2.6 Student Performance and Learning Outcome

2.6.1 Course Outcomes (COs)

Summary

Course outcomes are specific statements that outline what students are expected to learn and achieve by the end of a course. They provide a clear framework for assessing students' progress and ensuring that the course objectives align with educational standards. Outcomes typically encompass knowledge acquisition, skill development, and the application of learning in practical scenarios. Effective course outcomes are measurable, attainable, and relevant, guiding both teaching strategies and assessment methods. They help in setting clear expectations and ensuring that students are equipped with the necessary competencies for their academic and professional growth.

Dean Academics
Institute of Technology &
Management, Gwalior

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Academic Year 2022-23 & 2023-24
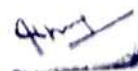
B.Tech CSE 3rd Sem		
Course Code/Course Name	**Course Outcomes**	
ES 301(Energy and environmental Engineering)	ES301.1	Identify and compare different energy resources and systems to analyze energy requirement issues
	ES301.2	Apply the concept of ecosystem and assess the synergy between the components and functions of an ecosystem.
	ES301.3	Demonstrate the critical analyzing ability towards the biodiversity, its conservation and need for sustainable development.
	ES301.4	To interpret and summarized the concept of environmental pollution to recognize the need of environmental protection as a life long learning.
	ES301.5	To understand, classify and apply professional, social and environmental ethical principles.
CS 302(Discrete Structure)	CS302.1	Ability to define and apply the concepts of Set, Relation ,Function , mathematical reasoning and counting techniques in mathematical situations.
	CS302.2	Understand and Apply the concept of functions and algebraic structures such as Groups and Rings to finite state machines and coding theory.
	CS302.3	Ability to apply and analyse the fundamentals of propositional logic and predicate calculus in Boolean Algebra to test the validity of statements.
	CS302.4	Demonstrate the knowledge of types of graphs, posets and lattice and apply it to solve engineering problems.
	CS302.5	Ability to evaluate the solution of different type of recurrence relations using generating functions.
CS 303(Data Structure)	CS303.1	Ability to Define, understand concepts of different categories of data Structures
	CS303.2	Identify different parameters to analyze the performance of an algorithm.
	CS303.3	Design algorithms to perform operations with Linear and Nonlinear data structures
	CS303.4	Compare and contrast different implementations of data structures.
	CS303.5	Apply appropriate data structure to solve and implement various real time problems.
CS 304(Digital Systems)	CS304.1	Student will be able to understand and apply the basic concept digital electronics for digital circuit and system design.
	CS304.2	Students will be able to realize and describe the operation ofcombinational circuits.
	CS304.3	Students will be able to realize and describe the operation of sequential circuits and memories.

	CS304.4	Students will be able to apply the fundamental knowledge of analog and digital electronics principle for understanding and creating different analog to digital converter, multivibrator and logic families.
	CS304.5	Students will be able to understand the basic concept of digital communication.
CS 305(Object Oriented Programming & Methodology)	CS305.1	Describe the procedural and object oriented paradigm with concepts of streams and functions.
	CS305.2	Demonstrate the use of various OOPs concepts with the help of programs
	CS305.3	Apply the concepts of inheritance and polymorphism and virtual functions in developing programs.
	CS305.4	Analyse relationship between classes and Exception handling concepts.
	CS305.5	Design application to solve real world problems.
CS 306(Computer Workshop(Java))	CS306.1	Understand the fundamentals of objectoriented programming in Java, including defining classes, objects, invoking methods etc and exception handling mechanisms. (Understand).
	CS306.2	Apply different technologies by implementing them in the Java programming language to solve the given problem (Apply).
	CS306.3	Design Graphical User Interface using Swings, AWT and Event Handling.
	CS306.4	Build connections through Java Database Connectivity (JDBC).
	CS306.5	Develop Programs for real world applications using the Java Collection API as well as the Java Standard class library. (Develop)
BT 107(Internship)	BT107.1	To Describe the everyday operations of an agency or organization.
	BT107.2	Student will able to Identify the ethical standards of behavior for professionals and interns within the agency/organization.
	BT107.3	Students will be able to Focus professional soft skills such as communication, punctuality and time management.
	BT107.4	Student will be able to Manage various personal habits or a social skill to deal better with work situations
	BT107.5	Build a professional network that can be a resource for the student

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B.Tech CSE 4th Sem		
Course Code/Course Name	**Course Outcomes**	
BT 401(Mathematics- III)	BT401.1	Ability to Understand and evaluate the zero of algebraic and transcendental equations, simultaneous linear equations with the help of Numerical Methods.
	BT401.2	Understand the theoretical principles of numerical techniques and the associated error measures and apply them to find differentiation, integration and Differential Equations
	BT401.3	Ability to remember operators and use them to estimate the value between the given set of data (interpolation) and hence, apply it to estimate various real life scenarios.
	BT401.4	Analyze different types of statistical situations in which different probability distributions can be applied.
	BT401.5	Ability to analyze and evaluate the solution of ODE and PDE by using Laplace and Fourier Transform.
CS 402(Analysis Design of Algorithm)	CS402.1	Learn,Apply & Analyze the complexity in Divide and Conquer techniques for suitable problems
	CS402.2	Apply and identify the Optimal Solution using the Greedy Approach for appropriate problems.
	CS402.3	Compute and Analyze the problems by using Dynamic Programming approach
	CS402.4	Apply the concept of Backtracking and Branch & Bound for solving the suitable problems, and enhance the performance of the algorithm
	CS402.5	Learn the concept of NP completeness and Apply the various operations on tree & Graph data structures
CS 403(Software Engineering)	CS403.1	Understand basic concepts and identify various SDLC models (spiral model, waterfall model concepts).
	CS403.2	Design SRS (software requirement specification) for various project. (student managment)
	CS403.3	Translate a specification to a design, and identify the components to build the architecture for a given problem, using an appropriate software engineering methodology
	CS403.4	Analyze the various testing techniques and apply in specific project(student managment)
	CS403.5	Develop software projects based on current technologies, by managing resources economically and keeping ethical values
CS 404(Computer Org. & Architecture)	CS404.1	Able to identify the basic structure of a processor, memory, Instructions to analyze the working of a system.
	CS404.2	Analyse the working of microprogrammed controller with firmware and hardwired control unit.
	CS404.3	Interpreting the computer arithmetic operations with structuring the flowchart and hardware algorithms .
	CS404.4	Classify and analyse the memory structure , input output organization and multiprocessors in a computer system.
	CS404.5	Able to implement mnemonics using assembler in assembly level language for executing instructions.

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CS 405(Operating Systems)	CS405.1	To Understand and apply the basic knowledge of operating systems like kernel, shell, and types of Operating systems.
	CS405.2	To analyse various synchronisation algorithm & Process scheduling algorithms (FCFS, SJF, RR, and SRTF) on the basis on Turnaround time and waiting time.
	CS405.3	To Apply page replacement algorithms like(LRU,FIFO,Optimal) to resolve the issues in virtual memory,and understand various memory management techniques.
	CS405.4	Design the concept of disk management and analyse different disk scheduling algorithms (FCFS, SSTF, SCAN etc.) for better utilization of external memory and apply file management operations.
	CS405.5	Installation and Evaluation of the various features of different OS like UNIX, Linux, windows, android,ubuntu etc.
CS 406(Programming Practices(python))	CS406.1	Identify the basic datatypes , operators, variables and functions.
	CS406.2	Ability to analyze the importance of object oriented programming over structural programming.
	CS406.3	Determine the list , tuples , dictionary and set build in container data types.
	CS406.4	Able to Implement object oriented database and Graphical user interface application using packages.
	CS406.5	Develop the ability to analyse and write database applications in Python programming.
	CS406.6	To develop the skill of creating small packages and user defined functions for predictive modeling .
	CS406.7	To facilitate students with the skills required to solve complex problems using object oriented concepts.

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Course Code/Course Name		Course Outcomes
B.Tech CSE 5th Sem		
CS 501(Theory of Computation)	CS501.1	Understand and apply concept of finite state machine to design a deterministic finite automata and non deterministic finite automata for a problem
	CS501.2	Analysis and Apply ardern's theorem to compute regular expression for a given deterministic and non deterministic finite automata.
	CS501.3	Analyze whether the given language is regular or not, equivalence of languages accepted by Push Down Automata and languages generated by context free grammars.
	CS501.4	Analysis and comprehension between Deterministic finite automata, non Deterministic finite automata, Push Down Automata, Turing machine on the basis of their power.
	CS501.5	Understand and apply concept of Turing machine to design machine for a given problem.
CS 502(Database Management Systems)	CS502.1	Understand basic concepts and identify various data models (E R modelling concepts) and apply these concepts for designing database and queries using SQL.
	CS502.2	Apply relational database theory and describe relational algebra expression, tuple and domain relation expression for writing queries in relational algebra.
	CS502.3	Identify and improve the database design by normalization, key constraints and transaction technique.
	CS502.4	Analyse various software todesign and differentiate between ER diagram and flowchart for related databasemanagement system
	CS502.5	Evaluate and optimize queries and transaction processes for solving real world problems
CS 503(Data analytics)	CS503.1	Able to identify descriptive and inferential statistical approachs followed to analyze the data.
	CS503.2	Analyse the hadoop ecosystem with Hadoop File System, MapReduce and Google File System.
	CS503.3	Ability to tranform data with the help of ETL and other processing tools
	CS503.4	Classify the problem using Distributed File System and processing tools like mapreduce and YARN.
	CS503.5	Evaluate or assess models with the large volume of unstructured data with the help of big data tools and techniques.
CS 504(Internet and Web Technology)	CS504.1	Discuss Internet Technology and Web Designing Tools
	CS504.2	Create web pages using XHTML and create XML documents and Schemas.
	CS504.3	Define the CSS with its types and Apply them to provide the styles to the webpages at various levels

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	CS504.4	List the various HTML tags and use them to develop the user friendly web pages.
	CS504.5	Use server side scripting with PHP to generate the web pages dynamically using the database connectivity
CS 505(Linux)	CS505.1	To describe the architecture and features of LINUX Operating System and distinguish it from other Operating System
	CS505.2	Demonstrate LINUX commands for file handling and process control
	CS505.3	Use network related commands and configuration files in Linux Operating system
	CS505.4	To Analyze a given problem and apply requisite facets of SHELL programming in order to devise a SHELL script to solve the problem
CS 506(Python)	CS506.1	Identify the basic datatypes , operators, variables and functions.
	CS506.2	Ability to analyze the importance of object oriented programming over structural programming.
	CS506.3	Determine the list , tuples , dictionary and set build in container data types.
	CS506.4	Able to Implement object oriented database and Graphical user interface application using packages.
	CS506.5	Develop the ability to analyse and write database applications in Python programming.
CS 507(Evaluation of Internship-II)	CS507.1	To Describe the everyday operations of an agency or organization.
	CS507.2	Student will able to Identify the ethical standards of behavior for professionals and interns within the agency/organization.
	CS507.3	Students will be able to Focus professional soft skills such as communication, punctuality and time management.
	CS507.4	Student will be able to Manage various personal habits or a social skill to deal better with work situations
	CS507.5	Build a professional network that can be a resource for the student
CS 508(Minor Project- I)	CS508.1	Describe how to convert real problems to provide problem based solution.
	CS508.2	Demonstrate the product based and application based solution of problems.
	CS508.3	Analysis of system modules according to the requirement.
	CS508.4	Designing of the system architecture,UML diagrams and report writing.
	CS508.5	Evaluate structural as well as functional testing after developing test case.

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B.Tech CSE 6th Sem		
Course Code/Course Name		**Course Outcomes**
CS 601(Machine Learning)	CS601.1	Understand and apply knowledge of computing and mathematics to machine learning problems, models and algorithms
	CS601.2	Understand the concepts of machine learning by applying different algorithms to create various models
	CS601.3	Analyze machine learning algorithms to design and develop programs using python
	CS601.4	Develop experiments and implement image recognition algorithms on various datasets using python
	CS601.5	Understand and apply knowledge of neural network concepts for implementing speech recognition algorithms using python.
CS 602(Computer Networks)	CS602.1	Understand the concept of various networking models & able to Apply knowledge of the TCP/IP and OSI layering model to intelligently debug the networking problems.
	CS602.2	Describe & analyze the methods to examine various data link layer design issues and data link protocols.
	CS602.3	Understand Medium Access Sub layer and different protocols working and Evaluate contention scheme for data services(ALOHA) and Local Area Networks(CSMA, CSMA/CD, CSMA/CA).
	CS602.4	Learn and define network routing through algorithm and use IP addressing to create subnets for any specific requirements.
	CS602.5	Identify Application Layer protocol (such as HTTP, FTP, SMTP, DNS, Bit torrent) as per the requirements of the network application and work with available tools to demonstrate the working of these protocols.
CS 603(Compiler Design)	CS603.1	Study and apply various types of language processors of complier and there semantic aspects
	CS603.2	Examine the workinfg of scanning and parsing phases of compiler
	CS603.3	Apply various compiler code gernerators and optimization methods
	CS603.4	Perform type checking operation and dynamic program analysis
	CS603.5	Design an efficient system software for a given expression
CS 604(Project Management)	CS604.1	To apply the software engineering concept to be followed in the conventional software management are developing in life project .
	CS604.2	To analyse the evolution & improving project contexts and suggest an appropriate management strategy
	CS604.3	To Identify and describe Techniques for gathering, organizing and analyzing data to formulate IT project.
	CS604.4	To explore the design concept using based architecture first approach & prepare the project schedule, environment and management.

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	CS604.5	To implement all modern approach project planning, organization, responsibilities, automation and control of the processes to achieve the desirable results.
CS 605(Data Analytics Lab)	CS605.1	Understand and apply the basic of data analytics concepts of statistics and probability.
	CS605.2	Apply the data processing techniques on Data Frame using Python Libraries.
	CS605.3	Implement and evaluate the data analytics techniques using MATLAB, R and Python tools.
	CS605.4	Able to evaluate or assess models with the large volume of data with the help of morden tools
	CS605.5	Define and explain to python for data cleaning and visualization as a data analytics tool.
CS 606(Skill Development Lab)	CS606.1	Understand the basics of software as a product.
	CS606.2	Understand and analyze the current requirements of industries.
	CS606.3	Implement the software as a product using different design patterns.
	CS606.4	Apply the software development techniques in real life applications.
	CS606.5	To analyze & compare current software product standards to impove their skills.
CS 607(Internship-III)	CS607.1	To Describe the everyday operations of an agency or organization.
	CS607.2	Student will able to Identify the ethical standards of behavior for professionals and interns within the agency/organization.
	CS607.3	Students will be able to Focus professional soft skills such as communication, punctuality and time management.
	CS607.4	Student will be able to Manage various personal habits or a social skill to deal better with work situations
	CS607.5	Build a professional network that can be a resource for the student
CS 6008(Minor Project II)	CS608.1	Designing of the project with modern programming languages
	CS608.2	Development of the project components module wise.
	CS608.3	Testing and analysis of project with various test cases and tools.
	CS608.4	Evaluate the project for deployment in different environment.
	CS608.5	Maintenance the project involving the changing and updating the modules as per requirements.

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Course Code/Course Name		Course Outcomes
B.Tech CSE 7th Sem		
CS 701(Software Architectures)	CS701.1	Describe the Fundamentals of software architecture, qualities and terminologies.
	CS701.2	Understand the fundamental principle for software architecture model and architecture style.
	CS701.3	Use implementation techniques of Software architecture for effective software development.
	CS701.4	To understand and compare software architecture analysis and design methods.
	CS701.5	Prepare & create the software architecture documentation for enterprise application development.
CS 702(Big data)	CS702.1	Understand and apply the concept of bigg data for interpreting the challenges in it.
	CS702.2	Demonstrate and differentiate fundamental enabling techniques(Hadoop, hive,mapreduce,yarn) and scalable algorithms for big data analytics.
	CS702.3	Sketch and execute hadoop queries for finding solutions of usecases related to hadoop elements(Hive, Pig)
	CS702.4	Evaluate and optimize queries of NO-sql solving big data real world problems.
	CS702.5	Analyze social network graphs by using networks and graph theory
CS 703(Cryptography & Information Security.)	CS703.1	To understand and apply various encryption techniques like transposition and substitution techniques
	CS703.2	To detect security mechanisms using rigorous approaches by key ciphers and Hash functions.
	CS703.3	Analyse the vulnerabilities in any computing system and hence be able to design a security solution
	CS703.4	Demonstrate various network security applications, IPSec, Firewall, IDS, Web Security, Email Security and Malicious software etc
	CS703.5	To evaluate network security threats and countermeasures
CS 704(Departmental Elective Lab)	CS704.1	Understand and apply the concept of Big data for interpreting the challenges in it
	CS704.2	Demonstrate and differentiate fundamental enabling techniques(Hadoop ,Hive,Map reduce,yarn) and scalable algorithms for big data analytics
	CS704.3	Sketch and execute Hadoop queries for finding solutions of use cases related to hadoop elements (Hive and Pig)
	CS704.4	Evaluate and optimize queries of NOSQL solving big data real world problems
	CS704.5	Analyze social network graphs by using networks and graph theory
CS 705(Open Elective Lab	CS705.1	To Develop and implement an interface for encryption and decryption algorithms i.e., AES, MD5 and RSA algorithms
	CS705.2	To analyze the performance of various security algorithms

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)	CS705.3	To Utilize the different open source tools for network security and analysis
	CS705.4	To Demonstrate intrusion detection system using network security tool
	CS705.5	To Construct network security designs using available secure solutions (such as PGP, SSL, IPSec, etc)
CS 706(Major Project-I)	CS706.1	Understand and identify the concept for the project.
	CS706.2	Analyse the requirements of different tools and techniques for project
	CS706.3	Design the various diagrams like data Flow diagram and use case diagrams for the project.
	CS706.4	Design the software requirement specification for the project.
	CS706.5	Understand and identify the future scope of the project.

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Course Code/Course Name		Course Outcomes
B.Tech CSE 8th Sem		
CS 801(Internet of Things)	CS801.1	To understand the Components that forms part of IoT Architecture
	CS801.2	To Analyse the most appropriate IoT Devices and Sensors based on Case Studies
	CS801.3	To design and develop Mobile Application which can interact with Sensors and Actuators.
	CS801.4	To evaluate and select the appropriate protocol for communication in IoT network
	CS801.5	To develop solutions of societal challenge using IoT
CS 802(Cloud Computing)	CS802.1	To define and understand the concepts ,key technologies, strength and limitation of cloud computing
	CS802.2	To understand and analyse the architecture and infrastructure of cloud computing including SaaS, PaaS,Iaas, public cloud, private cloud and hybrid cloud and interfaces
	CS802.3	To understand and Applying the virtualization technology
	CS802.4	To understand and compare the various data, cloud services to acquire efficient database for cloud storage
	CS802.5	Explaining and Illustrating the core issues of cloud computing, Cloud security fundamentals in cloud
CS 803(Image Processing)	CS803.1	Understand theory of computer vision and elaborate computer vision algorithms, methods and concepts.
	CS803.2	Understand Various Image Segmentation and other algorithms to best analyze the images for further image processing application.
	CS803.3	Implement computer vision systems with emphasis on applications and problem solving.
	CS803.4	Apply skills for automatic analysis of digital images to construct representations of physical objects and scenes.
	CS803.5	Design and implement real life problems using Image processing and computer vision.
CS 804(Cloud Computing)	CS804.1	To understand the cloud computing architecture
	CS804.2	To illustrate and create virtual machines through hypervisor
	CS804.3	To illustrate the storage as a Service on cloud through google drive.
	CS804.4	To understand and evaluate the different cloud services like google app engine,Microsoft Azure
	CS804.5	To describe the performance evaluation of Services in Cloud Computing.
CS 805(Major Project-II)	CS805.1	Understand the conceptual clarity about project organization functinality and various stages of a project, prepared report in terms of conclusion
	CS805.2	Classify the feasibility analysis in SDLC and project management using product and process metrics and choose the sutable process.

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	CS805.3	Explore design alternative and Designing of system modules according to the requirement.
	CS805.4	Designing of the architecture and show the data flow as well as control flow of the system
	CS805.5	Using a specific language ,create a module based on real life based problem and present this in a team.

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Academic Year 2021-22

B.Tech CSE 3rd Sem		
Course Code/Course Name	**Course Outcomes**	
ES 301(Energy and environmental Engineering)	ES301.1	Identify and compare different energy resources and systems to analyze energy requirement issues
	ES301.2	Apply the concept of ecosystem and assess the synergy between the components and functions of an ecosystem.
	ES301.3	Demonstrate the critical analyzing ability towards the biodiversity, its conservation and need for sustainable development.
	ES301.4	To interpret and summarized the concept of environmental pollution to recognize the need of environmental protection as a life long learning.
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CS 302(Discrete Structure)	CS302.1	Ability to define and apply the concepts of Set, Relation ,Function , mathematical reasoning and counting techniques in mathematical situations.
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	CS304.4	Students will be able to apply the fundamental knowledge of analog and digital electronics principle for understanding and creating different analog to digital converter, multivibrator and logic families.
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	CS406.2	Ability to analyze the importance of object oriented programming over structural programming.
	CS406.3	Determine the list , tuples , dictionary and set build in container data types.
	CS406.4	Able to Implement object oriented database and Graphical user interface application using packages.
	CS406.5	Develop the ability to analyse and write database applications in Python programming.
	CS406.6	To develop the skill of creating small packages and user defined functions for predictive modeling .
	CS406.7	To facilitate students with the skills required to solve complex problems using object oriented concepts.

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B.Tech CSE 5th Sem		
Course Code/Course Name	**Course Outcomes**	
CS 501(Theory of Computation)	CS501.1	Understand and apply concept of finite state machine to design a deterministic finite automata and non deterministic finite automata for a problem
	CS501.2	Analysis and Apply ardern's theorem to compute regular expression for a given deterministic and non deterministic finite automata.
	CS501.3	Analyze whether the given language is regular or not, equivalence of languages accepted by Push Down Automata and languages generated by context free grammars.
	CS501.4	Analysis and comprehension between Deterministic finite automata, non Deterministic finite automata, Push Down Automata, Turing machine on the basis of their power.
	CS501.5	Understand and apply concept of Turing machine to design machine for a given problem.
CS 502(Database Management Systems)	CS502.1	Understand basic concepts and identify various data models (E R modelling concepts) and apply these concepts for designing database and queries using SQL.
	CS502.2	Apply relational database theory and describe relational algebra expression, tuple and domain relation expression for writing queries in relational algebra.
	CS502.3	Identify and improve the database design by normalization , key constraints and transaction technique.
	CS502.4	Analyse various software todesign and differentiate between ER diagram and flowchart for related databasemanagement system
	CS502.5	Evaluate and optimize queries and transaction processes for solving real world problems
CS 503(Data analytics)	CS503.1	Able to identify descriptive and inferential statistical approachs followed to analyze the data.
	CS503.2	Analyse the hadoop ecosystem with Hadoop File System, MapReduce and Google File System.
	CS503.3	Ability to tranform data with the help of ETL and other processing tools
	CS503.4	Classify the problem using Distributed File System and processing tools like mapreduce and YARN.
	CS503.5	Evaluate or assess models with the large volume of unstructured data with the help of big data tools and techniques.
CS 504(Internet and Web Technology)	CS504.1	Discuss Internet Technology and Web Designing Tools
	CS504.2	Create web pages using XHTML and create XML documents and Schemas.
	CS504.3	Define the CSS with its types and Apply them to provide the styles to the webpages at various levels

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	CS504.4	List the various HTML tags and use them to develop the user friendly web pages.
	CS504.5	Use server side scripting with PHP to generate the web pages dynamically using the database connectivity
CS 505(Linux)	CS505.1	To describe the architecture and features of LINUX Operating System and distinguish it from other Operating System
	CS505.2	Demonstrate LINUX commands for file handling and process control
	CS505.3	Use network related commands and configuration files in Linux Operating system
	CS505.4	To Analyze a given problem and apply requisite facets of SHELL programming in order to devise a SHELL script to solve the problem
CS 506(Python)	CS506.1	Identify the basic datatypes , operators, variables and functions.
	CS506.2	Ability to analyze the importance of object oriented programming over structural programming.
	CS506.3	Determine the list , tuples , dictionary and set build in container data types.
	CS506.4	Able to Implement object oriented database and Graphical user interface application using packages.
	CS506.5	Develop the ability to analyse and write database applications in Python programming.
CS 507(Evaluation of Internship-II)	CS507.1	To Describe the everyday operations of an agency or organization.
	CS507.2	Student will able to Identify the ethical standards of behavior for professionals and interns within the agency/organization.
	CS507.3	Students will be able to Focus professional soft skills such as communication, punctuality and time management.
	CS507.4	Student will be able to Manage various personal habits or a social skill to deal better with work situations
	CS507.5	Build a professional network that can be a resource for the student
CS 508(Minor Project- I)	CS508.1	Describe how to convert real problems to provide problem based solution.
	CS508.2	Demonstrate the product based and application based solution of problems.
	CS508.3	Analysis of system modules according to the requirement.
	CS508.4	Designing of the system architecture,UML diagrams and report writing.
	CS508.5	Evaluate structural as well as functional testing after developing test case.

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B.Tech CSE 6ᵗʰ Sem		
Course Code/Course Name		Course Outcomes
CS 601(Machine Learning)	CS601.1	Understand and apply knowledge of computing and mathematics to machine learning problems, models and algorithms
	CS601.2	Understand the concepts of machine learning by applying different algorithms to create various models
	CS601.3	Analyze machine learning algorithms to design and develop programs using python
	CS601.4	Develop experiments and implement image recognition algorithms on various datasets using python
	CS601.5	Understand and apply knowledge of neural network concepts for implementing speech recognition algorithms using python.
CS 602(Computer Networks)	CS602.1	Understand the concept of various networking models & able to Apply knowledge of the TCP/IP and OSI layering model to intelligently debug the networking problems.
	CS602.2	Describe & analyze the methods to examine various data link layer design issues and data link protocols.
	CS602.3	Understand Medium Access Sub layer and different protocols working and Evaluate contention scheme for data services(ALOHA) and Local Area Networks(CSMA, CSMA/CD, CSMA/CA).
	CS602.4	Learn and define network routing through algorithm and use IP addressing to create subnets for any specific requirements.
	CS602.5	Identify Application Layer protocol (such as HTTP, FTP, SMTP, DNS, Bit torrent) as per the requirements of the network application and work with available tools to demonstrate the working of these protocols.
CS 603(Compiler Design)	CS603.1	Study and apply various types of language processors of complier and there semantic aspects
	CS603.2	Examine the workinfg of scanning and parsing phases of compiler
	CS603.3	Apply various compiler code gernerators and optimization methods
	CS603.4	Perform type checking operation and dynamic program analysis
	CS603.5	Design an efficient system software for a given expression
CS 604(Project Management)	CS604.1	To apply the software engineering concept to be followed in the conventional software management are developing in life project .
	CS604.2	To analyse the evolution & improving project contexts and suggest an appropriate management strategy
	CS604.3	To Identify and describe Techniques for gathering, organizing and analyzing data to formulate IT project.
	CS604.4	To explore the design concept using based architecture first approach & prepare the project schedule, environment and management.

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	CS604.5	To implement all modern approach project planning, organization, responsibilities, automation and control of the processes to achieve the desirable results.
CS 605(Data Analytics Lab)	CS605.1	Understand and apply the basic of data analytics concepts of statistics and probability.
	CS605.2	Apply the data processing techniques on Data Frame using Python Libraries.
	CS605.3	Implement and evaluate the data analytics techniques using MATLAB, R and Python tools.
	CS605.4	Able to evaluate or assess models with the large volume of data with the help of morden tools
	CS605.5	Define and explain to python for data cleaning and visualization as a data analytics tool.
CS 606(Skill Development Lab)	CS606.1	Understand the basics of software as a product.
	CS606.2	Understand and analyze the current requirements of industries.
	CS606.3	Implement the software as a product using different design patterns.
	CS606.4	Apply the software development techniques in real life applications.
	CS606.5	To analyze & compare current software product standards to impove their skills.
CS 607(Internship-III)	CS607.1	To Describe the everyday operations of an agency or organization.
	CS607.2	Student will able to Identify the ethical standards of behavior for professionals and interns within the agency/organization.
	CS607.3	Students will be able to Focus professional soft skills such as communication, punctuality and time management.
	CS607.4	Student will be able to Manage various personal habits or a social skill to deal better with work situations
	CS607.5	Build a professional network that can be a resource for the student
CS 6008(Minor Project II)	CS608.1	Designing of the project with modern programming languages
	CS608.2	Development of the project components module wise.
	CS608.3	Testing and analysis of project with various test cases and tools.
	CS608.4	Evaluate the project for deployment in different environment.
	CS608.5	Maintenance the project involving the changing and updating the modules as per requirements.

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B.Tech CSE 7th Sem		
Course Code/Course Name		**Course Outcomes**
CS 701(Software Architectures)	CS701.1	Describe the Fundamentals of software architecture, qualities and terminologies.
	CS701.2	Understand the fundamental principle for software architecture model and architecture style.
	CS701.3	Use implementation techniques of Software architecture for effective software development.
	CS701.4	To understand and compare software architecture analysis and design methods.
	CS701.5	Prepare & create the software architecture documentation for enterprise application development.
CS 702(Big data)	CS702.1	Understand and apply the concept of bigg data for interpreting the challenges in it.
	CS702.2	Demonstrate and differentiate fundamental enabling techniques(Hadoop, hive,mapreduce,yarn) and scalable algorithms for big data analytics.
	CS702.3	Sketch and execute hadoop queries for finding solutions of usecases related to hadoop elements(Hive, Pig)
	CS702.4	Evaluate and optimize queries of NO-sql solving big data real world problems.
	CS702.5	Analyze social network graphs by using networks and graph theory
CS 703(Cryptography & Information Security.)	CS703.1	To understand and apply various encryption techniques like transposition and substitution techniques
	CS703.2	To detect security mechanisms using rigorous approaches by key ciphers and Hash functions.
	CS703.3	Analyse the vulnerabilities in any computing system and hence be able to design a security solution
	CS703.4	Demonstrate various network security applications, IPSec, Firewall, IDS, Web Security, Email Security and Malicious software etc
	CS703.5	To evaluate network security threats and countermeasures
CS 704(Departmental Elective Lab)	CS704.1	Understand and apply the concept of Big data for interpreting the challenges in it
	CS704.2	Demonstrate and differentiate fundamental enabling techniques(Hadoop ,Hive,Map reduce,yarn) and scalable algorithms for big data analytics
	CS704.3	Sketch and execute Hadoop queries for finding solutions of use cases related to hadoop elements (Hive and Pig)
	CS704.4	Evaluate and optimize queries of NOSQL solving big data real world problems
	CS704.5	Analyze social network graphs by using networks and graph theory
CS 705(Open Elective Lab	CS705.1	To Develop and implement an interface for encryption and decryption algorithms i.e., AES, MD5 and RSA algorithms
	CS705.2	To analyze the performance of various security algorithms

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)	CS705.3	To Utilize the different open source tools for network security and analysis
	CS705.4	To Demonstrate intrusion detection system using network security tool
	CS705.5	To Construct network security designs using available secure solutions (such as PGP, SSL, IPSec, etc)
CS 706(Major Project-I)	CS706.1	Understand and identify the concept for the project.
	CS706.2	Analyse the requirements of different tools and techniques for project
	CS706.3	Design the various diagrams like data Flow diagram and use case diagrams for the project.
	CS706.4	Design the software requirement specification for the project.
	CS706.5	Understand and identify the future scope of the project.

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B.Tech CSE 8th Sem		
Course Code/Course Name		**Course Outcomes**
CS 801(Internet of Things)	CS801.1	To understand the Components that forms part of IoT Architecture
	CS801.2	To Analyse the most appropriate IoT Devices and Sensors based on Case Studies
	CS801.3	To design and develop Mobile Application which can interact with Sensors and Actuators.
	CS801.4	To evaluate and select the appropriate protocol for communication in IoT network
	CS801.5	To develop solutions of societal challenge using IoT
CS 802(Cloud Computing)	CS802.1	To define and understand the concepts ,key technologies, strength and limitation of cloud computing
	CS802.2	To understand and analyse the architecture and infrastructure of cloud computing including SaaS, PaaS,Iaas, public cloud, private cloud and hybrid cloud and interfaces
	CS802.3	To understand and Applying the virtualization technology
	CS802.4	To understand and compare the various data, cloud services to acquire efficient database for cloud storage
	CS802.5	Explaining and Illustrating the core issues of cloud computing, Cloud security fundamentals in cloud
CS 803(Image Processing)	CS803.1	Understand theory of computer vision and elaborate computer vision algorithms, methods and concepts.
	CS803.2	Understand Various Image Segmentation and other algorithms to best analyze the images for further image processing application.
	CS803.3	Implement computer vision systems with emphasis on applications and problem solving.
	CS803.4	Apply skills for automatic analysis of digital images to construct representations of physical objects and scenes.
	CS803.5	Design and implement real life problems using Image processing and computer vision.
CS 804(Cloud Computing)	CS804.1	To understand the cloud computing architecture
	CS804.2	To illustrate and create virtual machines through hypervisor
	CS804.3	To illustrate the storage as a Service on cloud through google drive.
	CS804.4	To understand and evaluate the different cloud services like google app engine,Microsoft Azure
	CS804.5	To describe the performance evaluation of Services in Cloud Computing.
CS 805(Major Project-II)	CS805.1	Understand the conceptual clarity about project organization functinality and various stages of a project, prepared report in terms of conclusion
	CS805.2	Classify the feasibility analysis in SDLC and project management using product and process metrics and choose the sutable process.

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	CS805.3	Explore design alternative and Designing of system modules according to the requirement.
	CS805.4	Designing of the architecture and show the data flow as well as control flow of the system
	CS805.5	Using a specific language ,create a module based on real life based problem and present this in a team.

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B.Tech CSE 3rd Sem		
Course Code/Course Name	**Course Outcomes**	
ES 301(Energy and environmental Engineering)	ES301.1	Identify and compare different energy resources and systems to analyze energy requirement issues
	ES301.2	Apply the concept of ecosystem and assess the synergy between the components and functions of an ecosystem.
	ES301.3	Demonstrate the critical analyzing ability towards the biodiversity, its conservation and need for sustainable development.
	ES301.4	To interpret and summarized the concept of environmental pollution to recognize the need of environmental protection as a life long learning.
	ES301.5	To understand, classify and apply professional, social and environmental ethical principles.
CS 302(Discrete Structure)	CS302.1	Ability to define and apply the concepts of Set, Relation ,Function , mathematical reasoning and counting techniques in mathematical situations.
	CS302.2	Understand and Apply the concept of functions and algebraic structures such as Groups and Rings to finite state machines and coding theory.
	CS302.3	Ability to apply and analyse the fundamentals of propositional logic and predicate calculus in Boolean Algebra to test the validity of statements.
	CS302.4	Demonstrate the knowledge of types of graphs, posets and lattice and apply it to solve engineering problems.
	CS302.5	Ability to evaluate the solution of different type of recurrence relations using generating functions.
CS 303(Data Structure)	CS303.1	Ability to Define, understand concepts of different categories of data Structures
	CS303.2	Identify different parameters to analyze the performance of an algorithm.
	CS303.3	Design algorithms to perform operations with Linear and Nonlinear data structures
	CS303.4	Compare and contrast different implementations of data structures.
	CS303.5	Apply appropriate data structure to solve and implement various real time problems.
CS 304(Digital Systems)	CS304.1	Student will be able to understand and apply the basic concept digital electronics for digital circuit and system design.
	CS304.2	Students will be able to realize and describe the operation of combinational circuits.
	CS304.3	Students will be able to realize and describe the operation of sequential circuits and memories.

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	CS304.4	Students will be able to apply the fundamental knowledge of analog and digital electronics principle for understanding and creating different analog to digital converter, multivibrator and logic families.
	CS304.5	Students will be able to understand the basic concept of digital communication.
CS 305(Object Oriented Programming & Methodology)	CS305.1	Describe the procedural and object oriented paradigm with concepts of streams and functions.
	CS305.2	Demonstrate the use of various OOPs concepts with the help of programs
	CS305.3	Apply the concepts of inheritance and polymorphism and virtual functions in developing programs.
	CS305.4	Analyse relationship between classes and Exception handling concepts.
	CS305.5	Design application to solve real world problems.
CS 306(Computer Workshop(Java))	CS306.1	Understand the fundamentals of objectoriented programming in Java, including defining classes, objects, invoking methods etc and exception handling mechanisms. (Understand).
	CS306.2	Apply different technologies by implementing them in the Java programming language to solve the given problem (Apply).
	CS306.3	Design Graphical User Interface using Swings, AWT and Event Handling.
	CS306.4	Build connections through Java Database Connectivity (JDBC).
	CS306.5	Develop Programs for real world applications using the Java Collection API as well as the Java Standard class library. (Develop)
BT 107(Internship)	BT107.1	To Describe the everyday operations of an agency or organization.
	BT107.2	Student will able to Identify the ethical standards of behavior for professionals and interns within the agency/organization.
	BT107.3	Students will be able to Focus professional soft skills such as communication, punctuality and time management.
	BT107.4	Student will be able to Manage various personal habits or a social skill to deal better with work situations
	BT107.5	Build a professional network that can be a resource for the student

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B.Tech CSE 4th Sem		
Course Code/Course Name	**Course Outcomes**	
BT 401(Mathematics- III)	BT401.1	Ability to Understand and evaluate the zero of algebraic and transcendental equations, simultaneous linear equations with the help of Numerical Methods.
	BT401.2	Understand the theoretical principles of numerical techniques and the associated error measures and apply them to find differentiation, integration and Differential Equations
	BT401.3	Ability to remember operators and use them to estimate the value between the given set of data (interpolation) and hence, apply it to estimate various real life scenarios.
	BT401.4	Analyze different types of statistical situations in which different probability distributions can be applied.
	BT401.5	Ability to analyze and evaluate the solution of ODE and PDE by using Laplace and Fourier Transform.
CS 402(Analysis Design of Algorithm)	CS402.1	Learn,Apply & Analyze the complexity in Divide and Conquer techniques for suitable problems
	CS402.2	Apply and identify the Optimal Solution using the Greedy Approach for appropriate problems.
	CS402.3	Compute and Analyze the problems by using Dynamic Programming approach
	CS402.4	Apply the concept of Backtracking and Branch & Bound for solving the suitable problems, and enhance the performance of the algorithm
	CS402.5	Learn the concept of NP completeness and Apply the various operations on tree & Graph data structures
CS 403(Software Engineering)	CS403.1	Understand basic concepts and identify various SDLC models (spiral model, waterfall model concepts).
	CS403.2	Design SRS (software requirement specification) for various project. (student managment)
	CS403.3	Translate a specification to a design, and identify the components to build the architecture for a given problem, using an appropriate software engineering methodology
	CS403.4	Analyze the various testing techniques and apply in specific project(student managment)
	CS403.5	Develop software projects based on current technologies, by managing resources economically and keeping ethical values
CS 404(Computer Org. & Architecture)	CS404.1	Able to identify the basic structure of a processor, memory, Instructions to analyze the working of a system.
	CS404.2	Analyse the working of microprogrammed controller with firmware and hardwired control unit.
	CS404.3	Interpreting the computer arithmetic operations with structuring the flowchart and hardware algorithms .
	CS404.4	Classify and analyse the memory structure , input output organization and multiprocessors in a computer system.
	CS404.5	Able to implement mnemonics using assembler in assembly level language for executing instructions.

CS 405 (Operating Systems)	CS405.1	To Understand and apply the basic knowledge of operating systems like kernel, shell, and types of Operating systems.
	CS405.2	To analyse various synchronisation algorithm & Process scheduling algorithms (FCFS, SJF, RR, and SRTF) on the basis on Turnaround time and waiting time.
	CS405.3	To Apply page replacement algorithms like(LRU,FIFO,Optimal) to resolve the issues in virtual memory,and understand various memory management techniques.
	CS405.4	Design the concept of disk management and analyse different disk scheduling algorithms (FCFS, SSTF, SCAN etc.) for better utilization of external memory and apply file management operations.
	CS405.5	Installation and Evaluation of the various features of different OS like UNIX, Linux, windows, android,ubuntu etc.
CS 406 (Programming Practices(python))	CS406.1	Identify the basic datatypes , operators, variables and functions.
	CS406.2	Ability to analyze the importance of object oriented programming over structural programming.
	CS406.3	Determine the list , tuples , dictionary and set build in container data types.
	CS406.4	Able to Implement object oriented database and Graphical user interface application using packages.
	CS406.5	Develop the ability to analyse and write database applications in Python programming.
	CS406.6	To develop the skill of creating small packages and user defined functions for predictive modeling .
	CS406.7	To facilitate students with the skills required to solve complex problems using object oriented concepts.

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B.Tech CSE 5th Sem

Course Code/Course Name		Course Outcomes
CS 501(Theory of Computation)	CS501.1	Understand and apply concept of finite state machine to design a deterministic finite automata and non deterministic finite automata for a problem
	CS501.2	Analysis and Apply ardern's theorem to compute regular expression for a given deterministic and non deterministic finite automata.
	CS501.3	Analyze whether the given language is regular or not, equivalence of languages accepted by Push Down Automata and languages generated by context free grammars.
	CS501.4	Analysis and comprehension between Deterministic finite automata, non Deterministic finite automata, Push Down Automata, Turing machine on the basis of their power.
	CS501.5	Understand and apply concept of Turing machine to design machine for a given problem.
CS 502(Database Management Systems)	CS502.1	Understand basic concepts and identify various data models (E R modelling concepts) and apply these concepts for designing database and queries using SQL.
	CS502.2	Apply relational database theory and describe relational algebra expression, tuple and domain relation expression for writing queries in relational algebra.
	CS502.3	Identify and improve the database design by normalization , key constraints and transaction technique.
	CS502.4	Analyse various software todesign and differentiate between ER diagram and flowchart for related databasemanagement system
	CS502.5	Evaluate and optimize queries and transaction processes for solving real world problems
CS 503(Data analytics)	CS503.1	Able to identify descriptive and inferential statistical approachs followed to analyze the data.
	CS503.2	Analyse the hadoop ecosystem with Hadoop File System, MapReduce and Google File System.
	CS503.3	Ability to tranform data with the help of ETL and other processing tools
	CS503.4	Classify the problem using Distributed File System and processing tools like mapreduce and YARN.
	CS503.5	Evaluate or assess models with the large volume of unstructured data with the help of big data tools and techniques.
CS 504(Internet and Web Technology)	CS504.1	Discuss Internet Technology and Web Designing Tools
	CS504.2	Create web pages using XHTML and create XML documents and Schemas.
	CS504.3	Define the CSS with its types and Apply them to provide the styles to the webpages at various levels

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	CS504.4	List the various HTML tags and use them to develop the user friendly web pages.
	CS504.5	Use server side scripting with PHP to generate the web pages dynamically using the database connectivity
CS 505(Linux)	CS505.1	To describe the architecture and features of LINUX Operating System and distinguish it from other Operating System
	CS505.2	Demonstrate LINUX commands for file handling and process control
	CS505.3	Use network related commands and configuration files in Linux Operating system
	CS505.4	To Analyze a given problem and apply requisite facets of SHELL programming in order to devise a SHELL script to solve the problem
CS 506(Python)	CS506.1	Identify the basic datatypes , operators, variables and functions.
	CS506.2	Ability to analyze the importance of object oriented programming over structural programming.
	CS506.3	Determine the list , tuples , dictionary and set build in container data types.
	CS506.4	Able to Implement object oriented database and Graphical user interface application using packages.
	CS506.5	Develop the ability to analyse and write database applications in Python programming.
CS 507(Evaluation of Internship-II)	CS507.1	To Describe the everyday operations of an agency or organization.
	CS507.2	Student will able to Identify the ethical standards of behavior for professionals and interns within the agency/organization.
	CS507.3	Students will be able to Focus professional soft skills such as communication, punctuality and time management.
	CS507.4	Student will be able to Manage various personal habits or a social skill to deal better with work situations
	CS507.5	Build a professional network that can be a resource for the student
CS 508(Minor Project- 1)	CS508.1	Describe how to convert real problems to provide problem based solution.
	CS508.2	Demonstrate the product based and application based solution of problems.
	CS508.3	Analysis of system modules according to the requirement.
	CS508.4	Designing of the system architecture,UML diagrams and report writing.
	CS508.5	Evaluate structural as well as functional testing after developing test case.

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B.Tech CSE 6th Sem		
Course Code/Course Name	**Course Outcomes**	
CS 601(Machine Learning)	CS601.1	Understand and apply knowledge of computing and mathematics to machine learning problems, models and algorithms
	CS601.2	Understand the concepts of machine learning by applying different algorithms to create various models
	CS601.3	Analyze machine learning algorithms to design and develop programs using python
	CS601.4	Develop experiments and implement image recognition algorithms on various datasets using python
	CS601.5	Understand and apply knowledge of neural network concepts for implementing speech recognition algorithms using python.
CS 602(Computer Networks)	CS602.1	Understand the concept of various networking models & able to Apply knowledge of the TCP/IP and OSI layering model to intelligently debug the networking problems.
	CS602.2	Describe & analyze the methods to examine various data link layer design issues and data link protocols.
	CS602.3	Understand Medium Access Sub layer and different protocols working and Evaluate contention scheme for data services(ALOHA) and Local Area Networks(CSMA, CSMA/CD, CSMA/CA).
	CS602.4	Learn and define network routing through algorithm and use IP addressing to create subnets for any specific requirements.
	CS602.5	Identify Application Layer protocol (such as HTTP, FTP, SMTP, DNS, Bit torrent) as per the requirements of the network application and work with available tools to demonstrate the working of these protocols.
CS 603(Compiler Design)	CS603.1	Study and apply various types of language processors of complier and there semantic aspects
	CS603.2	Examine the workinfg of scanning and parsing phases of compiler
	CS603.3	Apply various compiler code gernerators and optimization methods
	CS603.4	Perform type checking operation and dynamic program analysis
	CS603.5	Design an efficient system software for a given expression
CS 604(Project Management)	CS604.1	To apply the software engineering concept to be followed in the conventional software management are developing in life project .
	CS604.2	To analyse the evolution & improving project contexts and suggest an appropriate management strategy
	CS604.3	To Identify and describe Techniques for gathering, organizing and analyzing data to formulate IT project.
	CS604.4	To explore the design concept using based architecture first approach & prepare the project schedule, environment and management.

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	CS604.5	To implement all modern approach project planning, organization, responsibilities, automation and control of the processes to achieve the desirable results.
CS 605(Data Analytics Lab)	CS605.1	Understand and apply the basic of data analytics concepts of statistics and probability.
	CS605.2	Apply the data processing techniques on Data Frame using Python Libraries.
	CS605.3	Implement and evaluate the data analytics techniques using MATLAB, R and Python tools.
	CS605.4	Able to evaluate or assess models with the large volume of data with the help of morden tools
	CS605.5	Define and explain to python for data cleaning and visualization as a data analytics tool.
CS 606(Skill Development Lab)	CS606.1	Understand the basics of software as a product.
	CS606.2	Understand and analyze the current requirements of industries.
	CS606.3	Implement the software as a product using different design patterns.
	CS606.4	Apply the software development techniques in real life applications.
	CS606.5	To analyze & compare current software product standards to impove their skills.
CS 607(Internship-III)	CS607.1	To Describe the everyday operations of an agency or organization.
	CS607.2	Student will able to Identify the ethical standards of behavior for professionals and interns within the agency/organization.
	CS607.3	Students will be able to Focus professional soft skills such as communication, punctuality and time management.
	CS607.4	Student will be able to Manage various personal habits or a social skill to deal better with work situations
	CS607.5	Build a professional network that can be a resource for the student
CS 6008(Minor Project II)	CS608.1	Designing of the project with modern programming languages
	CS608.2	Development of the project components module wise.
	CS608.3	Testing and analysis of project with various test cases and tools.
	CS608.4	Evaluate the project for deployment in different environment.
	CS608.5	Maintenance the project involving the changing and updating the modules as per requirements.

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B.Tech CSE 7th Sem		
Course Code/Course Name		**Course Outcomes**
CS 701(Software Architectures)	CS701.1	Describe the Fundamentals of software architecture, qualities and terminologies.
	CS701.2	Understand the fundamental principle for software architecture model and architecture style.
	CS701.3	Use implementation techniques of Software architecture for effective software development.
	CS701.4	To understand and compare software architecture analysis and design methods.
	CS701.5	Prepare & create the software architecture documentation for enterprise application development.
CS 702(Big data)	CS702.1	Understand and apply the concept of bigg data for interpreting the challenges in it.
	CS702.2	Demonstrate and differentiate fundamental enabling techniques(Hadoop, hive,mapreduce,yarn) and scalable algorithms for big data analytics.
	CS702.3	Sketch and execute hadoop queries for finding solutions of usecases related to hadoop elements(Hive, Pig)
	CS702.4	Evaluate and optimize queries of NO-sql solving big data real world problems.
	CS702.5	Analyze social network graphs by using networks and graph theory
CS 703(Cryptography & Information Security.)	CS703.1	To understand and apply various encryption techniques like transposition and substitution techniques
	CS703.2	To detect security mechanisms using rigorous approaches by key ciphers and Hash functions.
	CS703.3	Analyse the vulnerabilities in any computing system and hence be able to design a security solution
	CS703.4	Demonstrate various network security applications, IPSec, Firewall, IDS, Web Security, Email Security and Malicious software etc
	CS703.5	To evaluate network security threats and countermeasures
CS 704(Departmental Elective Lab)	CS704.1	Understand and apply the concept of Big data for interpreting the challenges in it
	CS704.2	Demonstrate and differentiate fundamental enabling techniques(Hadoop ,Hive,Map reduce,yarn) and scalable algorithms for big data analytics
	CS704.3	Sketch and execute Hadoop queries for finding solutions of use cases related to hadoop elements (Hive and Pig)
	CS704.4	Evaluate and optimize queries of NOSQL solving big data real world problems
	CS704.5	Analyze social network graphs by using networks and graph theory
CS 705(Open Elective Lab	CS705.1	To Develop and implement an interface for encryption and decryption algorithms i.e., AES, MD5 and RSA algorithms
	CS705.2	To analyze the performance of various security algorithms

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	CS705.3	To Utilize the different open source tools for network security and analysis
	CS705.4	To Demonstrate intrusion detection system using network security tool
	CS705.5	To Construct network security designs using available secure solutions (such as PGP, SSL, IPSec, etc)
CS 706(Major Project-I)	CS706.1	Understand and identify the concept for the project.
	CS706.2	Analyse the requirements of different tools and techniques for project
	CS706.3	Design the various diagrams like data Flow diagram and use case diagrams for the project.
	CS706.4	Design the software requirement specification for the project.
	CS706.5	Understand and identify the future scope of the project.

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B.Tech CSE 8ᵗʰ Sem		
Course Code/Course Name		**Course Outcomes**
CS 801(Internet of Things)	CS801.1	To understand the Components that forms part of IoT Architecture
	CS801.2	To Analyse the most appropriate IoT Devices and Sensors based on Case Studies
	CS801.3	To design and develop Mobile Application which can interact with Sensors and Actuators.
	CS801.4	To evaluate and select the appropriate protocol for communication in IoT network
	CS801.5	To develop solutions of societal challenge using IoT
CS 802(Cloud Computing)	CS802.1	To define and understand the concepts ,key technologies, strength and limitation of cloud computing
	CS802.2	To understand and analyse the architecture and infrastructure of cloud computing including SaaS, PaaS,Iaas, public cloud, private cloud and hybrid cloud and interfaces
	CS802.3	To understand and Applying the virtualization technology
	CS802.4	To understand and compare the various data, cloud services to acquire efficient database for cloud storage
	CS802.5	Explaining and Illustrating the core issues of cloud computing, Cloud security fundamentals in cloud
CS 803(Image Processing)	CS803.1	Understand theory of computer vision and elaborate computer vision algorithms, methods and concepts.
	CS803.2	Understand Various Image Segmentation and other algorithms to best analyze the images for further image processing application.
	CS803.3	Implement computer vision systems with emphasis on applications and problem solving.
	CS803.4	Apply skills for automatic analysis of digital images to construct representations of physical objects and scenes.
	CS803.5	Design and implement real life problems using Image processing and computer vision.
CS 804(Cloud Computing)	CS804.1	To understand the cloud computing architecture
	CS804.2	To illustrate and create virtual machines through hypervisor
	CS804.3	To illustrate the storage as a Service on cloud through google drive.
	CS804.4	To understand and evaluate the different cloud services like google app engine,Microsoft Azure
	CS804.5	To describe the performance evaluation of Services in Cloud Computing.
CS 805(Major Project-II)	CS805.1	Understand the conceptual clarity about project organization functinality and various stages of a project, prepared report in terms of conclusion
	CS805.2	Classify the feasibility analysis in SDLC and project management using product and process metrics and choose the sutable process.

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	CS805.3	Explore design alternative and Designing of system modules according to the requirement.
	CS805.4	Designing of the architecture and show the data flow as well as control flow of the system
	CS805.5	Using a specific language ,create a module based on real life based problem and present this in a team.

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B.Tech CSE 3rd Sem		
Course Code/Course Name	**Course Outcomes**	
ES 301(Energy and environmental Engineering)	ES301.1	Identify and compare different energy resources and systems to analyze energy requirement issues
	ES301.2	Apply the concept of ecosystem and assess the synergy between the components and functions of an ecosystem.
	ES301.3	Demonstrate the critical analyzing ability towards the biodiversity, its conservation and need for sustainable development.
	ES301.4	To interpret and summarized the concept of environmental pollution to recognize the need of environmental protection as a life long learning.
	ES301.5	To understand, classify and apply professional, social and environmental ethical principles.
CS 302(Discrete Structure)	CS302.1	Ability to define and apply the concepts of Set, Relation ,Function , mathematical reasoning and counting techniques in mathematical situations.
	CS302.2	Understand and Apply the concept of functions and algebraic structures such as Groups and Rings to finite state machines and coding theory.
	CS302.3	Ability to apply and analyse the fundamentals of propositional logic and predicate calculus in Boolean Algebra to test the validity of statements.
	CS302.4	Demonstrate the knowledge of types of graphs, posets and lattice and apply it to solve engineering problems.
	CS302.5	Ability to evaluate the solution of different type of recurrence relations using generating functions.
CS 303(Data Structure)	CS303.1	Ability to Define, understand concepts of different categories of data Structures
	CS303.2	Identify different parameters to analyze the performance of an algorithm.
	CS303.3	Design algorithms to perform operations with Linear and Nonlinear data structures
	CS303.4	Compare and contrast different implementations of data structures.
	CS303.5	Apply appropriate data structure to solve and implement various real time problems.
CS 304(Digital Systems)	CS304.1	Student will be able to understand and apply the basic concept digital electronics for digital circuit and system design.
	CS304.2	Students will be able to realize and describe the operation ofcombinational circuits.
	CS304.3	Students will be able to realize and describe the operation of sequential circuits and memories.

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	CS304.4	Students will be able to apply the fundamental knowledge of analog and digital electronics principle for understanding and creating different analog to digital converter, multivibrator and logic families.
	CS304.5	Students will be able to understand the basic concept of digital communication.
CS 305(Object Oriented Programming & Methodology)	CS305.1	Describe the procedural and object oriented paradigm with concepts of streams and functions.
	CS305.2	Demonstrate the use of various OOPs concepts with the help of programs
	CS305.3	Apply the concepts of inheritance and polymorphism and virtual functions in developing programs.
	CS305.4	Analyse relationship between classes and Exception handling concepts.
	CS305.5	Design application to solve real world problems.
CS 306(Computer Workshop(Java))	CS306.1	Understand the fundamentals of objectoriented programming in Java, including defining classes, objects, invoking methods etc and exception handling mechanisms. (Understand).
	CS306.2	Apply different technologies by implementing them in the Java programming language to solve the given problem (Apply).
	CS306.3	Design Graphical User Interface using Swings, AWT and Event Handling.
	CS306.4	Build connections through Java Database Connectivity (JDBC).
	CS306.5	Develop Programs for real world applications using the Java Collection API as well as the Java Standard class library. (Develop)
BT 107(Internship)	BT107.1	To Describe the everyday operations of an agency or organization.
	BT107.2	Student will able to Identify the ethical standards of behavior for professionals and interns within the agency/organization.
	BT107.3	Students will be able to Focus professional soft skills such as communication, punctuality and time management.
	BT107.4	Student will be able to Manage various personal habits or a social skill to deal better with work situations
	BT107.5	Build a professional network that can be a resource for the student

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B.Tech CSE 4th Sem		
Course Code/Course Name	**Course Outcomes**	
BT 401: Mathematics III	BT401.1	Ability to Understand and evaluate the zero of algebraic and transcendental equations, simultaneous linear equations with the help of Numerical Methods.
	BT401.2	Understand the theoretical principles of numerical techniques and the associated error measures and apply them to find differentiation, integration and Differential Equations
	BT401.3	Ability to remember operators and use them to estimate the value between the given set of data (interpolation) and hence, apply it to estimate various real life scenarios.
	BT401.4	Analyze different types of statistical situations in which different probability distributions can be applied
	BT401.5	Ability to analyze and evaluate the solution of ODE and PDE by using Laplace and Fourier Transform.
CS 402: Analysis Design of Algorithm	CS402.1	Learn, Apply & Analyze the complexity in Divide and Conquer technique for suitable problems
	CS402.2	Apply and identify the Optimal Solution using the Greedy Approach for appropriate problems
	CS402.3	Compare and Analyze the problems by using Dynamic Programming approach
	CS402.4	Apply the concept of Backtracking and Branch & Bound for solving the suitable problems, and enhance the performance of the algorithm
	CS402.5	Learn the concept of NP completeness and Apply the various operations on tree & Graph data structures
CS 403: Software Engineering	CS403.1	Understand basic concepts and identify various SDLC models (spiral model, waterfall model concepts).
	CS403.2	Design SRS (software requirement specification) for various project (student management)
	CS403.3	Translate a specification to a design, and identify the components to build the architecture for a given problem, using an appropriate software engineering methodology
	CS403.4	Analyze the various testing techniques and apply in specific project.(student management)
	CS403.5	Develop software projects based on current technologies, by managing resources economically and keeping ethical values
CS 404: Computer Org. & Architecture	CS404.1	Able to identify the basic structure of a processor, memory instructions to analyze the working of a system.
	CS404.2	Analyze the working of microprogrammed controller with firmware and hardwired control unit.
	CS404.3	Interpreting the computer arithmetic operations with structuring the flowchart and hardware algorithms
	CS404.4	Classify and analyze the memory structure, input output organization and multiprocessors in a computer system
	CS404.5	Able to implement mnemonics using assembler in assembly level language for executing instructions

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CS 405(Operating Systems)	CS405.1	To Understand and apply the basic knowledge of operating systems like kernel, shell, and types of Operating systems.
	CS405.2	To analyse various synchronisation algorithm & Process scheduling algorithms (FCFS, SJF, RR, and SRTF) on the basis on Turnaround time and waiting time.
	CS405.3	To Apply page replacement algorithms like(LRU,FIFO,Optimal) to resolve the issues in virtual memory,and understand various memory management techniques.
	CS405.4	Design the concept of disk management and analyse different disk scheduling algorithms (FCFS, SSTF, SCAN etc.) for better utilization of external memory and apply file management operations.
	CS405.5	Installation and Evaluation of the various features of different OS like UNIX, Linux, windows, android,ubuntu etc.
CS 406(Programming Practices(python))	CS406.1	Identify the basic datatypes , operators, variables and functions.
	CS406.2	Ability to analyze the importance of object oriented programming over structural programming.
	CS406.3	Determine the list , tuples , dictionary and set build in container data types.
	CS406.4	Able to Implement object oriented database and Graphical user interface application using packages.
	CS406.5	Develop the ability to analyse and write database applications in Python programming.
	CS406.6	To develop the skill of creating small packages and user defined functions for predictive modeling .
	CS406.7	To facilitate students with the skills required to solve complex problems using object oriented concepts.

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B.Tech CSE 5th Sem		
Course Code/Course Name		**Course Outcomes**
CS 501(Theory of Computation)	CS501.1	Understand and apply concept of finite state machine to design a deterministic finite automata and non deterministic finite automata for a problem
	CS501.2	Analysis and Apply ardern's theorem to compute regular expression for a given deterministic and non deterministic finite automata.
	CS501.3	Analyze whether the given language is regular or not, equivalence of languages accepted by Push Down Automata and languages generated by context free grammars.
	CS501.4	Analysis and comprehension between Deterministic finite automata, non Deterministic finite automata, Push Down Automata, Turing machine on the basis of their power.
	CS501.5	Understand and apply concept of Turing machine to design machine for a given problem.
CS 502(Database Management Systems)	CS502.1	Understand basic concepts and identify various data models (E R modelling concepts) and apply these concepts for designing database and queries using SQL.
	CS502.2	Apply relational database theory and describe relational algebra expression, tuple and domain relation expression for writing queries in relational algebra.
	CS502.3	Identify and improve the database design by normalization , key constraints and transaction technique.
	CS502.4	Analyse various software todesign and differentiate between ER diagram and flowchart for related databasemanagement system
	CS502.5	Evaluate and optimize queries and transaction processes for solving real world problems
CS 503(Data analytics)	CS503.1	Able to identify descriptive and inferential statistical approachs followed to analyze the data.
	CS503.2	Analyse the hadoop ecosystem with Hadoop File System, MapReduce and Google File System.
	CS503.3	Ability to tranform data with the help of ETL and other processing tools
	CS503.4	Classify the problem using Distributed File System and processing tools like mapreduce and YARN.
	CS503.5	Evaluate or assess models with the large volume of unstructured data with the help of big data tools and techniques.
CS 504(Internet and Web Technology)	CS504.1	Discuss Internet Technology and Web Designing Tools
	CS504.2	Create web pages using XHTML and create XML documents and Schemas.
	CS504.3	Define the CSS with its types and Apply them to provide the styles to the webpages at various levels

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	CS504.4	List the various HTML tags and use them to develop the user friendly web pages.
	CS504.5	Use server side scripting with PHP to generate the web pages dynamically using the database connectivity
CS 505(Linux)	CS505.1	To describe the architecture and features of LINUX Operating System and distinguish it from other Operating System
	CS505.2	Demonstrate LINUX commands for file handling and process control
	CS505.3	Use network related commands and configuration files in Linux Operating system
	CS505.4	To Analyze a given problem and apply requisite facets of SHELL programming in order to devise a SHELL script to solve the problem
CS 506(Python)	CS506.1	Identify the basic datatypes , operators, variables and functions.
	CS506.2	Ability to analyze the importance of object oriented programming over structural programming.
	CS506.3	Determine the list , tuples , dictionary and set build in container data types.
	CS506.4	Able to Implement object oriented database and Graphical user interface application using packages.
	CS506.5	Develop the ability to analyse and write database applications in Python programming.
CS 507(Evaluation of Internship-II)	CS507.1	To Describe the everyday operations of an agency or organization.
	CS507.2	Student will able to Identify the ethical standards of behavior for professionals and interns within the agency/organization.
	CS507.3	Students will be able to Focus professional soft skills such as communication, punctuality and time management.
	CS507.4	Student will be able to Manage various personal habits or a social skill to deal better with work situations
	CS507.5	Build a professional network that can be a resource for the student
CS 508(Minor Project- 1)	CS508.1	Describe how to convert real problems to provide problem based solution.
	CS508.2	Demonstrate the product based and application based solution of problems.
	CS508.3	Analysis of system modules according to the requirement.
	CS508.4	Designing of the system architecture,UML diagrams and report writing.
	CS508.5	Evaluate structural as well as functional testing after developing test case.

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B.Tech CSE 6th Sem		
Course Code/Course Name		**Course Outcomes**
CS 601(Machine Learning)	CS601.1	Understand and apply knowledge of computing and mathematics to machine learning problems, models and algorithms
	CS601.2	Understand the concepts of machine learning by applying different algorithms to create various models
	CS601.3	Analyze machine learning algorithms to design and develop programs using python
	CS601.4	Develop experiments and implement image recognition algorithms on various datasets using python
	CS601.5	Understand and apply knowledge of neural network concepts for implementing speech recognition algorithms using python.
CS 602(Computer Networks)	CS602.1	Understand the concept of various networking models & able to Apply knowledge of the TCP/IP and OSI layering model to intelligently debug the networking problems.
	CS602.2	Describe & analyze the methods to examine various data link layer design issues and data link protocols.
	CS602.3	Understand Medium Access Sub layer and different protocols working and Evaluate contention scheme for data services(ALOHA) and Local Area Networks(CSMA, CSMA/CD, CSMA/CA).
	CS602.4	Learn and define network routing through algorithm and use IP addressing to create subnets for any specific requirements.
	CS602.5	Identify Application Layer protocol (such as HTTP, FTP, SMTP, DNS, Bit torrent) as per the requirements of the network application and work with available tools to demonstrate the working of these protocols.
CS 603(CGM)	CS603.1	Understand the basic concepts of computer graphics, different graphics devices of computer graphics.
	CS603.2	Analyze and illustrate line and circle drawing algorithms for scan conversion.
	CS603.3	Understanding of the basic principles of 2D and 3D computer graphics and apply geometric transformations on graphic objects
	CS603.4	Understand multimedia systems architecture, components and use various multimedia tools.
	CS603.5	Identify different multimedia data and file formats and concept of animation
CS 604(Project Management)	CS604.1	To apply the software engineering concept to be followed in the conventional software management are developing in life project .
	CS604.2	To analyse the evolution & improving project contexts and suggest an appropriate management strategy
	CS604.3	To Identify and describe Techniques for gathering, organizing and analyzing data to formulate IT project.

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	CS604.4	To explore the design concept using based architecture first approach & prepare the project schedule, environment and management.
	CS604.5	To implement all modern approach project planning, organization, responsibilities, automation and control of the processes to achieve the desirable results.
CS 605(Data Analytics Lab)	CS605.1	Understand and apply the basic of data analytics concepts of statistics and probability.
	CS605.2	Apply the data processing techniques on Data Frame using Python Libraries.
	CS605.3	Implement and evaluate the data analytics techniques using MATLAB, R and Python tools.
	CS605.4	Able to evaluate or assess models with the large volume of data with the help of morden tools
	CS605.5	Define and explain to python for data cleaning and visualization as a data analytics tool.
CS 606(Skill Development Lab)	CS606.1	Understand the basics of software as a product.
	CS606.2	Understand and analyze the current requirements of industries.
	CS606.3	Implement the software as a product using different design patterns.
	CS606.4	Apply the software development techniques in real life applications.
	CS606.5	To analyze & compare current software product standards to impove their skills.
CS 607(Internship-III)	CS607.1	To Describe the everyday operations of an agency or organization.
	CS607.2	Student will able to Identify the ethical standards of behavior for professionals and interns within the agency/organization.
	CS607.3	Students will be able to Focus professional soft skills such as communication, punctuality and time management.
	CS607.4	Student will be able to Manage various personal habits or a social skill to deal better with work situations
	CS607.5	Build a professional network that can be a resource for the student
CS 6008(Minor Project II)	CS608.1	Designing of the project with modern programming languages
	CS608.2	Development of the project components module wise.
	CS608.3	Testing and analysis of project with various test cases and tools.
	CS608.4	Evaluate the project for deployment in different environment.
	CS608.5	Maintenance the project involving the changing and updating the modules as per requirements.

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B.Tech CSE 7th Sem		
Course Code/Course Name	**Course Outcomes**	
CS 7001(Distributed System)	CS7001.1	To Understand about distributed system and Discuss its goals
	CS7001.2	Illustrate the concept of distributed shared memory and distributed file system
	CS7001.3	Analyse RPC mechanism and Synchronization
	CS7001.4	Evaluate different load distributing algorithm and deadlock algorithm
	CS7001.5	Understand about distributed database management system and distributed multimedia
CS 7002(Compiler Design)	CS7002.1	Study and apply various types of language processors of complier and there semantic aspects
	CS7002.2	Examine the workinfg of scanning and parsing phases of compiler
	CS7002.3	Apply various compiler code gernerators and optimization methods
	CS7002.4	Perform type checking operation and dynamic program analysis
	CS7002.5	Design an efficient system software for a given expression
CS 7003(Web engg.)	CS7003.1	Discuss and analyze various network protocol concept, search engines & Web Servers
	CS7003.2	Understand Website Design concepts and identify Web security issues.
	CS7003.3	Create web pages using HTML and DHTML documents and Schemas.
	CS7003.4	Apply validations on XML FILE using DTD
	CS7003.5	Understand E Commerce , Electronic Payment Systems & it's Security.
CS 7004(Digital Image Processing)	CS7004.1	Understand the fundamental concepts of a digital image processing system with the analysis of various digital images.
	CS7004.2	Analyse images in the frequency domain using various transforms.
	CS7004.3	Evaluate the techniques for image enhancement and image restoration.
	CS7004.4	Interpret and analyse various image segmentation and compression techniques with their standards.
	CS7004.5	Categorize various Representation techniques with their mathematical formulation.
CS 7005(Big Data)	CS7005.1	Understand and apply the concept of bigg data for interpreting the challenges in it.
	CS7005.2	Demonstrate and differentiate fundamental enabling techniques(Hadoop, hive,mapreduce,yarn) and scalable algorithms for big data analytics.
	CS7005.3	Sketch and execute hadoop queries for finding solutions of usecases related to hadoop elements(Hive, Pig)

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	CS7005.4	Evaluate and optimize queries of NO-sql solving big data real world problems.
	CS7005.5	Analyze social network graphs by using networks and graph theory
CS 7006(Project I)	CS7006.1	Understand and identify the concept for the project.
	CS7006.2	Analyse the requirements of different tools and techniques for project
	CS7006.3	Design the various diagrams like data Flow diagram and use case diagrams for the project.
	CS7006.4	Design the software requirement specification for the project.
	CS7006.5	Understand and identify the future scope of the project.
CS 7007(Industrial Training)	CS7007.1	Capability to acquire and apply fundamental principles of engineering.
	CS7007.2	Learn maximum from real life experiences by involving and interacting with stakeholders and Apply engineering knowledge on real World of Work.
	CS7007.3	Identify and formulate the real world problems and find engineering solution based on software approach
	CS7007.4	Understanding and Awareness of the social, cultural, global and environmental responsibility as an engineer.

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B.Tech CSE 8th Sem		
Course Code/Course Name		**Course Outcomes**
CS 8001(Soft Computing)	CS8001.1	Understand the fundamentals of soft computing techniques and their applications.
	CS8001.2	Analyze various neural network architectures.
	CS8001.3	Demonstrate the various concepts of Fuzzy logic &its applications
	CS8001.4	Understand the working of CPN,RNN &associative memory
	CS8001.5	Understand the genetic algorithm concepts and their applications.
CS 8002(Cloud Computing)	CS8002.1	To define and understand the concepts ,key technologies, strength and limitation of cloud computing
	CS8002.2	To understand and analyse the architecture and infrastructure of cloud computing including SaaS, PaaS,Iaas, public cloud, private cloud and hybrid cloud and interfaces
	CS8002.3	To understand and Applying the virtualization technology
	CS8002.4	To understand and compare the various data, cloud services to acquire efficient database for cloud storage
	CS8002.5	Explaining and Illustrating the core issues of cloud computing, Cloud security fundamentals in cloud
CS 8003(Data Mining	CS8003.1	To Understanding the functionality of the various data mining and data ware housing component.
	CS8003.2	To Apply different Operation by OLAP and techniques by data preprocessing for Data.
	CS8003.3	Analysis the strengths and limitations of various data mining and data warehousing models.
	CS8003.4	Design and implement systems for data mining.
	CS8003.5	Investigation of different methodologies used in data mining and data ware housing.
CS 8004(Advanced Computer Network)	CS8004.1	Understand the different aspects of networks, protocols and network design models and able to apply knowledge of OSI-IS0 layering model to intelligently debug the networking problems.
	CS8004.2	Describe and Analyze the various TCP/IP layer protocols .
	CS8004.3	Analyze and Explain different Routing protocols..
	CS8004.4	Understand the different aspects of vpn network and atm services
	CS8004.5	Understand the different aspects of network layer, transport layer and application layer in networking.
CS 8005(Major Project)	CS8005.1	Understand the conceptual clarity about project organization and various stages of a project.
	CS8005.2	Classify the feasibility analysis in SDLC and project management using product and process metrics.
	CS8005.3	Designing of system modules according to the requirement.

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	CS8005.4	Designing of the architecture and show the **data** flow as well as control flow of the system.
	CS8005.5	Apply structural as well as functional **testing** after developing test cases.

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