Teerthanker Mahaveer University
College of Computing Sciences & IT

B.Sc. (Computer Sciences Honors)

Programme Outcome

PO-1	**:**	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO-2	**:**	Problem analysis& Solving: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO-3	**:**	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO-4	**:**	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO-5	**:**	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
PO-6	**:**	Social Interaction & effective citizenship: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO-7	**:**	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO-8	**:**	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO-9	**:**	Attitude (Individual and team work): Function effectively as an individual, and as member or leader in diverse teams, and in multidisciplinary settings.
PO-10	**:**	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clean instructions.
PO-11	**:**	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

Programme Specific Outcome

PSO-1	**:**	Understanding the nature and basic concepts of computing, mathematics, and basic sciences that are relevant and appropriate to the domain.
PSO-2	**:**	Applying knowledge of computing, mathematics, and basic sciences that are relevant

		and appropriate to the domain.
PSO-3	**:**	Designing computer-based system, process, component, or program to meet desired needs of government and society.

Course Outcomes

TMU101	**CO-1**	Understanding environmental problems arising due to constructional and developmental activities.
	CO-2	Understanding the natural resources and suitable methods for conservation of resources for sustainable development.
	CO-3	Understanding the importance of ecosystem and biodiversity and its conservation for maintaining ecological balance.
	CO-4	Understanding the types and adverse effects of various environmental pollutants and their abatement devices.
	CO-5	Understanding Greenhouse effect, various Environmental laws, impact of human population explosion, environment protection movements, different disasters and their management.
CSC111	**CO-1**	Computer Fundamentals & C Programming
	CO-2	Understanding various terminologies and functions used in C programming language.
	CO-3	Applying programming concepts to write compile and debug programs in C language.
	CO-4	Analyzing programming concepts by using loops, arrays, pointers, structures etc.
	CO-5	Design programs for general purposes
CSC112	**CO-1**	Understanding the concepts of Morals, Values, Ethics and Value education.
	CO-2	Understanding the concept of work ethics and find out the difference between profession, ethics and happiness.
	CO-3	Analyzing the concept of trust, spiritualism, and focus on problems related to stress.
	CO-4	Understanding the concept and meaning of Intellectual Property Rights, Cybercrime, Plagiarism and misconduct
	CO-5	Understanding about e-waste and creating a balance between computer ethics and corporate social responsibility.
CSC113	**CO-1**	Understanding the operations of logic gates, boolean algebra and karnaugh map
	CO-2	Understanding the working of combinational and sequential circuits.
	CO-3	Understanding the working of register organization and stack organization.
	CO-4	Understanding the concept of Input-Output Organization and memory organization
	CO-5	Applying the concepts of combinational and sequential circuits to design the desired circuit.
TMUGE101	**CO-1**	Remembering and understanding of the basic of English grammar and vocabulary
	CO-2	Understanding of the basic Communication process

	CO-3	Applying correct vocabulary and tenses in sentences construction
	CO-4	Analyzing communication needs and developing communication strategies using both verbal & non-verbal method.
	CO-5	Drafting applications in correct format for common issues
	CO-6	Developing self-confidence.
CSC156	**CO-1**	Understanding problem-solving techniques.
	CO-2	Applying sorting algorithms
	CO-3	Applying function on programs for reusability
	CO-4	Applying concepts such as arrays, structures etc to write different programs in C language
	CO-5	Design general purpose programs using C
CSC157	**CO-1**	Understanding the basics of MS office
	CO-2	Understanding the working of basic of sequential circuits
	CO-3	Understanding the working of basic gates.
	CO-4	Applying concepts of MS-WORD, MS-EXCEL, POWERPOINT and MSACCESS
	CO-5	Applying concepts of logic gate and boolean algebra to design combinational circuits
	CO-6	Designing sequential circuits with flipflops and registers
TMUGA-101	**CO-1**	Solving complex problems using Criss cross method, base method and square techniques.
	CO-2	Applying the arithmetical concepts of Average, Mixture and Allegation.
	CO-3	Evaluating the different possibilities of various reasoning based problems in series, Blood relation and Direction.
	CO-4	Operationalizing the inter-related concept of Percentage in Profit Loss and Discount, Si/CI and Mixture/Allegation.
CSC213	**CO-1**	Understanding various operating systems, Process Management, Process states, Process Synchronization, CPU Scheduling, Memory Management & Directory Structure
	CO-2	Understanding concepts of detailed operation deadlock and deadlock characterization
	CO-3	Understanding and comparing different CPU Scheduling Algorithms & Memory management techniques
	CO-4	Understanding Disc access, management and scheduling
	CO-5	Analyzing deadlocks and memory
CSC214	**CO-1**	Understanding the basics of web technologies, HTML, Linking of HTML files
	CO-2	Understanding the concept of Image alignment text alignment in HTML
	CO-3	Understanding the concept of web page working, creating forms using of buttons
	CO-4	Understanding various operations on cascading style sheet (CSS)
	CO-5	Understanding the bootstrap framework with its features and layout
CSC215	**CO-1**	Understanding the basic concepts of C++ Programming to solve computing problems.
	CO-2	Understanding the basic concepts of object and classes in C++ and different function statements for transforming a problem solution into programs
	CO-3	Understanding the basic concepts of data structure, arrays and recursion

	CO-4	Understanding the stack, linked list and queue data structure using C++ class concepts
	CO-5	Understanding the basic concepts of sorting and searching with different algorithms
	CO-6	Understanding the basic concepts of tree and file structure
CSC216	**CO-1**	Understanding the concepts of propositional calculus, mathematical techniques and counting principles
	CO-2	Understanding the concepts of graph and tree in discrete structures
	CO-3	Understanding the concepts of recurrence relations and generating functions in combinatory
	CO-4	Applying the various counting principles for solution of a real life problem
	CO-5	Analyzing the mathematical problems based on graph and trees
TMUGE201	**CO-1**	Remembering & understanding the basics of English Grammar and Vocabulary
	CO-2	Understanding the basics of Listening, Speaking & Writing Skills
	CO-3	Understanding principles of letter drafting and various types of formats.
	CO-4	Applying correct vocabulary and grammar in sentence construction while writing and delivering presentations
	CO-5	Analyzing different types of listening, role of Audience & Locale in presentation
CSC255	**CO-1**	Applying concepts to create simple web pages using various HTML tags and attributes
	CO-2	Applying concepts of CSS to design the layout of web pages.
	CO-3	Applying concepts of Java script to design dynamic web pages.
	CO-4	Applying concepts of dynamic and auto responsive web pages using Java Script and Bootstrap Framework.
	CO-5	Designing dynamic and auto responsive web pages using Java Script and Bootstrap Framework.
CSC256	**CO-1**	Applying concepts of data types, class and object by writing C++ program
	CO-2	Applying concepts of stack, linked list and queue by writing C++ Program.
	CO-3	Applying concepts of different searching and sorting algorithms by writing C++ Program
	CO-4	Applying basic concepts of tree by writing C++ Program.
	CO-5	Developing various programs for utility in C++
TMUGA-201	**CO-1**	Applying the arithmetical concepts in Ratio Proportion Variation
	CO-2	Employing the techniques of Percentage; Ratios and Average in inter related concepts of Time and Work, Time Speed and Distance
	CO-3	Identifying different possibilities of reasoning based problems of Syllogisms and Venn diagram
	CO-4	Examining the optimized approach to solve logs and Surds
CSC301	**CO-1**	Understanding the concepts of life cycle models to choose the appropriate model
	CO-2	Understanding the software based on the industry standards
	CO-3	Understanding and Designing test cases
	CO-4	Understanding the UML notation
	CO-5	Understanding the UML notation
CSC312	**CO-1**	Understanding numerical methods to find our solution of algebraic linear

		equations using different methods under different conditions, and numerical solution of system of algebraic linear equations.
	CO-2	Understanding numerical methods to find our solution of non linear equations using different methods under different conditions, and numerical solution of system of non linear equations. Also work out numerical differentiation and integration whenever and wherever routine methods are not applicable
	CO-3	Understanding various interpolation methods and finite difference concepts.
	CO-4	Understanding the importance of curve fitting, regression and its applications to solve problems.
	CO-5	Understanding the importance of time series and forecasting models, and Testing of Hypothesis to apply various test and its applications to solve problems.
CSC313	**CO-1**	Understanding the importance of Transportation Problems and Integer Linear Programming and its applications to solve problems.
	CO-2	Understanding the importance of Non Linear Programming and Dynamic Programming and its applications to solve problems.
	CO-3	Understanding the importance of Inventory Models and Replacement problems and its applications to solve problems.
	CO-4	Applying problems defining, understanding and classification
	CO-5	Applying Linear Programming problem and similar such problems into appropriate forms and problem solving
CSC314	**CO-1**	Understanding the confluence of scientific computing, ways of learn, technology, interventions and computing.
	CO-2	Understanding the computing and parts of digital, numerical solutions technique. That is beneficial for student‘s in future competitive exams.
	CO-3	Understanding to solve the competitive exams questions in a very less time.
	CO-4	Understanding for solving the problem of Euler's. Euler's equations
	CO-5	Applying methods for scientific computing and numerical solutions technique.
CSC315	**CO-1**	Understanding the detail concept of java in real life.
	CO-2	Understanding java with some modules.
	CO-3	Understanding how the java is different and easy from other programming Languages.
	CO-4	Applying the relationship between java and Data Analysis
	CO-5	Analyzing how the data is predicted in java
CSC316	**CO-1**	Understanding the basic concept of computer network and its applications, network topology, network architecture, OSI reference model, TCP/IP protocol, physical layer transmission.
	CO-2	Understanding concept of medium access sublayer, error detection and correction algorithms, LAN protocols, CSMA with collision detection, ethernet, Wireless LANs.
	CO-3	Understanding concept of network layer, internetworking devices, routing algorithms, IP address, subnetting, supernetting, IPV4 and IPV6.
	CO-4	Understanding concept of transport layer, P2P delivery, UDP, SCTP,

		congestion control and quality of services.
	CO-5	Understanding concept of application layer, DNS, FTP,HTTP, cryptography and network security.
TMUGE301	**CO-1**	Remembering and understanding the English grammar and vocabulary.
	CO-2	Understanding the art of public speaking and strategies of reading comprehension.
	CO-3	Applying correct vocabulary and sentence construction during public speaking or professional writing.
	CO-4	Aanalyzing different types of sentences like simple, compound and complex.
	CO-5	Drafting notice, agenda and minutes of the meeting.
	CO-6	Demonstrating speaking skills during common conversation and power point presentation.
CSC357	**CO-1**	Understanding the execution of java In real life.
	CO-2	Applying the different modules to predict data
	CO-3	Applying different functions to search pattern in the files.
	CO-4	Analyzing the data from different datasets with different modules.
	CO-5	Develop applets in Java
CSC358	**CO-1**	Understanding floating point arithmetic operations and deduce errors involved in polynomial interpolation.
	CO-2	Understanding Algebraic and transcendental equation.
	CO-3	Applying formulae by Bessel‘s, Newton, Sterling, and Lagrange‘s
	CO-4	Applying method of least square and showing frequency chart, regression analyst
	CO-5	Applying numerical integration and differentiations
CSC359	**CO-1**	Understanding the importance of optimization of industrial process management.
	CO-2	Understanding the concepts of mathematics for making optimization problem.
	CO-3	Understanding the performance measurement for various optimization problems.
	CO-4	Applying basic concepts of mathematics to formulate an optimization problem.
	CO-5	Analyzing and appreciating variety of performance measures for various optimization problems.
CSC360	**CO-1**	Understanding the range of mathematical problems, model and / or solve them using an appropriate method.
	CO-2	Understanding the solutions using one or more of the commonly-used programming environments.
	CO-3	Applying computer code so that others can understand it more easily
	CO-4	Applying and preparing reports on the results obtained.
	CO-5	Analyzing reports with given terms and conditions
TMUGA-302	**CO-1**	Understanding the concepts of modern mathematics Divisibility rule, Remainder Theorem, HCF /LCM in Number System.
	CO-2	Applying the concepts of modern mathematics Divisibility rule, Remainder Theorem, HCF /LCM in Number System
	CO-3	Applying the rules of permutation and combination, Fundamental

		Principle of Counting to find the probability.
	CO-4	Applying calculative and arithmetical concepts of ratio, Average and Percentage to analyze and interpret data.
	CO-5	Analyzing the various arithmetic concepts to check sufficiency of data
TMUGS-301	**CO-1**	Utilizing effective verbal and non-verbal communication techniques in formal and informal settings
	CO-2	Understanding and analyzing self and devising a strategy for self growth and development
	CO-3	growth and development. CO-3 Adapting a positive mindset conducive for growth through optimism and constructive thinking
	CO-4	Utilizing time in the most effective manner and avoiding procrastination.
	CO-5	Making appropriate and responsible decisions through various techniques like SWOT, Simulation and Decision Tree.
	CO-6	Formulating strategies of avoiding time wasters and preparing todo list to manage priorities and achieve SMART goals.
CSC403	**CO-1**	Understanding of algorithms using inductive proof.
	CO-2	Understanding best, worst and average -case running times of algorithms using asymptotic analysis.
	CO-3	Understanding the divide-and-conquer paradigm and explain when an algorithmic design.
	CO-4	Applying algorithms that employ divide-and-conquer paradigm.
	CO-5	Applying divide-and-conquer algorithms. Derive and solve recurrences describing the performance of divide-and-conquer algorithms
CSC411	**CO-1**	Understanding the basics of database concepts including Characteristics, design of data models, database architecture and database languages.
	CO-2	Understanding the performance of data models using entity relationship model and relational model with the help of E-R diagram, extended E-R diagram, key concepts and integrity constraints.
	CO-3	Understanding and analyzing the relational tables and evaluate the results with DDL, DML and DCL queries and operations like sub queries, join, union and intersection using SQL.
	CO-4	Understanding and remembering the concept of functional dependency and normalization upto 3NF and BCNF on relational tables with transaction processing, serializability and recovery.
	CO-5	Applying the concept of concurrency control protocols and locking on database transactions with recovery techniques and database security
CSC413	**CO-1**	Understanding the basic of R programming, data types, operators, R vectors, R matrix, Categorical and continuous variables, understanding about Data frames, lists, sorting and merger of data frames.
	CO-2	Understanding basic programming structure in R, conditions, loops, understanding import data from CSV, Excel, SPSS, STATA, SAS files, export data to various file format. Understanding aggregate function
	CO-3	Understanding data visualization, elementary statistics, Sampling distributions, Hypothesis testing, Linear Regression, Multiple Linear Regression, Linear Model selection.
	CO-4	Understanding grammar of graphics, graph plotting, understanding debugging tools traceback(), debug()

	CO-5	Understanding Clustering in R, K-Means and k-medoids clustering, Analyzing Time Series, understanding reading, plotting and decomposing time series data, understanding ARIMA models, Text mining using R.
CSC414	**CO-1**	Understanding the concepts of Internet of Things
	CO-2	Understanding basic protocols in wireless sensor network
	CO-3	Understanding IoT applications in different domain and be able to analyze their performance.
	CO-4	Applying methods for verifying wireless sensor network.
	CO-5	Applying basic IoT applications on embedded platform
CSC415	**CO-1**	Understanding the concepts of confidentiality, availability, and integrity in context of Information Assurance
	CO-2	Understanding types of attackers as well as various types of attacks and their solutions.
	CO-3	Understanding various authentication mechanisms on email security and cryptographic methods for data security.
	CO-4	Understanding various network and port scanning tools.
	CO-5	Understanding legal and ethical issues in computer security.
CSC416	**CO-1**	Understanding basic terminology and the fundamentals associated with Hacking in good or bad perspective
	CO-2	Understanding to commiserate with different ways and methodology of Hacking.
	CO-3	Understanding the nature, class and platforms to tackle for web and network-based Hacking.
	CO-4	Understanding to plan tracking and a vulnerability assessment for webbased applications.
	CO-5	Understanding to express the basic understanding of ethical hacking laws and tests.
TMUGE401	**CO-1**	Remembering and understanding the English grammar and vocabulary
	CO-2	Understanding the essentials of effective listening and speaking
	CO-3	Understanding the corporate expectations and professional ethics
	CO-4	Applying correct vocabulary and sentence construction during professional writing or job interviews.
	CO-5	Analyzing different types of interviews.
	CO-6	Drafting resume, C.V. or cover letter
CSC456	**CO-1**	Understanding the Oracle installation to perform DDL queries like Create, Alter, Drop, Truncate and Rename on relational database tables.
	CO-2	Understanding and applying DML queries like Select, Insert, Update and Delete on relational database tables.
	CO-3	Understanding and applying DCL queries like Grant and Revoke on relational database tables with the mechanism to take the backup of our database
	CO-4	Applying and evaluating aggregate functions with Group By and Having Clauses.
	CO-5	Analyzing queries for different types of joins and set operations with the creation of nested sub queries and views. Also learn to design a database with at least 2-NF conformity.
CSC458	**CO-1**	Understanding a variety of emerging devices and technologies such as

		smart sensing, pervasive connectivity, virtual interfaces & ubiquitous computing and their potential applications in consumer, retail, healthcare and industrial contexts.
	CO-2	Understanding on research with industry partners to address significant and complex challenges surrounding IoT technologies and applications.
	CO-3	Applying methods on a platform for conducting consultancy work required by government/Private organizations in around Coimbatore.
	CO-4	Applying faculty learning, research and hands-on experimentation to discover and demonstrate the promise of the Internet of Things.
	CO-5	Analyzing the students unique interdisciplinary learning and innovation experiences with IoT technologies
CSC459	**CO-1**	Applying various cryptographic methods for data security.
	CO-2	Applying expertise in configuring host and network level technical security controls.
	CO-3	Applying the various network and port scanning tools for data and network security
	CO-4	Analyzing analytical skills in identifying and troubleshooting networking, security, and performance issues.
	CO-5	Analyzing network working with configure host and controls.
CSC460	**CO-1**	Understanding skills of Scanning, Foot-printing & Reconnaissance.
	CO-2	Applying skills over enumeration tools, social engineering, and simulation of system hacking.
	CO-3	Applying demonstrating application / network-level Session Hijacking.
	CO-4	Analyzing different attacks and backdoor plantation.
	CO-5	Creating different network application demonstrated on network levels.
CSC461	**CO-1**	Applying real world problems using R, adding vectors, finding mean, min, max of vectors.
	CO-2	Applying searching and sorting based programs, recursion and basic mathematics based applications.
	CO-3	Analyzing application which taking input from user, creating programs to generate random number.
	CO-4	Analyzing data science tools and their implementations.
	CO-5	Creating list based application, plotting graph using R.
TMUGA-402	**CO-1**	Implementing the rules of different geometrical concepts in Lines and Angles, Triangles, Area and volumes of different figures.
	CO-2	Recognizing the rules of Crypt-arithmetic and relate them to find out the solutions.
	CO-3	Illustrating the different Algebraic expressions in Quadratics, progressions etc
	CO-4	Employing the concept of higher level reasoning in Clocks, Calendars and Puzzle Problems.
	CO-5	Correlating the various arithmetic and reasoning concepts in checking sufficiency of data.
TMUGS-401	**CO-1**	Communicating effectively in a variety of public and interpersonal settings.
	CO-2	Applying concepts of change management for growth and development by understanding inertia of change and mastering the Laws of Change

	CO-3	Analyzing scenarios, synthesizing alternatives and thinking critically to negotiate, resolve conflicts and develop cordial interpersonal relationships.
	CO-4	Functioning in a team and enabling other people to act while encouraging growth and creating mutual respect and trust.
	CO-5	Handling difficult situations with grace, style, and professionalism
CSC515	**CO-1**	Understanding the basics of Dot Net Framework with C#
	CO-2	Classifying hands-on use of Dot Net Framework with C# applications in Web, Window and Console Application. Completion of the assignments will result Dot Net Framework with C# applications knowledge and skills
	CO-3	Identifying categories of programs, Web, Window and Console Application. Organize and work with many projects.
	CO-4	Recognizing when to use each of the Dot Net Framework with C# programs to create professional, academic, business and many software projects.
	CO-5	Applying skills and concepts for basic use of computer hardware, software, networks and the Internet in the workplace and in future coursework as identified by the internationally accepted Internet and Microsoft Core .Net standards
CSC516	**CO-1**	Understanding the basic concept of computer automation, finite state system, DFA, NFA, comparison of DFA and NFA, limitations and applications of finite automata.
	CO-2	Understanding concept of finite automata with epsilon transitions, kleen's theorem, minimization of DFA, Moore and Mealy machine, closure properties of regular sets.
	CO-3	Understanding concept of regular language in finite machine, converting DFA's to regular expression, applications of regular expressions, pumping lemma of regular language, Chomsky classification of grammars, right linear and left linear grammar, construction of CFG, derivation trees, sentential forms .
	CO-4	Understanding concept of context free grammar, ambiguity in CFG and removing this, reduced grammar, CNF and GNF, closure properties of CFL, pumping lemma for CFL.
	CO-5	Understanding concept of PDA, acceptance of CFL, CFL and PDA equivalence, DCFL and DPDA.
CSC517	**CO-1**	Understand programming skills in core Python.
	CO-2	Understand Object Oriented Skills in Python
	CO-3	Understand important aspects related with string, lists and dictionary in python.
	CO-4	Apply the skill of designing user defined functions in python
	CO-5	Develop the ability to work on database applications.
CSC518	**CO-1**	Understand the android framework, Android Software Development Kit, Android application Architecture, various predefine classes and interfaces which are helpful in application development
	CO-2	Understand the various application components, Activities and its various methods, necessary directory structure for application development.
	CO-3	Understand view and viewgroup objects, basic layout designing using xml,

		understanding android virtual device, understanding screen orientation, understanding various UI controls
	CO-4	Understand custom views, fragments, event handling, styling of components, understanding the different pixel density for images.
	CO-5	Analyze different methods of content provider class for data sharing between applications, Understanding preference file and its various methods for storing application preferences.
CSC512	**CO-1**	Understand the detail concept of java In real life
	CO-2	Understand how java is different and easy from other programming Languages.
	CO-3	Understand java with some modules
	CO-4	Understand how the data is predicted in java
	CO-5	Analyzing the relationship between java and Data Analysis.
CSC513	**CO-1**	Understand the concept of Sociology, social structure, social values and its impact on business.
	CO-2	Understand the Work and Social change: modern societies, industrial capitalism, globalization, service sector
	CO-3	Understand the Work experience in Industry: Technology & work experience, Social background, Stress & anxiety of workers.
	CO-4	Understand the Ethics and the professions, significance of professional ethics for engineers, applied ethics.
	CO-5	Understand the significance of ethical leadership, corporate culture and reputation management, corporate social responsibility
CSC520	**CO-1**	Understand the Concepts, functions and importance of management with its applicability.
	CO-2	Understand the meaning of organizational behavior and its concepts.
	CO-3	Understand the Theories of motivation and leadership and its importance, applicability into business
	CO-4	Understand the Perception and Thinking process of individual, personality traits and its importance
	CO-5	Analyzing the behavior of individuals to make it productive in organization.
CSC558	**CO-1**	Understand Activity, analyzing various lifecycle callback methods of Activity class, creating some basic layouts using predefine widgets.
	CO-2	Understand view system, Adapter based views, analyzing various classes of adapter based views, creating basic list using List view, understanding Base Adapter and its various methods
	CO-3	Understand menu and its types, creating basic screens using menus, buttons and Text views.
	CO-4	Understand the web services, creating application that‘s consume web services using Network calling, creating application related to content sharing.
	CO-5	Understand map based activity, understanding Geo coding, creating application that‘s shows Maps and current location
CSC559	**CO-1**	Understand the execution of java In real life.
	CO-2	Apply the different modules to predict data.
	CO-3	Apply different functions to search pattern in the files.

	CO-4	Analyze the data from different datasets with different modules.
	CO-5	Develop applications for the use of society
CSC560	**CO-1**	Apply core python programming like loop, if statement and other concept.
	CO-2	Apply different collections - list, tupple, dictionaries.
	CO-3	Apply functions.
	CO-4	Apply class, inheritance and operator overloading.
	CO-5	Develop Database application in python
CSC561	**CO-1**	Understand how to design, code, compile, and execute business-oriented programs using the C# programming language commands.
	CO-2	Apply programming logic for business-oriented programs using appropriate tools such as TOE (Task, Object and Event) charts, hierarchy charts, flowcharts, and pseudo code
	CO-3	Analyze the characteristics unique to object-oriented programming vs. structured programming.
	CO-4	Analyze program-generated output for correctness.
	CO-5	Develop code that validates input data.
CSC616	**CO-1**	Understand the concept of web servers, server side and client side scripts on web development.
	CO-2	Understand the basics of PHP language, its syntax, Wordpress and CakePHP framework, AJAX,.
	CO-3	Understand the basics of MySQL, creating database and database connectivity in PHP with MySQL
	CO-4	Apply concepts of PHP language using XML and AJAX to create more interactive web applications
	CO-5	Apply MySQL with PHP to create dynamic content that interact with database.
CSC617	**CO-1**	Understand the basics of ASP.Net with MVC Architecture
	CO-2	Understand the meaning and basic components of a ASP.Net with MVC Architecture.
	CO-3	Understand categories of programs, Web, Window and Console Application. Organize and work with many projects.
	CO-4	Apply ASP.Net with MVC Architecture applications in Web, Window and Console Application. Completion of the assignments will result ASP.Net with MVC Architecture applications knowledge and skills.
	CO-5	Analyze when to use each of the ASP.Net with MVC Architecture programs to create professional, academic, business and many software projects.
CSC618	**CO-1**	Understand how the human intelligence works and takes decision by using experience.
	CO-2	Understand how to make a machine intelligent to take decisions like human and how to give experience to machine.
	CO-3	Understand the importance of ecosystem and conserving it for maintaining ecological balance using machines that takes their own decisions
	CO-4	Apply various techniques and algorithms for regression, classification and clustering with python, the widely used language having most

		sophisticated machine learning libraries.
	CO-5	Analyze the efficiency of algorithms using confusion matrix for classification algorithms and R2 Adjusted for regression algorithms.
CSC619	**CO-1**	Understand the concepts, characteristics, delivery models and benefits of cloud computing
	CO-2	Understand the key security and compliance challenges of cloud computing
	CO-3	Understand the key technical and organizational challenges
	CO-4	Understand the different characteristics of public, private and hybrid cloud deployment models
	CO-5	Apply certain methods for fulfilling the challenges of cloud computing
CSC620	**CO-1**	Understand about human computer interaction.
	CO-2	Understand the interaction design theory as well as elements of cognitive psychology when designing, critiquing or talking about software and/or hardware.
	CO-3	Apply certain methods for working on software and hardware.
	CO-4	Apply mock-ups and carry out user and expert evaluation of interfaces.
	CO-5	Analyze general ways in which to test hypotheses about human computer interaction.
CSC621	**CO-1**	Understand the basics of wireless &mobile telecommunication system.
	CO-2	Understand the required functionality of each layer of Mobile Internet Protocol
	CO-3	Understand and identifying the GSM, GPRS and Bluetooth software model for mobile Computing.
	CO-4	Understand the design of Ad-Hoc Networks.
	CO-5	Understand different mobile platform and outline the various mobile applications.
CSC622	**CO-1**	Understand the unstructured-nature, reason, drivers and applications of data i.e. big data.
	CO-2	Understand new way processing & paradigm of —divide and conquer‖ approach i.e. map-reduce algorithm and its applications.
	CO-3	Understand the concepts of Non-relational databases and querying tools.
	CO-4	Understand the fundaments of Hadoop, Hadoop- Architecture, Eco-system, data-formats, big data processing.
	CO-5	Apply big data processing on Hadoop
CSC623	**CO-1**	Understand the basic concepts of NOSQL including its four types of databases, MongoDB, Cassandra, HBASE, Neo4j and aggregate oriented databases.
	CO-2	Understand, and analyzing Replication and sharding, Map Reduce on databases. Distribution Models, Event Logging, Content Management Systems, Blogging Platforms, Web Analytics or Real-Time Analytics.
	CO-3	Understand Column-oriented NoSQL databases using Apache HBASE, Column-oriented NoSQL databases using Apache Cassandra and Architecture of HBASE.
	CO-4	Understand NoSQL Key/Value databases using Riak, Key-Value Databases, Preferences, Shopping Cart Data, Multioperation Transactions, Query by Data, Operations by Sets.

	CO-5	Understand Graph NoSQL databases using Neo4,NoSQL database development tools and programming languages, Graph Databases, Query Features, Scaling, Suitable Use Cases, Connected Data, Routing, Dispatch, and Location-Based Services with Recommended Engines,
CSC657	**CO-1**	Understand the working of basic programming in PHP and MySQL Lab.
	CO-2	Understand and designing the working of PHP and MySQL Lab.
	CO-3	Understand and designing the working of PHP and MySQL Lab.
	CO-4	Apply the arithmetic expressions using programming in PHP and MySQL Lab.
	CO-5	Apply the designing procedures to design basic project in programming in PHP and MySQL Lab
CSC656	**CO-1**	Understand the concept of MVC framework with ASP.Net to create simple web applications.
	CO-2	Apply the concept of MVC framework with ASP.Net to create simple web applications.
	CO-3	Apply ASP.Net with Ajax to create web applications.
	CO-4	Apply ASP.Net with Ajax to create window applications.
	CO-5	Develop Desktop and Web Applications.
CSC658	**CO-1**	Understand and Designing mobile and pervasive computing applications and services.
	CO-2	Understand contemporary development environment and languages (WML and J2ME) to develop mobile applications
	CO-3	Understand role as a member of a team to complete a large programming project.
	CO-4	Apply Authentication and encryption technique used in GSM
	CO-5	Design typical functionalities of modern smartphones e.g. personal phone book containing the name, phone no., address, e-mail,etc
CSC659	**CO-1**	Understand and using generic platform i.e. linux for tools like Hadoop
	CO-2	Understand how to use hadoop cluster for big data processing and analytics
	CO-3	Apply known applications of map-reduce algorithms over hadoop and analyze the same
	CO-4	Apply aided tools of eco-system of big data processor to maintain and administer the cluster.
	CO-5	Design applications on Hadoop
CSC660	**CO-1**	Understand the concept of MongoDB and its Installation on Windows &Linux.
	CO-2	Understanding AND/OR operations, Limit Records and Sort Records, Indexing, Advanced Indexing, Aggregation and Map Reducein MongoDB
	CO-3	Apply and creating database and show database using MongoDB shell.
	CO-4	Apply Queries related to Insert Update, Delete, Projection and Where Clause equivalent using MongoDB.
	CO-5	Analyze document oriented and column oriented databases study, queries and practices
CSC661	**CO-1**	Understand how to import data, clean data and prepare training, testing and validation data in python.

	CO-2	Apply python to train an algorithm to make a machine intelligent to take decisions like human
	CO-3	Apply various techniques and algorithms for regression, classification and clustering with python, the widely used language having most sophisticated machine learning libraries.
	CO-4	Analyze the efficiency of model after implementation in python
	CO-5	Develop ecosystem by preparing a model that uses other models and used by other models in machine learning ecosystem