The Department of Computer Science & Engineering (CSE) was started in 1985 with a B.Tech degree program in Computer Science and Engg. Over the years, the department has developed to become a center of excellence providing in-depth technical knowledge and opportunities for innovation and research with well equipped with state-of-the-art computer facilities and dedicated faculty.

The department started Master of Technology (M.Tech) degree program of two years in Computer Science & Engineering in 1989 and Computer Science and Information Security in 2010 with the aim to develop core competence and prepare the students to carry out development work, as well as take up the challenges in research.

Besides these, the Department has strong research interest in diverse branches of Computer Science and offers a Doctor of Philosophy (Ph.D) programme.

### Academic programs offered
- B.Tech. in Computer Science & Engineering (since 1985)
- M.Tech. in Computer Science & Engineering (since 1989)
- M.Tech. in Computer Science & Information Security (since 2010)
- Ph.D.

### Infrastructural Facilities
The department has 11 different laboratories, viz. Digital Systems Lab., PG and Research Lab, Data base Systems Lab., Network Technology Lab., Software Engineering Lab, Information Security Lab., Programming Lab, Project Lab., Operating Systems Lab., Language Processor Lab and Computer Graphics Lab. with central air-conditioning, UPS and special furniture for computer users. Each laboratory has been designed to accommodate 30-35 students per session and has been equipped with the state of the art computer systems, with a total of about 380 Intel based Computers, with all necessary peripherals.

### Industry Interaction and Research Activities
The department has tie-up with Infosys, Microsoft, TCS, and EMC2 Corporation. The department also offers Elective courses in collaboration with industries.

- The elective course Data Mining and Business Analytics is offered in collaboration with Infosys
- The elective course Information Storage Management is offered in collaboration with EMC

The research activities of the staff and the students have resulted in more than 350 publications in International conferences and Journals. Great emphasis is given on the emerging, interdisciplinary, cutting-edge areas of research within the department. Currently the department has the following research groups for the benefit of faculty and students.

- High Performance Computing System
- Computer Vision
- Software Engineering
- Knowledge Engineering
- Computer Networks & Security
**Faculty List**

**Professor & Head**
Dr Renuka A., Ph.D (NITK, Surathkal)

**Professor**
Dr N. V. Subba Reddy, Ph.D (Kuvempu University)
Dr Prema K. V., Ph.D (Kuvempu University)
Dr Dinesh Acharya U., Ph.D (Manipal University)
Dr Gopalakrishna N. Kini, Ph.D (Manipal University)
Dr Ashalatha Nayak G. D., Ph.D (IIT, Kharagpur)
Dr Geetha M., Ph.D (NITK, Surathkal)
Dr Harish S. V., Ph.D (NITK, Surathkal)
Dr Krishna Moorthi Makkithaya, Ph.D (Manipal University)

**Associate Professor**
Dr Vivekananda Bhat K., Ph.D (IIT, Kharagpur)
Dr P. C. Siddalingaswamy, Ph.D (Manipal University)
Dr Srikanth Prabhu, Ph.D (IIT, Kharagpur)
Dr Mamata Balachandra, Ph.D (Manipal University)
Dr Vijaya Arjunan, Ph.D (SCSVMV, Kanchipuram)

**Assistant Professor - Selection Grade**
Ms Hemalatha S., M.Tech
Mr Shivaprasad G., M.Tech
Mr Giridhar N. Shakarad, M.Tech
Mr Narendra V. G., M.Tech
Mr Manamohana K., M.Tech
Mr Rajesh G., M.Tech
Ms Suma D., M.Tech

**Assistant Professor - Senior Scale**
Mr Chidananda Acharya, M.Tech
Mr Praveen Pai T., M.Tech
Mr Ashwath Rao B., M.Tech
Mr Ahmed Shafeeq B. M., M.Tech
Mr Govardhan Hegde K., M.Tech
Mr Dasharathraj K. Shetty, B.E., M.Tech, MBA
Ms Shanthi P.B., M.Tech

Mr. B. Kishore, M.Tech
Mr. Roshan David Jathanna, M.Tech
Ms C. Anita Marx, M.Tech
Mr Gururaj, M.Tech
Mr Yusuf Haider M., M.Tech
Ms Archana Praveen Kumar, M.Tech
Ms Tanuja Shallesh, M.Tech
Mr Murali Krishna S N, B.E., M.Tech
Ms D. Cenitta, B.E., M.Tech
Mr Prakash K. Atthal, M.Tech
Mr Manoj R., M.Tech
Ms Anjana S., M.Tech
Ms Rajashree Krishna, M.Tech

Ms Sucharitha Shetty, M.Tech
Ms Anitha Kini, M.Tech
Ms Shwetha Rai, M.Tech
Mr Karanth Shyam Subravya, M.Tech
Ms Radhika Kamath, M.Tech
Ms Vidhya V., M.Tech
Ms Ancilla Juliet Pinto, M.Tech
Ms Praseeda, M.Tech
Mr N. Siva Selvan, M.Tech
Mr Ganesh Babu C., MS
Ms Jashma Suresh P., ME
Ms Priya Kamath B., M.Tech
Ms Deepthi S., M.Tech
Ms Roopashri Shetty, M.Tech
Ms Jyothi Upadhya K., M.Tech
Ms Janani M., M.Tech
Ms Vidya Pai, M.Tech
Ms Vyshali Rao K. P., M.Tech
Ms Josephine Veena D., M.Tech
Ms Jimcymol James, M.Tech
Mr Bhargav J. Bhatkalkar, M.Tech
Ms Praseetha M., M.Tech
Ms Anu Jose, M.Tech
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<th>Third Semester</th>
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References:

CSE 2103: DATA STRUCTURES [3 1 0 4]
Introduction - Pointers and Pointer Application, Accessing variables through pointers, pointers to pointers, pointer arithmetic and arrays, pointers and functions, Recursion- definition, recursive programs, efficiency of recursion. Stacks, queues, evaluation of expressions, multiple stacks and queues and its application, Linked lists representations- Singly, doubly, header node, circular along with the application, Trees-Binary trees, representation, recursive/ non recursive inorder, preorder and post order tree traversal, level order traversal Binary search tree, creation, insertion deletion operations on binary search tree, Optimal Binary Search Trees, Red-Black Trees, Splay Trees, mway search trees, B trees, Sorting, Graphs

References:

CSE 2104: OBJECT ORIENTED PROGRAMMING [3 1 0 4]

References:

CSE 2111: LOGIC DESIGN LAB [0 0 3 2]

References:

CSE 2112: DATA STRUCTURES LAB [0 0 3 2]
Reviewing the concepts of pointers and structures. Studying the operation of stacks and queues and the associated application programs. Creating dynamic allocation of memory for linked list and applying it to examples using single, doubly, circular linked list. Implementing sorting and searching techniques, Creation of trees and the application associated with the trees.

References:

CSE 2113: OBJECT ORIENTED PROGRAMMING LAB [0 0 3 1]
Programs on control statements, arrays, classes objects and methods, Inheritance, Interfaces, packages, exceptions, multithreading, Generics, Strings, input-output streams, Applets and swings.

References:

CSE 2202: DESIGN AND ANALYSIS OF ALGORITHMS [3 1 0 4]

References:

CSE 2203: MICROPROCESSORS [2 1 0 3]

References:

CSE 2204: DATABASE SYSTEMS [2 1 0 3]
References:


References:

CSE 2211: MICROPROCESSORS LAB [0 0 3 2]
Basics of Assembly Programming, Simple Programs using Addition, Subtraction and Branching Instructions, Operations on BCD and ASCII data (Packing, Unpacking, Conversion between BCD and ASCII), Multiplication and Division, List Operations (Arrays), String Operations, DOS and BIOS interrupts String Operations, DOS interrupts Integer Operations and file operations, Logic Controller Interfacing, DAC Interfacing, Keyboard Interfacing, Seven Segment Display Interfacing, Stepper Motor, ADC Interfacing, Elevator Interfacing

References:

CSE 2212: DATABASE SYSTEMS LAB [0 0 3 2]
Implementation of ER diagrams using DIA tool, Designing the different databases and working with queries using SQL. Working with Advanced SQL like, Exceptions Cursors, Procedures, Functions and Packages, Mini-Project work using Java as front end and Oracle/PostgreSQL as back end.

References:

FIFTH SEMESTER

CSE 3101: COMPUTER ARCHITECTURE [2 1 0 3]

References:

CSE 3102: OPERATING SYSTEMS [3 1 0 4]

References:

CSE 3103: COMPUTER NETWORKS [3 1 0 4]

References:

CSE 3104: SOFTWARE ENGINEERING [3 1 0 4]

References:

CSE 3111: OPERATING SYSTEMS LAB [0 0 3 1]
Implementing UNIX commands and learn the usage of VI editor, Illustration of Shell Commands, Shell programming, CPU Scheduling Algorithms, Deadlock Detection and Avoidance Algorithms, Page replacement and allocation algorithms, Disk Scheduling Algorithms, Inter Process Communication by using Pipes, Sockets and Messages.

References:

CSE 3112: ALGORITHMS LAB [0 0 3 1]
Implement a doubly linked list & BST, GCD Techniques, Bubble sort, Selection sort, Linear search, String Matching, Merge Sort, Quick sort, binary search, insertion sort, DFS, BFS, topological sorting, AVL tree, 2-3 tree, heap sort, Horspool algorithm, Open hash table, Floyd's algorithm, Warshall's algorithm, Prim's algorithm, Kruskal's algorithm, Dijkstra's algorithm, N queens problem, subset-sum problem, branch and bound technique.

References:

CSE 3113: COMPUTER NETWORKS LAB [0 0 3 2]
Review of Linux system calls and working with UNIX Network commands, UDP Based Client Server Programs, TCP Based Client Server Programs, Concurrent TCP Servers, Implement the various TCP Protocols- Simple, Go Back N, Selective Reject, Link State Routing, Shortest Path Routing, Distance Vector Routing, Checking the class of IPv4 Addresses, Encapsulation and Decapsulation of IP Packets, Fragmentation, Calculating Cyclic Redundancy Check and Frame Sorting, Synchronous Multiplexing using SELECT System Call.

References:

SIXTH SEMESTER

HUM 4002: ENGINEERING ECONOMICS AND FINANCIAL MANAGEMENT [2 1 0 3]

References:

CSE 3201: COMPILER DESIGN [2 1 0 3]
Introduction, Language Processors, The Structure of a Compiler, Lexical Analysis: Role of the Lexical Analyzer, Input Buffering, Recognition of Tokens, Design of Lexical Analyzer Generator, Syntax Analysis:

References:

CSE 3202: PARALLEL COMPUTER ARCHITECTURE AND PROGRAMMING [2 1 0 3]

GPUs as parallel computers, Architecture of a modern GPU, Need for parallelism, Parallel programming languages and models, History of GPU Computing, Message passing model, MPI basic data types and functions, Point-to-point communication, Collective communication, Benchmarking parallel performance, MPI error handling functions, OpenCL Architecture, OpenCL execution model, Program and Kernel Object, Memory model, Writing Kernels, OpenCL Device Architecture, OpenCL APIs, OpenCL programs, Data Parallelism, CUDA Program Structure, Matrix-Matrix Multiplication, Device memories and Data transfer, Kernel functions and Threads, Importance of Memory Access Efficiency, CUDA Device Memory types, Parallel Virtual Machines, Process Management, Communication functions, Comparison of parallel programming models.

References:

CSE 3211: COMPILER DESIGN LAB [0 0 3 2]

Preliminary Scanning Applications, Identification of Tokens in a given Program, Design of Lexical Analyzer, Design of Parser, Design of Code Generator, Usage of LEX and YACC.

References:

CSE 3212: PARALLEL PROGRAMMING LAB [0 0 3 2]

Study of Working Environment of Visual Studio, MPI Programs using Point to Point communication, MPI Programs using Collective communication, Error Handling in MPI, OpenCL program to perform Vector Addition, Matrix Multiplication, Sorting, String reverse, String sorting, Transpose of Matrix, Benchmarking parallel performance, Simple CUDA programs to perform operations on Vectors and Matrices.

References:

SEVENTH SEMESTER

HUM 4001: ESSENTIALS OF MANAGEMENT [2 1 0 3]


References:

CSE 4101: INTERNET TECHNOLOGIES [2 1 0 3]

References:

CSE 4102: DISTRIBUTED AND CLOUD COMPUTING [3 1 0 4]

References:

CSE 4111: INTERNET TECHNOLOGIES LAB [0 0 3 2]
HTML Tags, C# Programming Language Constructs, Web Forms and Web Controls, State Management, Validation, Styles, Themes and Master Pages, Working with Data, Data Controls, Files and Streams, XML, AJAX, Mini Project.

References:


EIGHTH SEMESTER

CSE 4297: SEMINAR
- Each student has to present a seminar individually, on any technical topic of current interest / latest advancement / topics not covered in the syllabus.
- The topic has to approved by the Department and a report of the same has to be submitted a week before the day of the presentation.

CSE 4298: INDUSTRIAL TRAINING
- Each student has to undergo industrial training for a minimum period of 4 weeks. This may be taken in a phased manner during the vacation starting from the end of third semester.
- Student has to submit to the department a training report in the prescribed format and also make a presentation of the same. The report should include the certificates issued by the industry.

CSE 4299: PROJECT WORK / PRACTICE SCHOOL
- The project work may be carried out in the institution/industry/ research laboratory or any other competent institutions.
- The duration of the project work shall be a minimum of 16 weeks which may be extended up to 24 weeks.
- A mid-semester evaluation of the project work shall be done after about 8 weeks.
- An interim project report on the progress of the work shall be submitted to the department during the mid-semester evaluation.
- The final evaluation and viva-voice will be conducted after submission of the final project report in the prescribed form.
- Student has to make a presentation on the work carried out, before the department committee as part of project evaluation.

MINOR SPECIALISATIONS

I. GRAPHICS AND IMAGE PROCESSING

CSE 4001: COMPUTER GRAPHICS [3 0 0 3]

References:
CSE 4002: COMPUTER VISION [3 0 0 3]
Introduction to computer vision. Advantages of computer vision, Cameras, Pinhole, CCD, Radiometry-Measuring light, Radiosity, Specularity, Sources, Shadows and Shading, Light sources, Local and global shading models, photometric stereo, Linear filters, Convolution, Sampling, Spatial frequency, Fourier transforms, Geometry of multiple views, Two views, Three views, Image reconstruction and rectification, Human stereopsis, Model-based vision, Binocular fusion, Finding templates using classifiers, Class histograms, Feature selection, Neural networks, Support vector machine, Recognition by relations between templates, Finding objects by voting and relations between templates, Relational reasoning using probabilistic models and search, Geometric templates from spatial relations, Object recognition, Application: Image based rendering. Construction of 3D models, Approaches to image based rendering.

References:

CSE 4003: DIGITAL IMAGE PROCESSING [3 0 0 3]
Introduction to Digital Image Processing, components of an image processing system, Spatial domain- Gray level transformations, histogram processing, spatial filtering, smoothing spatial filters, sharpening spatial filters, combining spatial enhancement methods, Filtering in the frequency domain-Introduction to the Fourier transform, frequency domain, the basics of filtering in the frequency domain, image smoothing and image sharpening using frequency domain filters. Image restoration- Noise models, restoration using spatial filtering, periodic noise reduction by frequency domain filtering, estimating the degradation function. Morphological image processing- Preliminaries, dilation and erosion, opening and closing, the hit-or-miss transformation, basic algorithms, extension to gray-scale images. Image segmentation- Point, line, and edge detection, Thresholding, region-based segmentation, segmentation using morphological watersheds, motion in segmentation.

References:

CSE 4004: MULTIMEDIA APPLICATIONS [3 0 0 3]

References:

II. INFORMATION MANAGEMENT AND ANALYTICS
CSE 4005: ADVANCED DATABASE SYSTEMS [3 0 0 3]
Query processing and optimization, Measures of Query Cost, Evaluation of Expressions, Transformation of Relational Expressions, Estimating Statistics of Expression Results, Materialized Views. Concurrency Control and Recovery System, Lock-Based Protocols, Multiple Granularity, Timestamp-Based Protocols, Validation-Based Protocols. Parallel and distributed Databases, I/O Parallelism, Complex Data types, Structured Data Types and Inheritance in SQL, Object Identity and Reference Types in SQL, Data storage, Distributed transactions, Commit protocols, Concurrency control in distributed Databases, Availability, Distributed Query processing, Cloud Based Database, XML Document Schema, Querying and Transaction, Storage of XML Data, Transaction-Processing Monitors, Transactional Workflows, Motivation, Spatial and geographic Data, multimedia Database, Mobility and Personal Database.

References:

CSE 4006: BIG DATA ANALYTICS [3 0 0 3]
Big Data, Characteristics of Big data, Data in warehouse and data in Hadoop, Importance of Big Data, Big data use cases, Map Reduce, Distributed File System, Algorithms using Map Reduce, Communication Cost model, Complexity Theory, Meet Hadoop, Comparison with other systems, The Hadoop Distributed File System, Hadoop I/O, File Based Data structures, Developing a Map Reduce Application, Inverted Index for Text Retrieval, Graph Algorithms, Page Rank, Stream Data Model: A Data-
References:

CSE 4007: DATA WAREHOUSE AND DATA MINING [3 0 0 3]
Introduction to Data warehouse and Data Mining, Data Warehouse Building Blocks, Principles of Dimension Modelling, Advanced Topics in Dimension Modelling, ETL, Data Quality, OLAP, Data Pre-processing, Data cleaning, Data Integration and Transformation, Knowledge discovery in databases, Data mining techniques, Association rules mining, Algorithms for mining frequent patterns, Apriori Algorithm, FP Growth without generating candidate generation, From association mining to correlation analysis, Pattern Evaluation Methods, Introduction to classification, Decision Tree Induction, Bayesian Classification, Rule Based Classification, Back-propagation, Lazy Learners, Model evaluation and Selection, Ensemble methods, Introduction to cluster analysis, Partitioning methods, Hierarchical methods, Density-Based methods, Evaluation of Clustering, Outlier analysis.

References:
1. Jiawei Han and Micheline Kamber, “Data Mining- Concepts and Techniques”, (3e), Morgan Kaufmann Publishers, 2011
2. Paulraj Ponniah, “Data Warehousing”, (2e), Wiley India Pvt. Ltd., 2010

CSE 4008: INFORMATION RETRIEVAL [3 0 0 3]

References:

III. INTELLIGENT SYSTEMS

CSE 4009: ARTIFICIAL INTELLIGENCE [3 0 0 3]

References:

CSE 4010: MACHINE LEARNING [3 0 0 3]

References:
IV. NETWORK AND SECURITY

CSE 4011: NATURAL LANGUAGE PROCESSING [3 0 0 3]

References:

CSE 4012: SOCIAL NETWORK ANALYSIS [3 0 0 3]

References:

IV. NETWORK AND SECURITY

CSE 4013: ADVANCED COMPUTER NETWORKS [3 0 0 3]

References:

CSE 4014: INFORMATION SECURITY [3 0 0 3]

References:

CSE 4015: PRINCIPLES OF CRYPTOGRAPHY [3 0 0 3]

References:
CSE 4016: WIRELESS NETWORKS [3 0 0 3]
Introduction to Wireless Networks, 1G cellular systems- AMPS, 2G cellular systems- DAMPS, CDMA, GSM, CDPD, GPRS, Cordless telephony, Wireless application Protocol (WAP), 3G cellular systems-service classes and standards, IMT 2000, 4G systems and beyond-OFDM and services, Challenges, Fixed wireless access systems- WLL, IEEE 802.16 standards, WLAN- concepts, applications, topology, requirements, physical and MAC layers, IEEE 802.11a,b and g, Wireless ATM and Ad Hoc routing- ATM architecture, HIPERLAN architecture, Routing in Wireless Ad Hoc Networks, Personal area networks(PAN)- Bluetooth and Home RF, Wireless Geolocation Systems- architecture, E-911 services

References:

V. SOFTWARE PROCESS ENGINEERING

CSE 4017: BUILDING ENTERPRISE APPLICATION [3 0 0 3]
Introduction, software engineering methodologies, life cycle of raising enterprise applications, Incepting Enterprise applications, Enterprise analysis, Business modeling, requirements elicitation and analysis, use case modeling, prototyping, nonfunctional requirements, requirements validation, planning and estimation, Architecting and Designing Enterprise applications, Architectures, views and viewpoints, Logical architecture, Technical architecture, data architecture and design infrastructure architecture and design elements, policies for infrastructure management, deployment strategy, construction readiness, Introduction to concept of software construction maps, methodologies of code review Testing and rolling out Enterprise applications, Types and methods of testing an enterprise application, testing levels and testing approaches, testing environments

References:

CSE 4018: DESIGN PATTERNS [3 0 0 3]

References:

CSE 4019: SOFTWARE ARCHITECTURE [3 0 0 3]

References:

CSE 4020: SOFTWARE TESTING AND ANALYSIS [3 0 0 3]

References:
VI. BUSINESS MANAGEMENT

HUM 4011: FINANCIAL MANAGEMENT [2 1 0 3]
Introduction to financial management, Principle of accountancy, Sources of long term finance, Valuation of securities, Leverages, Working capital management, Capital budgeting, Cost of capital, Cash management, and Dividend decisions.

References:

HUM 4012: HUMAN RESOURCE MANAGEMENT [2 1 0 3]

References:

HUM 4013: MARKETING MANAGEMENT [2 1 0 3]

References:

HUM 4014: OPERATIONS AND SYSTEMS MANAGEMENT [2 1 0 3]

References:

OTHER PROGRAMME ELECTIVES

CSE 4021: ADVANCED DATA STRUCTURES AND ALGORITHMS [3 0 0 3]

References:

CSE 4022: ADVANCED JAVA PROGRAMMING [3 0 0 3]
Java basics, applets, J2EE and J2SE, J2EE multilayer architecture, design patterns, J2EE database, database schema, jdbc driver types, jdbc packages, brief overview of jdbc process, statement objects and result set, HTML, XML, XHTML, generating an XML document, parsing XML, Java Servlets and common gateway interface programming, HTTP request headers, HTTP response header and cookies, sessions, JSP.
Installation, JSP tags, Tomcat, Request string, user sessions, cookies, session objects, Enterprise java beans and JAR files, deployment descriptors, Struts Architecture, writing and executing struts application, Model View Controller layers, Validator and Tiles, Java Mail API, Java remote method invocation, Java message service, SOAP.

References:

CSE 4023: ADVANCED LINUX PROGRAMMING [3 0 0 3]

References:

CSE 4024:BUSINESS INTELLIGENCE AND ITS APPLICATION [3 0 0 3]
Introduction to Business Intelligence, Types of digital data; Introduction to OLTP and OLAP Evolution of BI, Applications, Components, Framework, Roles & Responsibilities, Data integration, Data quality, Data profiling and applications, Data flow and transformations, SSIS Architecture, Introduction to ETL using SSIS; Integration Services objects: Data flow components, Data and dimension modeling, multidimensional data model, Concepts of dimensions, facts, cubes, attribute, hierarchies, star and snowflake schema, Measures, Metrics, KPIs and Performance Management, Introduction to enterprise reporting, concepts of dashboards, balanced scorecards, Introduction to SSRS Architecture, enterprise reporting using SSRS.

References:

CSE 4025: DATA COMMUNICATIONS [3 0 0 3]

References:

CSE 4026: EMBEDDED SYSTEMS [3 0 0 3]
Introduction to Embedded systems, classification of Embedded systems, RISC and ARM design philosophy, ARM processors fundamentals and instruction set, Real-time operating systems(RTOS). Schedulers, Performance metric in scheduling models for periodic, sporadic, Aperiodic tasks, synchronization between the processes, OS functions and tasks and for resource management, embedded Linux Internals, OS security issues, RTOS programming tools- MICRO C/OS-II AND VxWORKS, Embedded project management cycle, Embedded system design and co-design issues in system development process, use of scopes and logic analyzers for system hardware tests, Issues in Embedded System Design, Overview of 8/16/32-bit microcontroller, RISC and CISC based systems.

References:

CSE 4027: MOBILE APPLICATION DEVELOPMENT [3 0 0 3]
Mobile platforms, Mobile apps development, Android platform, setting up the mobile app development environment, case study, App user interface mobile UI resources, Activity- states and life cycle, interaction amongst activities, App functionality- Threads, Async task, Services states and life cycle, Notifications, Broadcast receivers, Telephony and SMS APIs, Native data handling on-device file I/O, shared preferences,
References:


CSE 4028: PARALLEL ALGORITHMS [3 0 0 3]

References:


CSE 4029: PRINCIPLES OF PROGRAMMING LANGUAGES [3 0 0 3]

References:


CSE 4030: PRODUCT REALIZATION WITH HARDWARE-SOFTWARE INTERFACE [3 0 0 3]

References:


CSE 4031: SOFT COMPUTING PARADIGMS [3 0 0 3]
Artificial Neural Networks-Definition, benefits, terminology, neuron models, activation functions, learning process, types of learning, error-correction, memory based, Hebbian, competitive, and Boltzmann learning, Feed forward neural network- Single and multilayer perceptron, limitations, back propagation algorithm, practical considerations, radial basis function network, Recurrent networks-Hopfield network, NARX model, state space model, recurrent multilayer perceptron, second order networks, learning algorithms, Self-organizing map, principal component analysis, Neural network applications, Fuzzy Logic- Basic concepts, operations and properties, relations, logic, fuzzy quantifiers, inference, rules, fuzzification and defuzzification, Fuzzy Logic Applications, Genetic Algorithms - basic concepts, principles, gene encoding, genetic operators, genetic programming, Neuro fuzzy systems applications.

References:


CSE 4032: STORAGE DEVICE AND TECHNOLOGY [3 0 0 3]
Introduction to Information Storage and Management, Data center infrastructure, Information Life cycle, Storage System Environment, Data Protection, RAID, RAID levels, Intelligent Storage System, EMC CLARiON, Direct Attached Storage and Introduction to SCSI, Storage Area Networks, Network Attached Storage, Content Addressed Storage, Architecture, Examples, Storage Virtualization, Configuration, Challenges, Storage Area Networks, Zoning, Business Continuity, Information Availability, Business Impact Analysis, Backup and
References:

CSE 4032: VIRTUAL REALITY TECHNOLOGIES [3 0 0 3]

References:

OPEN ELECTIVES

CSE 3281: DATABASE MANAGEMENT SYSTEMS [3 0 0 3]

References:

CSE 3282: ESSENTIALS OF IT [3 0 0 3]

References:

CSE 3283: ESSENTIALS OF INDUSTRIAL COMPUTING [3 0 0 3]

References:

CSE 3284: GAME PROGRAMMING [3 0 0 3]
Basic Elements of Game Design: Games and Video Games, What is a Game, Conventional Games and Video Games, Key Components of Video Games, The Structure of a Video Game, Stages of the Design

References:

CSE 3285: INTRODUCTION TO ALGORITHMS [3 0 0 3]

References:

CSE 3286: LINUX BASICS AND PROGRAMMING [3 0 0 3]

References:

CSE 3287: PRINCIPLES OF SOFTWARE ENGINEERING [3 0 0 3]

References:
CSE 3289: PROGRAMMING IN C# [3 0 0 3]

References:

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