Course Outcomes of B.Tech./M.Tech. Courses in Department of Computer Science and Engineering

Department	Course Code	Course Name	Course Outcomes
CSE	CO101	Programming Fundamentals	CO101.1. Ability to develop algorithmic solutions for use on computers. Approach the programming task using procedural and Object Oriented Programming techniques CO101.2. Ability to perform console input and output, utilize basic operators, and perform sequential Processing, utilize the basic control CO101.3. Ability to use decision structures, loops, storage class and functions CO101.4. Ability to process data in arrays, pointers and data files CO101.5. Ability to Develop effective programs in C and C++.
CSE	CS103	Web Designing	CS103.1:To define the principles of webpage design.[Remembering]. CS103.2:To visualize the basic concepts of Hyper Text Markup Language (HTML).[Understanding] CS103.3:To recognize the elements of Hyper Text Markup Language (HTML). [Remembering] CS103.4: To apply the basic concept of Cascading Style Sheet (CSS) for styling the webpages.[Applying] CS103.5: To develop the concept of web publishing.[Creating]
CSE	CO201	Data Structures	CO201.1 To recall and identify fundamental data structures (arrays, stacks, queues, linked lists, trees, and graphs) and their key characteristics. CO201.2: To explain the operations of various data structures (insertion, deletion, traversal, searching) and their real-world applications. CO201.3: To implement different data structures in a programming language to solve basic computational problems. CO201.4: To compare and contrast the efficiency (time and space complexity) of different data structures and algorithms for a given problem. CO201.5: To assess and choose the most appropriate data structure for solving complex problems by evaluating their performance and trade-offs.
CSE	CO203	Object Oriented Programming	C0203.1 Describe the evolution of programming paradigms and differentiate between structured and object-oriented development. [Understanding] C0203.2 Demonstrate the use of classes and objects, including the implementation of constructors, destructors, and static members in C++ programs. [Applying] C0203.3 Analyze various types of inheritance and operator overloading, and implement them in C++ programs, including the use of virtual functions and abstract classes. [Analyzing] C0203.4 Create and utilize function and class templates to develop generic programs, demonstrating inheritance and containership with class templates. [Creating] C0203.5 Evaluate the role of access specifiers in classes and apply polymorphism through function and operator overloading, function overriding, and the use of abstract classes in program design. [Evaluating] C0203.6 Investigate recent advancements in OOP, such as static analyzers for dynamic programming errors, and apply these concepts to improve code accuracy and reliability. [Synthesizing]

CSE	CO205	Discrete Structures	CO205.1 Illustrate basic mathematical objects such as sets, functions, relations and natural numbers and their properties. CO205.2 Examine various structures and properties of modern algebra and Solve substantial experience of formal and logical arguments. CO205.3 Design, select and apply appropriate discrete structures to solve computer engineering problems. CO205.4 Justify the mathematical properties via the formal language of propositional and predicate logic. CO205.5 Use graphs and trees, as tools to visualize and simplify the problems.	
CSE	CO207	Modelling & Simulation	CO207.1:To understand and classify various simulation modelling techniques.[Understanding]. CO207.2:To outline steps in a simulation study and illustrate Discrete event simulation.[Understanding] CO207.3:To construct a model for complex systems and experiment with simulation language. [Applying] CO207.4: To analyze random numbers generation using different statistical techniques.[Analysing] CO207.5: To evaluate simulation output and validate the system.[Evaluating]	
CSE	CO301	Software Engineering	CO301.1: To understand the fundamental principles, life cycle models, and other software characterstics. [Understanding] CO301.2:To apply techniques for requirements elicitation, analysis, and validation. [Applying] CO301.3:To analyze and apply design principles for effective software architecture. [Analyzing] CO301.4:To Plan, schedule projects, and estimate costs to manage software projects. [Applying and Analyzing] CO301.5:To conduct verification, validation, and various types of testing. [Applying and Evaluating] CO301.6: To apply maintenance models and practices for effective software maintenance. [Applying and Evaluating]	
CSE	CO303	Theory of Computation	CO303.1: Construct, analyze and interpret Regular languages, Expression and finite automata (FA) with and without output. CO303.2: Design, analyze and interpret Context Free languages, Expression and Grammars. CO303.3: Design and analyze different types of Push down Automata (PDA) as Simple Parser. CO303.4: Design different types of Turing Machines as Acceptor, Verifier, Translator and Basic computing machines and Apply to propose computation solutions. CO303.5: Compare and analyze different languages, grammars, automata and machines and appreciate their power and convert automata to programs and functions.	
CSE	CO305	Information Theory & Coding	CO305.1: To define and recall key concepts of information theory, such as entropy, mutual information, and channel capacity, along with fundamental coding techniques. CO305.2 To explain the principles behind lossless and lossy coding, including Shannon's source and channel coding theorems, and how they relate to real-world communication systems. CO305.3 To apply coding algorithms like Huffman coding and error correction methods (e.g., Hamming codes) to encode and decode messages efficiently. CO305.4 To analyze different types of communication channels and assess their capacity and efficiency using concepts like signal-to-noise ratio and bandwidth limitations. CO305.5 To evaluate various coding schemes and trade-offs, such as error detection/correction capabilities versus efficiency, for optimizing communication performance in noisy environments.	

CSE	CO313	Computer Graphics	CO313.1: Understand the components and applications of computer graphics systems, including display devices and color models. CO313.2: Implement and analyze output primitive algorithms for rendering lines, shapes, and fills. CO313.3: Apply 2D and 3D transformation techniques using matrix representations and homogeneous coordinates. CO313.4: Utilize 2D viewing and clipping techniques for managing and displaying graphical content. CO313.5: Design and manipulate curves and surfaces using Bezier and B-Spline techniques. CO313.6: Apply projection and shading methods for realistic image rendering and hidden surface removal.
CSE	CO327	Machine Learning	CO327.1: Design and implement supervised learning algorithms, including linear regression and classification models, and evaluate their performance using appropriate metrics. CO327.2: Apply unsupervised learning techniques, such as k-means and hierarchical clustering, to real-world datasets and interpret the results. CO327.3: Develop and train neural network models, including convolutional neural networks (CNNs) and recurrent neural networks (RNNs), for complex pattern recognition tasks. CO327.4: Apply reinforcement learning algorithms, such as Q-learning and policy gradient methods, to create agents capable of solving decision-making problems in simulated environments. CO327.5: Critically evaluate the ethical implications of AI technologies and apply principles of responsible AI in the development and deployment of machine learning models.
CSE	CO415	Wireless & Mobile Computing	CO415.1 Explain emerging wireless technologies standards, GSM, cellular systems and digital cellular standards CO415.2 Understand wireless networking, IEEE 802.11, Bluetooth, and mobile IP. CO415.3 Analyze data management, replication, and clustering in mobile networks. CO415.4 Explore mobile agents, security techniques, and transaction processing. CO415.5 Discuss ad hoc network routing protocols, localization, and quality of service
CSE	CO425	Information Theory & Coding	CO425.1 To define and recall key concepts of information theory, such as entropy, mutual information, and channel capacity, along with fundamental coding techniques. CO425.2 To explain the principles behind lossless and lossy coding, including Shannon's source and channel coding theorems, and how they relate to real-world communication systems. CO425.3 To apply coding algorithms like Huffman coding and error correction methods (e.g., Hamming codes) to encode and decode messages efficiently. CO425.4 To analyze different types of communication channels and assess their capacity and efficiency using concepts like signal-to-noise ratio and bandwidth limitations. CO425.5 To evaluate various coding schemes and trade-offs, such as error detection/correction capabilities versus efficiency, for optimizing communication performance in noisy environments.

CSE	CO427	Web Technology	CO427.1 This course describe the World Wide Web as a platform for interactive applications, content publishing and social services. Demonstrate competency using FTP to transfer web pages to a server. CO427.2 Construct dynamic websites with good aesthetic sense of designing and latest technical skills. Understand the user as well as client point of view of the system. CO427.3 List a Good grounding of Web Application Terminologies, Internet Tools, E – Commerce and other web services. CO427.4 Identify fundamental skills to maintain web server services required to host a website. CO427.5 Describe markup languages for processing, identifying, and presenting of information in web pages using markup languages such as: HTML, XHTML and XML language. CO427.6 Design websites using appropriate security principles, focusing specifically on the vulnerabilities inherent in common web implementations.
CSE	CO429	Neural Networks	CO429.1: Understand the history and biological inspiration behind neural networks and their mathematical models. CO429.2: Understand the fundamental concepts and architecture of neural networks, including neurons, layers, and activation functions. CO429.3: Analyze the mathematical derivation of FeedForward and Backpropogation in ANN and other related neural models. CO429.4: Implement various Neural Network Models including understanding overfitting, underfitting, and regularization methods. CO429.5: Design Neuwral Network Solutions for Defined Scenarios and assess using performance metrics.
CSE	CO431	Reinforcement Learning	CO431.1: Explain Core Concepts of Reinforcement Learning CO431.2: Implement and Analyze Reinforcement Learning Algorithms CO431.3: Design Reinforcement Learning Solutions for Defined Scenarios CO431.4: Assess Reinforcement Learning Systems Using Performance Metrics CO431.5: Identify and Mitigate Ethical Risks in Reinforcement Learning Applications
CSE	CO433	Distributed Systems	CO433.1: Apply knowledge of computer networks and operating system to perform of various (DS) algorithms and techniques related to communication, synchronization, resource allocation, file systems, fault tolerance and security CO433-2: Demonstrate limitations and applicability of various DS concepts in real life problems. CO433-3: Investigate real life problems and formulate as computer engineering (DS) problems. CO433-4: Design, select and apply appropriate DS concepts to solve computer engineering problems. CO433-5: Compose and provide solution through computer program for DS concepts using modern computer languages such as C, Java and Python.
CSE	CO 202	Database Management Systems	CO202.1: Ability to differentiate database systems from traditional file systems and compare their functionality and benefits. CO202.2: Transform information model into a relational database schema and define the schema using data definition language in DBMS smd Formulate SQL, relational algebra and TRC query for broad range of query problems. CO202.3: Able to use a DBMS software to create, populate, maintain, and query a database and to analyze functional dependencies and design of database. CO202.4: Describe normalization theory and apply such knowledge to the normalization of a database and List basic database storage structures and access techniques: file and page organizations, including B-tree and hashing. CO202.5: Pursue advance courses and acquire knowledge of new technologies, skills in the field of DBMS. CO202.6: Generate and integrate databases for real life projects"

CSE	CO 204	Operating System Design	CO204.1. Explain the fundamental concepts of operating systems, including their functions, evolution, types (batch, interactive, time-sharing, real-time), and system protection mechanisms. CO204. 2. Analyze the principles of concurrency, including process synchronization techniques (semaphores), inter-process communication (IPC), process scheduling algorithms, and their performance criteria. CO204. 3. Identify and resolve deadlock situations in operating systems using prevention, avoidance, and detection techniques. CO204. 4. Elaborate, describe memory management techniques, including paging, segmentation, virtual memory, and their impact on performance. CO204. 5. Evaluate and interpret I/O management concepts, disk scheduling algorithms, and file system organization and access mechanisms.
CSE	CO 206	Computer Organization and Architecture	CO206.1 : To understand the basics of instruction sets and their impact on processor design.[Understanding] CO206.2 :To understand the architecture and functionality of central processing unit.[Understanding] CO206.3 :To explain and apply the different addressing modes and memory organisation. [Applying] CO206.4 :To compare cache memory types and its use.[Analysing] CO206.5 :To explain input/output organisation and compare modes of data transfer.[Creating]
CSE	CO 208	Algorithms Design and Analysis	CO208.1 : Analyze the time and space complexity of different algorithms .[Analysis] CO208.2 :Explain how divide and conquer methods can be used to solve problems efficiently by breaking them down into smaller subproblems[Comprehension] CO208.3 :Implement and apply greedy algorithms to address and solve real-world optimization problems, such as finding the minimum spanning tree and the shortest path. [Applying] CO208.4 :Evaluate and compare various algorithmic approaches, such as greedy algorithms and dynamic programming, to select the most appropriate strategy for a given problem.[Evaluate] CO208.5 :Design algorithms using techniques like dynamic programming and backtracking methods to tackle complex problems .[Design]
CSE	CO 302	Compiler Design	CO302.1: Illustrate and acquire knowledge of different phases of the compiler and implement phases using compiler tools CO302.2: Design and implement different types of parsers i.e. Top-Down and Bottom-up parsers. CO302.3: Apply syntax-directed translation method using synthesized and inherited attributes to generate intermediate code. CO302.4: Analyze data structures used for symbol table and runtime organization and errors in various phases CO302.5: Apply code optimization and code generation techniques to create target code
CSE	CO 304	Artificial Intelligence	CO304.1: Learn uninformed and informed search strategies. CO304.2: Understand state space search and apply on real world problems. CO304.3: Apply knowledge representation for complex case studies. CO304.4: Formulate valid solutions using learning. CO304.5: Examine the knowledge based systems.

CSE	CO 306	Computer Networks	CO306.1: To Understand the fundamental concepts and principles of computer networks, analyse the functionalities and topologies of the physical layer in computer networks. [Understanding and Analysing] CO306.2: Implement data link layer protocols emphasizing the logical link layer for reliable data transmission. [Evaluate] CO306.3: Implement data link layer protocols for reliable data transmission, focusing on medium access layer mechanisms. [Evaluate] CO306.4: To explore routing algorithms and address resolution in the network layer. [Applying] CO306.5: To evaluate transport layer protocols and mechanisms for end-to-end communication. [Evaluating] CO306.6: To evaluate the security mechanisms and authentication protocols implemented at the application layer. [Analysing and Evaluating]
CSE	CO 318	Advanced Database Management Systems	CO 318.1: Apply advanced concepts like integrity constraints, ER diagrams, relational algebra, and functional dependencies for data normalization. CO 318.2: Implement complex transaction techniques, including nested and multilevel transactions, focusing on workflows and serializability. CO 318.3: Use advanced strategies for query transformation, size estimation, and indexing to enhance query performance and database operations. CO 318.4: Design Parallel and Distributed Databases, focusing on data storage, fragmentation, replication, and concurrency control. CO 318.5: Design and manage active databases with real-time constraints, including triggers, event constraints, and concurrency control. CO 318.6: Assess and apply advanced security measures for databases, including access control, encryption, and secure transaction processing, to protect data integrity and privacy.
CSE	CO 324	Pattern Recognition	CO324.1: Identify and formulate a real life problems as pattern recognition problem (as computer engineering problems.) CO324.2: Describe, design, select, and analyse appropriate machine learning model to solve computer engineering problems. CO324.3: Apply the knowledge of pattern recognition to solve complex engineering problems (classification, regression etc.). CO324.4: Implement algorithms for classification and regression tasks, train models, conduct experiments, and develop real-world pattern recognition applications. CO324.5: Work as individual, team member, team leader in handling projects related to computer vision in multidisciplinary scenario.
CSE	CO 326	Object Oriented Software Engineering (Elective)	CO326.1: Comprehend key object-oriented principles like encapsulation, inheritance, polymorphism, and abstraction, and their appropriate contexts. CO326.2. Given a problem, identify domain objects, their properties, and relationships, and accurately model them. CO326.3. Identify and represent constraints on objects and their relationships within the domain accurately. CO326.4. Identify and represent constraints on objects and their relationships within the domain accurately. CO326.5. Utilize Unified Modeling Language (UML) to model different aspects of object-oriented software design effectively. CO326.6. Identify recurring problems and apply suitable object-oriented design patterns to solve them efficiently.
CSE	CO 328	Deep Learning	CO328.1: Explain Deep Learning Foundations and Architecture CO328.2: Design and Implement Deep Learning Models CO328.3: Analyse and Optimize Model Performance CO328.4: Implement and Evaluate Generative Models CO328.5: Apply Ethical Principles in Deep Learning Practice

CSE	CO 408	Intellectual Property Rights,	CO408.1: Understand the fundamental principles of Intellectual Property Rights (IPR) and their pivotal role in fostering innovation and research. CO408.2: Analyze patent, design, copyright and trademark laws, encompassing filing procedures, prosecution steps, and infringement actions, with reference to relevant case laws. CO408.3: To apply the concepts of patentability, including conditions and subject matter, to hypothetical scenarios.. CO408.4: Examine case laws such as Alice Corp. v. CLS Bank and understand their impact on patent law and practices. CO408.5: To conduct Prior-art, validity/invalidity, state-of-the-art, freedom to operate, and landscape analysis searches.
CSE	CO102	Programming Fundamental	CO102/102.1: Identify situations where computational methods and computers would be useful and apply the basics of programming. CO102/102.2: Apply basic concepts of procedural programming language and/or object oriented programming based on the problem requirements CO102/102.3: Select the programming paradigm for problem solving based on the problem's properties CO102/102.4: Develop effective programs in C and C++ language.
CSE	CS104	Data Structures	CO315.1: Understand and perform operations on advanced tree structures such as B-trees and Red-Black trees. CO315.2:Implement and analyze mergeable heaps, including binomial and Fibonacci heaps, and their operations. CO315.3:Apply fundamental graph theory concepts and definitions to analyze graph properties and components. CO315.4:Implement and evaluate graph algorithms for connectivity, shortest paths, and network flows. CO315.5:Design and utilize advanced data structures like tries, suffix trees, and spatial trees for efficient data handling.
CSE	CS102	Discrete Structures	CS102.1 Illustrate basic mathematical objects such as sets, functions, relations and natural numbers and their properties. CS102.2 Examine various structures and properties of modern algebra and Solve substantial experience of formal and logical arguments. CS102.3 Design, select and apply appropriate discrete structures to solve computer engineering problems. CS102.4 Justify the mathematical properties via the formal language of propositional and predicate logic. CS102.5 Use graphs and trees, as tools to visualize and simplify the problems.
CSE	CS106	Basics of Machine Learning	CS106.1: Understand and explain the fundamental concepts and terminology of machine learning

M.Tech

CSE	CSE501	Advanced Algorithms and Data Structures	CSE501.1: To understand time and space complexity of recursive and non-recursive algorithms and apply them. CSE501.2: Learn different search strategies to design algorithm like divide and conquer, their applications to different problems CSE501.3: Development of graph based algorithm and analyse various applications of BFS, DFS and other algorithm of graphs.[Understanding, Applying] CSE501.4: To apply dynamic programming techniques to solve numerous problems[Analysing, Evaluating] CSE501.5: To understand concept of NP problems, classify problems P, NP, NP complete and compose approximate solutions.[Evaluate]

CSE	CSE505	Advanced Database Management Systems	CSE505.1: Apply advanced concepts like integrity constraints, ER diagrams, relational algebra, and functional dependencies for data normalization. CSE505.2: Implement complex transaction techniques, including nested and multilevel transactions, focusing on workflows and serializability. CSE505.3: Use advanced strategies for query transformation, size estimation, and indexing to enhance query performance and database operations. CSE505.4: Design Parallel and Distributed Databases, focusing on data storage, fragmentation, replication, and concurrency control. CSE505.5: Design and manage active databases with real-time constraints, including triggers, event constraints, and concurrency control. CSE505.6: Assess and apply advanced security measures for databases, including access control, encryption, and secure transaction processing, to protect data integrity and privacy.	
CSE	CSE509	Artificial Intelligence and Machine Learning	CSE509.1:Understanding about design of intelligent systems CSE509.2:Ability to design and analyze various intelligent search techniques CSE509.3:Learning of knowledge representation for different types of knowledge such as inherited, procedural knowledge CSE509.4:Ability to design intelligent system using Prolog, Lisp CSE509.5: Introduction to "Machine Learning" techniques CSE509.6:Ability to design Expert System and Intelligent Systems	
CSE	CSE531C	Parallel Computer Architecture	CSE531C.1 Define the fundamental concepts and classification schemes in parallel computing architectures. CSE531C.2 Explain the principles of multi-core and multi-threaded architectures, including their performance issues and optimization techniques. CSE531C.3 Apply program optimization techniques and parallelization strategies in the development of parallel programs. CSE531C.4 Analyze different parallel computer architectures and evaluate their performance, including memory hierarchy and communication latency. CSE531C.5 Evaluate compiler optimization issues and operating system techniques for efficient multiprocessing and parallel program execution. CSE531C.6 Design and implement parallel computing solutions for real-world applications in areas such as digital signal processing and image processing.	
CSE	CSE6401	Pattern Recognition	CSE6401.1: Learn various data pre-processing techniques. CSE6401.2: Understand feature selection methodologies. CSE6401.3: Apply different learning approaches in pattern recognition CSE6401.4: Implement performance evaluation of models.	
CSE	CSE6205	Advances in Internet and Web Technology	CSE6205.1: Familiarize students with the pre-requisite primer on the what, how, who & why of the Internet. CSE6205.2: Make students comprehend the developments and approaches in the field of Web from three perspectives, namely, Web in Theory, Web in Practice and Web in Research. CSE6205.3: To learn multiple concepts, tools and technologies that help developers build a pretty complex yet fascinating dynamic and interactive websites. CSE6205.4: To help students acquire knowledge and skills for creation and deployment of web site considering both client and server side programming. CSE6205.5: To gain ability to effectively use and understand the function of search engine. CSE6205.6: To acquaint students with the recent and dynamic research trends and studies for efficient and effective resource and knowledge discovery on Web.	
CSE	AI501	Advanced Data Structure and Algorithm	AI501.1:To find time and space complexity of recursive and non-recursive algorithms.[Understanding, Applying]. AI501.2: To understand terminology graph based algorithm and analyse various applications of BFS, DFS .[Understanding, Applying] AI501.3:To design and analyze greedy algorithm to solve real life problems. [Applying] AI501.4: To apply dynamic programming techniques to solve numerous problems[Analysing, Evaluating] AI501.5: To be able to classify problems as P, NP, NP complete and compose approximate.[Evaluate]	

CSE	AI505	Artificial Intelligence and Machine Learning	AI505.1: Describe AI problems, task domains, intelligent programs, and methodologies. Understand AI techniques such as search, knowledge, and abstraction. [Understanding] AI505.2: Analyze and implement basic problem-solving methods like state space search, production system characteristics, and heuristic search techniques such as Hill Climbing, Best First Search, A* Search, and AO* Search. [Analysing] AI505.3: Evaluate game playing strategies including game trees, Minimax, and alpha-beta pruning, as well as knowledge representation methods using predicate logic, unification, resolution, and deduction.[Evaluating] AI505.4: Develop and assess machine learning models, including supervised learning methods, predictive modeling, performance evaluation measures, and model validation techniques.[Creating] AI505.5: Apply and compare various dimensionality reduction techniques such as feature selection (wrapper, filter, univariate analysis, CFS) and feature extraction methods like Principal Component Analysis (PCA). [Applying] AI505.6: Understand and implement decision tree algorithms, including ID3, Gain Ratio, and Gini Index, and address issues such as overfitting, pruning, and problems with information gain. [Understanding]
CSE	AI507	Natural Language Processing	AI507.1: To explain the issues and challenges in natural language processing, including the phases of pre-processing such as normalization, stemming, lemmatization, and slang word meaning detection.[Understanding] AI507.2: To analyze word-level processing techniques for spelling error detection and correction, including methods like Minimum Edit Distance, N-Gram Method, and the Viterbi algorithm.[Analyzing] AI507.3: To evaluate computational lexicons such as WordNet and Fuzzy Hindi WordNet, and assess the role and methods of word sense disambiguation in natural language processing.[Evaluating] AI507.4: To apply word embedding techniques like Word2Vec, Paragraph2Vec, GloVe, and FastText, and compute similarities using measures such as cosine similarity and Jaccard similarity.[Applying] AI507.5: To design and implement sentiment analysis systems, including aspect-based sentiment analysis, and evaluate different machine translation approaches and their evaluation methods.[Creating]
CSE	AI509	Artificial Neural Networks	AI509.1: Explain the architecture and functioning of various types of neural networks such as feedforward neural networks, convolutional neural networks (CNNs), and recurrent neural networks (RNNs). AI509.2: Define key concepts and terminology related to artificial neural networks, including neurons, activation functions, layers, and learning algorithms. AI509.3: Implement basic neural network models using a programming language or a neural network library, such as Python with TensorFlow or PyTorch, to solve simple classification or regression tasks. AI509.4: Differentiate between various neural network architectures and optimization techniques by comparing their performance and suitability for different types of problems. AI509.5: Assess the performance of neural network models using metrics like accuracy, precision, recall, and F1 score, and optimize the models based on these evaluations. AI509.6: Design and develop custom neural network solutions to address complex real-world problems, incorporating advanced techniques like dropout, regularization, and hyperparameter tuning.
CSE	AI531B	Advance Database Management Systems	AI531B. 1 : Understand the fundamentals of relational database systems including: data models, database architectures and ER features. AI531B. 2 : Analyze and apply the different normalization techniques. AI531B. 3 : Assess the basic issues of transaction processing and concurrency control AI531B. 4 : Analyze deadlock and discuss the strategies for managing deadlocks. AI531B. 5 : Understand advanced query optimization and decision support system.

CSE	AI5305	Information and Network Security	AI5305 1. Identify and explain various security attacks and basic cryptographic techniques. [Understanding, Applying] AI5305 2. Analyze the principles and methods of modern block ciphers for e.g. DES, IDEA etc. [Remembering, Undrstaning] AI5305 3. Apply mathematical concepts such as modular arithmetic and discrete logarithms to understand and implement public key cryptography systems like RSA, Elgamal etc. [Applying, Evaluating] AI5305 4. Understand message authentication codes, hash functions, and digital signatures, emphasizing their role in securing communications. [Understanding] AI5305 5. Evaluate authentication applications and protocols, such as Kerberos and assess their effectiveness in securing electronic communications. [Understanding,Evaluate]
CSE	AI5201	Seminar	AI5201.1: Figure out the problem and work on the project under the faculty mentor assigned. [Understanding] AI5201.2: Understand and study in depth the various research papers related to the the problem undertaken. [Understanding, Applying] AI5201.3: Implement and learn the latest advanced tools and techniques required. [Applying, Evaluating] AI5201.4: Learn problem solving skills, build communication, interpersonal and team work skills. [Applying] AI5201.5: Prepare professional reports and presentations. [Applying]
CSE	AI6405	Advanced Computer Vision	AI6405.1: Understand and define the fundamental concepts of Advanced Computer Vision. AI6405.2: Describe and design the appropriate Advanced Computer Vision method to solve the problems. AI6405.3: Design, apply and explain the knowledge of Advanced Computer Vision to solve complex engineering problems. AI6405.4: Implement and evaluate the solution using computer vision and assessment methos for real-world problems. AI6405.5: Work as individual, team member, team leader in handling projects related to computer vision in multidisciplinary scenario.
CSE	AI6307	Block Chain and Applications	AI6307.1 Describe the fundamental concepts of distributed databases and cryptographic principles used in blockchain technology[Remembering] AI6307.2 Explain the advantages of blockchain over conventional distributed databases and identify blockchain networks' key components and mechanisms.[Understanding] AI6307.3 Apply cryptographic techniques such as hash functions and digital signatures to secure transactions within a blockchain network.[Applying] AI6307.4 Analyze various consensus algorithms and evaluate their effectiveness in maintaining the security and integrity of blockchain networks.[Analysing] AI6307.5 Develop a simple blockchain application and design smart contracts using Ethereum, addressing potential vulnerabilities and ensuring secure transactions.[Creating]
CSE	AI6209	Predictive Modelling	AI6209.1: To understand the fundamentals of predictive modelling. [Understanding] AI6209.2: To apply statistical tests to identify and interpret errors. [Applying] AI6209.3: To analyze data through advanced preparation techniques to improve modelling accuracy. [Analyzing] AI6209.4: To use metrics for predictive model validation and performance comparison. [Evaluating] AI6209.5: To gain expertise in creating robust predictive models by integrating data preparation, model construction, and validation techniques. [Creating] AI6209.6: To synthesize knowledge to address complex modelling challenges. [Synthesizing]

CSE	CSE504	Advanced Computer Networks	CSE504.1: To understand the fundamental networking layers and control mechanisms. CSE504.2: Develop skills in network traffic modeling, simulation, and performance measurement, focusing on network coding techniques and QoS. CSE504.3: Study and apply routing protocols, including AODV and multicast flow, along with mobility supports in wireless networks. CSE504.4: Design and evaluate overlay network types, such as RON, P2P, and CDN, addressing challenges in web caching and cross-layer optimizations. CSE504.5: Explore emerging network types like data centers, DTNs, and 4G networks, and apply knowledge to emerging applications like VoIP, SIP, and video over P2P. CSE504.6: Understand and implement concepts in wireless sensor networks (WSN) and online social networks (OSN), focusing on cross-layer sensor data dissemination.
CSE	CSE5402	Wireless & Mobile Communication	CSE5402.1 Explain emerging wireless technologies standards, GSM, cellular systems and digital cellular standards CSE5402.2 Understand wireless networking, IEEE 802.11, Bluetooth, and mobile IP. CSE5402.3 Analyze data management, replication, and clustering in mobile networks. CSE5402.4 Explore mobile agents, security techniques, and transaction processing. CSE5402.5 Discuss ad hoc network routing protocols, localization, and quality of service
CSE	CSE5304	Information & Network Security	CSE5304.1: Identify and analyze various threats to information and network security, including malware, phishing, denial of service attacks, and social engineering. CSE5304.2: Implement effective security measures to protect information assets and network infrastructure, including encryption, access control mechanisms, firewalls, and intrusion detection systems. CSE5304.3: Recognize ethical considerations related to information and network security, including privacy laws, intellectual property rights, and ethical hacking principles. CSE5304.4: Develop skills in detecting, responding to, and recovering from security incidents, including incident handling and incident response procedures. CSE5304.5: Develop skills in detecting, responding to, and recovering from security incidents, including incident handling and incident response procedures.
CSE	CSE5214	Advances in Multimedia Technology	CSE5214.1: Familiarize students with data communication and networking fundamentals, including bandwidth requirements and real-time constraints for different media types. CSE5214.2: Enable students to comprehend and evaluate the performance and requirements of multimedia over LAN and WAN, including multimedia conferencing scenarios. CSE5214.3: Educate students on creating linear and nonlinear hypermedia presentations using various authoring and publishing tools and effectively structuring information. CSE5214.4: Acquaint students with different approaches to authoring hypermedia documents, understanding and applying hypermedia data models and standards in practical contexts. CSE5214.5: Teach students the fundamentals of color science and image processing, applying these concepts using tools like Photoshop for tasks such as image acquisition, representation, and compression, including various file formats. CSE5214.6: Equip students with knowledge of composite video signals and standards (NTSC, PAL, SECAM) and the ability to apply video compression techniques using MPEG standards, while exploring recent trends and research in multimedia and hypermedia technologies.

CSE	AI502	Machine Learning	AI502.1: Understanding different classes of Machine Learning such as supervised, non supervised and reinforcement learning AI502.2: Under standing the need of data pre processing, Learning dimensional reduction and feature selection techniques for preprocessing. AI502.3: Knowledge of (i)classification techniques such as decision tress, ANN and KNN and (ii) prediction techniques such as regression. Analysis and evaluation of these techniques AI502.4: Knowledge of Ensemble learning and Reinforcement Learning. Techniques of Ensemble learning like begging, boosting and Random Forest. Their applications to different data sets AI502.5: Knowledge of clustering techniques such as Partition based clustering, Hierarchical clustering and Density based clustering and their implementation to different data set
CSE	AI5402	Natural Language Processing	AI5402.1: Define key terminology related to natural language processing, such as tokenization, stemming, and named entity recognition. AI5402.2:Explain the fundamental concepts and techniques in NLP, including syntactic and semantic analysis, and the role of machine learning in NLP tasks. AI5402.3:Implement basic NLP techniques using programming libraries (e.g., NLTK, SpaCy) to preprocess text data for various applications, such as sentiment analysis or text classification. AI5402.4:Compare and contrast different NLP models (e.g., rule-based vs. statistical vs. neural models) and analyze their strengths and weaknesses in specific use cases. AI5402.5: Design and develop an end-to-end NLP application (e.g., chatbots, text summarizers) that integrates multiple NLP techniques, demonstrating originality and critical thinking in approach and implementation.
CSE	AI5304	Pattern Recognition	AI5304.1: Learn various data pre-processing techniques. AI5304.2: Understand feature selection methodologies. AI5304.3: Apply different learning approaches in pattern recognition. AI5304.4: Implement performance evaluation of models.
CSE	AI5202	Heuristic Methods	AI5202.1: Understand optimization problems, their inherent characteristics and wide areas of applications AI5202.2: Analyze the problem with respect to constraints, solution space, time complexity, heuristic involved AI5202.3: Formulate a mathematical model for the problem AI5202.4: Construct/ Design a model for solving the problem AI5202.5: Solve the problems using appropriate heuristic technique