Program Outcomes, Program Specific Outcomes & Course Outcomes of M.Tech. CSE Program

Program Outcomes	**POs of M.Tech. CSE Program**
1	To encourage individuals, design and implement research solutions for day by day changing computing and information system environment in the local areas for adopting innovation.
2	Familiarization upon predictable needs with proper contemplations such as technological, financial and agricultural issues.
3	Ability to comprehend technological changes in field of Image processing, Data analysis, Cloud securities, Software paradigms, Networking, Ethical and Forensic security platforms.
Program Specific Outcomes	**PSOs of M.Tech. CSE Program**
1	Should be able to handle research problem ability and write dissertations.
2	Able to analyse and understand mathematical models, able to learn the necessity of algorithms through literature surveys for fully understanding the proposed architecture of the hardware and software system.
3	Able to implement Agile techniques in various domains and deliver value to their customers faster and with fewer annoyances for new start-up programs.
4	To instil different skills like Computer languages, technologies and managerial skills for the successful entrepreneur and innovative developers.

Course	**Course Outcomes(COs)**
M.Tech (CSE) 1st Sem.	
Advanced Computer System Architecture (CSE501)	**CO 1:** Understand the Concept of Parallel Processing and its applications. **CO 2:** Implement the Hardware for Arithmetic Operations. **CO 3:** Analyze the performance of different scalar Computers. **CO 4:** Develop the Pipelining Concept for a given set of Instructions.
Programming in Java (CSE502	**CO 1:** Use the syntax and semantics of java programming language and basic concepts of OOP. **CO 2:** Develop reusable programs using the concepts of inheritance, polymorphism, interfaces and packages. **CO 3:** Apply the concepts of Multithreading and Exception handling to develop efficient and error free codes **CO 4:** Design event driven GUI and web related applications which mimic the real word scenarios.
Network Security (CSE503)	**CO 1:** Understand security of the data over the network. **CO 2:** Analyze research techniques in the emerging areas of cryptography and network security.

	CO 3: Understand implementation of various networking protocols. **CO 4:** Analyze physical points of vulnerability in simple and complex networks.
Research Methodology (RM599)	**CO 1:** Understand basic concepts of research and its methodologies. **CO 2:** Identify appropriate research topics. **CO 3:** Select and define appropriate research problem and parameters. **CO 4:** Organize and conduct research (advanced project) in a more appropriate manner **CO 5:**Write a research report and thesis **CO 6:** Write a research proposal (grants)
M.Tech (CSE) 2nd Sem.	
Digital Image processing (CSE504)	**CO 1:** Understand the fundamental concepts of a digital image processing system. **CO 2:** Analyze images in the frequency domain using various transforms. **CO 3:** Evaluate the techniques for image enhancement and image restoration. **CO 4:** Categorize various compression techniques. **CO 5:** Interpret Image compression standards. **CO 6**: Interpret image segmentation and representation techniques.
Relational Database Management System (CSE505)	**CO 1:** Understand various data models and database system architectures. **CO 2:** Design a database using normalization theory and explain the concepts of transaction processing. **CO 3:** Implementing queries to access database using SQL.
Distributed Operating System (CSE506)	**CO 1:** Gain knowledge of distributed operating system architecture. **CO 2:** Understand principles and importance of distributed operating system. **CO 3:** Implement distributed client server applications using remote method invocation. **CO 4:** Analyze distinguishing features between centralized systems and distributed systems
Mathematical Foundation for Cyber Security (CSE507)	**CO 1:** Understand basic concepts of various algebraic structures and theorems like Euler's theorem for designing security algorithm. **CO 2:** Understand coding theory which will be useful for data compression, information hiding **CO 3:** Analyze various pseudorandom number generation methods used for designing security protocols.
Advanced Software engineering (CSE508)	**CO 1:** Understand and adhere to professional ethical standards in the system development and modification process, especially by accepting responsibility for the consequences of design decisions and design implementations **CO 2:** Analyze the ability to analyze and implement solutions to complex problems involving computers and networks. **CO 3:** Develop a solid understanding to the methods of modern software engineering. **CO 4:** Develop the ability to build and configure major operating system components

Big Data Analytics (CSE509)	**CO 1:** Develop an ability to apply mathematics and science in engineering applications. **CO 2:** Develop ability to be socially intelligent with good SIQ (Social Intelligence Quotient) and EQ (Emotional Quotient) **CO 3:** Implement good cognitive load management [discriminate and filter the available data] skills. **CO 4:** Understand problem solving ability techniques for solving engineering problems.
M.Tech (CSE) 3rd Sem.	
Cloud Storage Infrastructures (CSE510)	**CO1:** Analyze the components of a virtualized data centre and appraise the role of storage in it. **CO 2:** Implement an information storage strategy for a cloud environment with due consideration for customer and regulatory requirements. **CO 3**: Analyze how best to provide reliable access to information both locally and remotely using storage technologies.
Cloud Security (CSE511)	**CO1:** Articulate the differences between deployment models (public, private, hybrid, and community) versus service models (infrastructure-, platform-, and software-as-a-service) of cloud computing. **CO 2:** Describe cloud security architectures from the perspectives of: providers, brokers, carriers, and auditors. **CO 3**: Understand how cloud computing changes the traditional enterprise security considerations compared to on-premise. **CO 4**: Understand how identity management considerations are different in the cloud, compared to on-premise.
Cloud Architecture (CSE512)	**CO1:** Implement the architecture of the modern data center and the mechanisms of service orchestration. **CO 2:** Understanding how QoS technologies are used to provide "data pipes" between data centers.
Mobile and Cloud Computing (CSE513)	**CO1:**Understand the IoT and Cloud architectures **CO 2:** Deploy Cloud Services using different cloud technologies. **CO 3:** Implement cloud computing elements such virtual machines, web apps, mobile services, etc. **CO 4:** Understand Visualisation techniques to show data generated from the IoT device.
Cloud Strategy Planning & Management (CSE515)	**CO 1:** Understand latest trends in cloud computing. **CO2:** Analyze principles of cloud virtualization, cloud storage, data management and data visualization. **CO 3:** Deploy a cloud based systems. **CO 4:** Develop applications using cloud platforms.
Service Oriented Architecture (CSE516)	**CO1:** Analyze different cloud programming platforms and tools. **CO 2:** Understand the applicability of SOA design patterns and the meaning of the major SOA implementation technologies. **CO 3**: Understand the problematics in service design and analysis

Applied Cryptography (CSE521)	**CO1:** Understand the fundamental knowledge of the cryptographical technologies. **CO 2:** Understand the security properties of the cryptographical technologies. **CO 3:** Implement the cryptanalysis skills to evaluate the cryptographical technologies. **CO 4:** Analyze new cybersecurity problems with solutions.
Intrusion Detection and Prevention System (CSE522)	**CO1:** Understand the fundamental concepts of Network Protocol Analysis and demonstrate the skill to capture and analyze network packets. **CO 2:** Use various protocol analyzers and Network Intrusion Detection Systems as security tools to detect network attacks and troubleshoot network problems. **CO 3:** Analyze intrusion detection alerts and logs to distinguish attack types from false alarms.
Cyber laws & Security Policies (CSE523)	**CO1:** Analyze and Evaluate the cyber security needs of an organization. **CO 2:** Analyze software vulnerabilities and security solutions to reduce the risk of exploitation. **CO 3:** Understand the concepts of risk management process and risk treatment methods. **CO 4:** Design operational and strategic cyber security strategies. **CO 5:** Design security architecture for an organization.
Intellectual Property Rights (CSE524)	**CO1:** Recognize the crucial role of IP in organizations of different industrial sectors for the purposes of product and technology development. **CO 2:** Identify different types of Intellectual Properties (IPs), the right of ownership, scope of protection as well as the ways to create and to extract value from IP. **CO 3:** Be able to anticipate and subject to critical analysis arguments relating to the development and reform of intellectual property right institutions and their likely impact on creativity and innovation.
Software Vulnerability Analysis (CSE525)	**CO1:** Analyze continuous risk management and how to put it into practice to ensure software security. **CO 2:** Implement security properties and link them into the software development lifecycle. **CO 3:** Apply software validation and verification techniques to test security vulnerabilities. **CO 4:** Develop case studies to think like an attacker in order to expose security vulnerabilities in software systems. **CO 5:** Debate and solve security vulnerabilities using software verification and testing techniques.

Web Security (CSE526)	**CO1:** Analyze and resolve security issues in networks and computer systems to secure an IT infrastructure. **CO 2:** Evaluate and communicate the human role in security systems with an emphasis on ethics, social engineering vulnerabilities and training. **CO 3:** Interpret and forensically investigate security incidents.
Security Threats (CSE527)	**CO 1:** Understand and appreciate the legal and ethical environment impacting individuals as well as business organizations and have an understanding of the ethical implications of IT legal decisions. **CO 2:** Implement basic security tools to enhance system security and can develop basic security enhancements in stand-alone applications.
Pattern Oriented Software Architecture (CSE531)	**CO1:** Understand the architecture, creating it and moving from one to any, different structural patterns. **CO 2:** Analyze the architecture and build the system from the components. **CO 3:** Design creational and structural patterns. **CO 4:** Analyze case study in utilizing architectural structures.
Agile Software Process (CSE532)	**CO1:** Understand the value of enterprise architecture and aligning the IT strategy with the business strategy. **CO 2: Learn** the roles of coarse-grained design, of dealing with costly-to-change decisions and of evolutionary architecture. **CO 3:** Implement sequence work across functional, non-functional and risk aspects. **CO 4:** Analyzing accumulated change which can eventually overwhelm an architecture, requiring a new architecture and a possible rewrite.
Software Project Management (CSE533)	**CO 1:**Learn the different project contexts and suggest an appropriate management strategy. **CO 2:**Implement the role of professional ethics in successful software development. **CO 3:** Undersatnd and describe the key phases of project management. **CO 4:** Implementing an appropriate project management approach through an evaluation of the business context and scope of the project.
Software Quality Management (CSE534)	**CO 1:** Create and apply a software quality assurance plan for all software projects. **CO 2:** Create and manage a software quality assurance team. **CO 3:** Conduct and facilitate inspections, product reviews, walk-throughs, and audits. **CO 4:** Create and maintain appropriate metrics to measure and maintain quality. **CO 5:** Apply a software quality assurance program in an agile environment involving iterative and incremental development.

Stochastic process and Queuing Theory (CSE535)	**CO 1:** Implement model complex systems with uncertainty using random processes, and analyze the system performance **CO 2:** Develop fundamental knowledge of the probability concepts **CO 3:** Acquire skills in analyzing queueing models. **CO 4:** Understand and characterize phenomenon which evolve with respect to time in a probabilistic manner.
Advanced Software Engineering (CSE536)	**CO 1:** Understand and adhere to professional ethical standards in the system development and modification process, especially by accepting responsibility for the consequences of design decisions and design implementations **CO 2:** Analyze the ability to analyze and implement solutions to complex problems involving computers and networks. **CO 3:** Develop a solid understanding to the methods of modern software engineering. **CO 4:** Develop the ability to build and configure major operating system components
Software Testing (CSE537)	**CO 1:** Implementing Various test procesess and continuous quality improvement. **CO 2**: Understanding methods of test generation from requirements. **CO 3:** Analyze application of software testing techniques in commercial environments.
M.Tech (CSE) 4th Sem.	
Design & Development of Cloud Applications (CSE517)	**CO 1:** Understand the meaning of the "Service Oriented" paradigm both from the business and technical point of view. **CO 2**: Analyze requirements towards the creation of a service. **CO 3**: Implement service starting from the analysis phase.
Cyber Crime Investigation and Digital forensics (CSE528)	**CO 1:** Conduct digital investigations that conform to accepted professional standards. **CO 2:** Identification and documentation of potential security breaches of computer data. **CO 3:** Access and critically evaluate relevant technical and legal information and emerging industry trends
Personal Software Process (CSE538)	**CO 1:** Implement Behavior modeling using UML: Finite state machines (FSM). **CO 2:** Input space modeling using combinatorial designs.

	CO 3: Understand Combinatorial test generation. **CO 4:** Understand Test adequacy assessment using: control flow, data flow, and program mutations.