
5	C406.5	Explain Symbol tables, structure languages, hashing, tree structures representation, static, runtime stack and heap allocations, storage allocation for arrays and in strings and records.	3		
6	C406.6	Explain data flow analysis, Code generation and apply generic code generation algorithm.	3		
			3		
CO No.	C407	Software Automation and Testing (6EC11)	H		
1	C407.1	Describe concepts of Software testing	3		
2	C407.2	Describe and apply the concepts Flow graphs, Path testing and Data Flow Testing.	3		
3	C407.3	Practice Software testing strategy and Environment with economics and apply Software Metrics useful in software development and maintenance.	3		
4	C407.4	Software Testing Methodology, finding defects hard to find, Verification and validation, Functional and structural, Workbench concept, Eight Consideration of software testing methodology, checklist. Describe Agile computing with agile testing	3		
5	C407.5	Demonstrate Software Testing Techniques such as JADs, Pareto Analysis, Regression Testing, Structured walkthroughs, Thread testing, Performance testing and White box testing.	3		
6	C407.6	Describe Graph matrices and applications, and practice and apply automated testing tools such load Runner, UFT and QTP.	3		
			3		
CO No.	C409	Industry Oriented Mini (6E781) Project	H	M	H

1	C409.1	Use the concepts learned in the courses, so far, in conceptualizing, designing and executing the modules of the projects, Exhibit the interest in learning the modern tools and technologies through the bridge courses arranged in the college, beyond the curriculum, and hence developing the software, Inculcate an enthusiasm to use the creative ideas to build the innovative projects which are meeting the current needs of the market and society as a whole, Improve their communicative skills and team skills largely improve, Work as an individual and in a team.	3	2	3
			3	2	3
CO No.	C410	Software Testing and Automation Lab (6EC75)	H		M
1	C410.1	Prepare Test Plan document and write Test Cases for Small scale Project (Like for their B. Tech IV Year Project or Post-Graduate Projects), they are learning how to Analyze SRS document in order to prepare Test Plan Document. Demonstrate skills to use modern software testing tools (EX: UFT, TestLink, Bugzilla, Selenium, Test Director and Quality Center) and test application (web, Window application) by using the tools. Demonstrate the ability to differentiate between different Testing tools present in the market (like functional testing tools, Test Management Tools, Bug Tracking Tools and Performance Testing Tools) and prepare Test Plan document and write Test Cases for Small scale Project (Like for their B. Tech IV Year Project or Post-Graduate Projects).	3		2
			3		2
CO No.	C411	Compiler Design and Information Security Lab (6EC76)	H		H
1	C411.1	Implement the lexical analyzer using JLex, flex or lex or other lexical analyzer generating tools. Design top-down parser for the given language. Design bottom-up parser for the above language. Implement symmetric key encryption algorithms. Implement asymmetric key encryption algorithms. Implement hashing and key exchange algorithms.	3		3
			3		3
CO No.	C412	Project – I (6E780)	H	L	H

1	C412.1	Develop plans with relevant people to achieve the project's goals. Break work down into tasks and determine handover procedures. Identify links and dependencies, and schedule to achieve deliverables. Estimate the human and physical resources required, and make plans to obtain the necessary resources. Allocate roles with clear lines of responsibility and accountability with team spirit. Design and develop the software or prototype to meet societal needs.	3	1	3
			3	1	3
CO No.	C413	Technical Literature Review and Seminar –III (6E797)			H
1	C413.1	Identify a topic from the current technologies of their choice in the computer science domain and the allied fields, after surveying in the internet resources, journals and technical magazines in the library. Arrange the contents of the presentation and also write the report of the research paper. Present the technical topic in front of the panel and the fellow students, using the oratory skills and also submit the report of the research paper. Interact through answering the questions and also can add some points to the seminar			3
					3
B. TECH IV YEAR II SEMESTER					
CO No.	C414	Mobile Computing (6EC14)	H		
1	C414.1	Identify vast application areas for mobile / wireless communication / computing. They also understand the working principle of GSM technology.	2		
2	C414.2	Discuss various media access control methods that are meant for wireless communication along with SDMA, FDMA, TDMA and CDMA.	3		
3	C414.3	Identify IP mobile primitives in Network layer in the wireless communication and recognize suitable solutions for the same.	3		
4	C414.4	Explain the issues in the Transport layer in wireless communication and identifying suitable solutions for the same	3		
5	C414.5	Discuss MANETs with examples and explain hoarding, client server computing along with the data delivery mechanisms.	3		
6	C414.6	Discuss protocols and tools such as WAP, Blue Tooth and explain emerging mobile operating Systems	3		

			3		
CO No.	C416	Project – II (6E884)	M	M	H
1	C416.1	Develop plans with relevant people to achieve the project's goals. Break work down into tasks and determine handover procedures. Identify links and dependencies, and schedule to achieve deliverables. Estimate the human and physical resources required, and make plans to obtain the necessary resources. Allocate roles with clear lines of responsibility and accountability with team spirit. Design and develop the software or prototype to meet societal needs.	2	2	3
			2	2	3
CO No.	C417	Comprehensive Viva Voce - III (6E885)	H		
1	C417.1	Assess the relevant courses they have undergone till the completion of that academic year. Comprehend the concepts in the core subjects and the elective subjects, to make them ready to face technical interviews which improve their employability skills. They are asked to comprehend the concepts in the core subjects and the elective subjects, to make them ready to face technical interviews which improve their employability skills. Assessment is done in the relevant courses they have undergone till the completion of that academic year.	3		
			3		
CO No.	C418	Technical Literature Review and Seminar – IV (6E898)			H
1	C418.1	1. Identify a topic from the current technologies of their choice in the computer science domain and the allied fields, after surveying in the internet resources, journals and technical magazines in the library. Arrange the contents of the presentation and also write the report of the research paper. Present the technical topic in front of the panel and the fellow students, using the oratory skills and also submit the report of the research paper. Interact through answering the questions and also can add some points to the seminar			3
					3