Computer science Courses

CS205: Numerical Analysis

Prerequisites: GS114-IT112

Floating-point arithmetic, Error, stability, convergence, Taylor's series, Iterative, solutions for finding roots (Newton's Method), Curve fitting; function approximation

Numerical differentiation and integration (Simpson's Rule), Explicit and implicit methods, Differential equations (Euler's Method), Linear algebra, Finite differences

CS211: Analysis of algorithms

Prerequisites: 212

This course emphasizes the fundamental concepts of algorithm design and analysis such as searching, sorting and graph algorithms. Examples include divide-and-conquer dynamic programming, greedy method, backtracking, local search methods, and parallel programming. Analysis techniques will be developed to aid in judging program efficiency.

CS331:   Programming languages

Prerequisites: IT212

Overview of programming languages, Virtual machines, Introduction to language translation, Declarations and types, Type systems. Abstraction mechanisms, Object-oriented programming, Functional programming.

CS341: Software development

Prerequisites: IS361, IT341

Provides an intensive, implementation-oriented introduction to the software-development techniques used to create medium-scale interactive applications, focusing on the use of large object-oriented libraries to create well-designed graphical user interfaces. Topics include event-driven programming, computer graphics, human-computer interaction (HCI), and graphical user interfaces.

CS431:   Compiler Construction

Prerequisites: CS331

Application of regular expressions in lexical scanners, Parsing (concrete and abstract syntax, abstract syntax trees).Application of context-free grammars in table-driven and recursive-descent parsing. Symbol table management. Code generation by tree walking. Architecture-specific operations: instruction selection and register allocation

Optimization techniques. The use of tools in support of the translation process and the advantages thereof. Program libraries and separate compilation. Building syntax-directed tools

CS442: Advanced Database

Prerequisites: IT341

Implementation of a databases using an enterprise database management system. Database design theory. Database queries. Advanced database techniques: - object-oriented; distributed databases; intelligent,: knowledge-based systems and rule-based reasoning, data warehousing. Multimedia databases; Data mining techniques and models. Transaction processing.

CS443: Data and Web Mining

Prerequisite: CS451

The course introduces principles and techniques of (Web) data mining. Topics include: Web usage mining, Web content mining, and their applications to e-commerce, techniques from machine learning, data mining, text mining, and information retrieval to extract useful knowledge from Web data which could be used for business intelligence, site management, personalization, and user profiling, data mining using Decision-Tree based classifiers, Association-Rule mining, Clustering methods, Neural Networks, Statistical methods.

CS451: Intelligent Systems

Prerequisites: IT212, IT201

Introduction. Problem solving as search: problem spaces. Uninformed and heuristic search. Knowledge representation: propositional logic and first-order logic Logical reasoning: deductive inference, unification, forward and backward chaining, resolution. Speech recognition and natural language understanding. Machine learning. Planning: situation calculus, strips language, partial-order planning. Visual perception and robotics.

CS453: Robotics

Prerequisite: CS451

Overview of robotics and autonomous agents, Applications of robotics, Building blocks of robots: inputs and outputs, sensors, motors, gears, encoders, micro-controllers, Robot motion, Active perception: Object sensing; sonar range sensing; vision sensing, line sensing, Intelligent movement and control, Remote control, Wireless communication and security.

CS454: Embedded systems

Prerequisite: IT322

Introduction to real-time systems, Designing real-time systems, Reliability and fault tolerance, Remote Debugging, Micro Analyzer, Reliability and fault tolerance, Concurrent programming, Shared variable-based synchronization and communication, Message-based synchronization and communication, Atomic actions, concurrent processes and reliability, Resource control, Scheduling, Distributed systems.

CS461: Computer Graphics

Prerequisites: IT212

History and applications of computer graphics. Ethical issue arising in computer graphics.

The graphics pipeline. Affine transformations between spaces in the pipeline. Clipping algorithms. Scan conversion algorithms for lines, circles, and polygons. Hidden object detection and obscuration algorithms. Illumination, shading, and color models.

CS462:   Multimedia Technology

Prerequisites: IT322

Design and implementation of technologies used to implement interactive multimedia applications such as streaming video playback, video conferencing, video editing, and hypermedia authoring; Digital media representations; Compression and synchronization; Implementation technologies including hardware architectures for media processing (e.g., processor, bus, and input/output devices); Operating System support; Multimedia systems services.

CS463: Computer Vision & Image Processing

Prerequisite: CS461.

An introduction to computing vision. Basic techniques of analysis and manipulation of pictorial data by computer. Image input/output devices, image processing software, enhancement, segmentation, property measurement, and image compression. Applications such as optical character recognition may be introduced.

CS471: Distributed Systems

Prerequisites: IT322

Introduction to distributed systems, Communication , Replication & Consistency, Distributed Shared Memory, Distributed Objects , Synchronization & Coordination, Fault Tolerance , Security , Naming, Distributed File Systems , Parallel Programming, Grid.

CS491: Special topics in Computer Science

Prerequisite: 90 Credit Hrs.