Guru Nanak Dev Engineering College, Ludhiana

Department of Computer Science & Engineering

COURSE OUTCOMES

M.Tech. Computer Science and Engineering

(Batch 2014 Onwards)

Software Engineering Methodologies (MTCS-501)

CO1   Demonstrate knowledge of the wider software engineering context, software engineering processes and their applicability.

CO2   Understand a problem domain and to elicit, analyze, and specify the requirements of a software system solution.

CO3   Describe and formulate test cases to perform different levels of testing

CO4   Identify and outline specific components of a software design that can be targeted for reuse.

CO5   Use the Agile process to develop a quality software product.

CO6   Analyze the engineering problems encountered in system and software development.

DataBases and Data Mining (MTCS-502)

CO1   Make use of Distributed Database Management Systems, Object Oriented Database Management System to meet identified needs within economic, environmental and social constraints.

CO2   Develop an understanding of Spatial Databases, Geographical Databases and Multimedia Databases to carry out research in the specialized/emerging areas.

CO3   Examine and explain various applications & trends of data warehouse and data mining techniques in various domains

CO4   Explain the purpose of adapting to the data warehouse and data mining techniques in various domains

CO5   Describe and demonstrate the use of Online Analytical Processing to analyze and interpret data.

CO6   Apply knowledge of clustering and classification techniques to solve real world problems.

Advanced Data Structures (MTCS503)

CO1   Understand various advanced techniques to design algorithms for solving complex problems.

CO2   Analyze and Develop programs to implement different data structures such as: arrays, linked lists, stacks, queues, trees, hash tables, and graphs and related algorithms.

CO3   Formulate new solutions for programing problems or improve existing code using learned algorithms and data structures and Compare the analysis of various sorting algorithm.

CO4   Compare and Contrast different types of trees and identify the usage of appropriate trees to provide solution to the problem.

CO5   Identify and determine the usage of various data structures, operations and associated algorithms.

CO6   Create and apply appropriate data structure using simple algorithms for modeling and solving given computing problems.

Distributed Computing Architecture (MTCS504)

CO1   Identify the principles underlying the functioning of distributed systems, describe the problems and challenges associated with these principles, and evaluate the effectiveness and shortcomings of their solutions.

CO2   Demonstrate knowledge of the core architectural aspects of distributed systems.

CO3   Analyze knowledge of the details of the main underlying components of distributed systems (such as RPC, file systems).

CO4   Examine methods that have emerged from the field of distributed operating systems in an application perspective.

CO5   Analyze and apply important methods in distributed systems to support scalability and fault tolerance.

CO6   Compare and contrast the concepts of current technology used to build architectures to enhance distributed computing infrastructures with various computing principles and paradigms, including grid and cloud computing.

Digital Image Processing (MTCS505)

CO1   Develop a theoretical foundation of digital image representation, manipulation, encoding and pre- processing depending on the decoded quality.

CO2   Apply the knowledge of mathematics, science and engineering principles for image enhancement in spatial and fourier domains

CO3   Appreciate the utility of image restoration and wavelet decompositions and their role in image processing systems.

CO4   Appreciate the utility of image restoration and wavelet decompositions and their role in image processing systems.

CO5   Analyze image structure and apply various morphological operations to get the desired results.

CO6   Design and identify various image features to create practical solutions to a range of common image processing problems.

Information Retrieval (MTCS506)

CO1   Apply the knowledge of mathematics and engineering to provide solution for complex web problems by comparing different information retrieval processes for web.

CO2   Identify the web engineering problems including representing documents, dictionaries, wild card queries, spell correction and phonetic correction

CO3   Create, select and apply appropriate techniques and resources to construct web index with an understanding of the limitations.

CO4   Examine and analyze the research literature to comprehend the complex web structure, web crawling and its different architectures.

CO5   Interpret research based knowledge and methods including design of algorithms, analysis and their interpretation to provide valid solution for computing the scores and ranking documents in a complete search engine.

CO6   Understand the need for comprehending the latest technologies for linking, describing and searching the web to engage in life-long learning in the broadest context of technological change.

Advanced Data Structures Lab (MTCS507)

CO1 Construct algorithms using basic design techniques for searching, sorting and graph algorithms.

CO2 Design algorithm using advanced techniques for solving complex problems.

CO3 Identify the given problem and formulate and design algorithm for solving given problem.

CO4 Use modern engineering tools and latest programming language to implement the   designed algorithms.

CO5 Apply knowledge and function on multi-disciplinary teams through mini projects based on various problems.

CO6 Analyze the performance of various algorithms to choose the optimum algorithm

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Software Engineering Methodologies Lab (MTCS507)

CO1   Describe and demonstrate use of software and user-interface design principles.

CO2   Analyze software requirements by applying various modeling techniques.

CO3   List and classify CASE tools and discuss recent trends and research in software engineering.

CO4   Identify user needs and formulate software specifications.

CO5   Adapt the basic software engineering methods and practices in their appropriate applications

CO6   Relate the software architectural styles to the suitable applications.

Information Retrieval (MTCS508)

CO1 Apply the knowledge of mathematics and engineering to provide solution for complex web problems by comparing different information retrieval processes for web.

CO2 Identify the web engineering problems including representing documents, dictionaries, wild card queries, spell correction and phonetic correction

CO3 Create, select and apply appropriate techniques and resources to construct web index with an understanding of the limitations.

CO4 Examine and analyze the research literature to comprehend the complex web structure, web crawling and its different architectures.

CO5 Interpret research based knowledge and methods including design of algorithms, analysis and their interpretation to provide valid solution for computing the scores and ranking documents in a complete search engine.

CO6 Understand the need for comprehending the latest technologies for linking, describing and searching the web to engage in life-long learning in the broadest context of technological change.

Digital Image Processing Lab-II (MTCS508)

CO1   Design and implement algorithms to perform basic image processing operations.

CO2   Construct and implement algorithms for advanced image processing such as compression, segmentation, representation etc.

CO3   Apply mathematical, scientific and engineering techniques to compare and contrast the features of digital images.

CO4   Apply knowledge of software tools such as MATLAB, OCATVE and other techniques with hands-on experience for processing digital images.

CO5   Develop programming skills to design algorithms and solve problems related to digital image processing.

Network Security Theory (MTCS601)

CO1   Examine the advanced concepts of computer networks including fast access protocols and technologies

CO2   Identifying the basics of network security Issues, breaches, and counter measures etc.

CO3   Analyses the fundamentals of cryptography including symmetric cryptography,asymmetric cryptography

CO4   Learning the concepts of Hash functions and digital signatures.

CO5   Predict various TCP/IP security mechanisms to maintain network Security

Ad-hoc Networks (MTCS602)

CO1   Apply knowledge of principles and characteristics of Ad hoc networks, MAC protocols, IEEE standards to solve complex networking problems related to wireless sensor networks.

CO2   Evaluate the challenges in designing MAC, routing and transport protocols for wireless adhoc networks.

CO3   Identify, formulate, and analyze proactive routing protocol's function and their implications on data transmission delay and bandwidth consumption.

CO4   Function in multi-disciplinary teams through groups while working on mini-project concerning data gathering and quality of sensor networks.

CO5   Understand and analyze cross layer design and integration of Adhoc networks for 4G.

CO6   Classify the security issues and QoS related performance requirements.

Wireless Networks (MTCS603)

CO1   To provide an overview of Wireless Communication networks area and its applications in communication engineering.

CO2   To enable students to compare and contrast multiple division techniques, mobile communication systems, and existing wireless networks.

CO3   To explain the various terminology, principles, devices, schemes, concepts, algorithms and different methodologies used in Wireless Communication Networks.

CO4   To appreciate the contribution of Wireless Communication networks to overall technological growth.

CO5   Analyze security, energy efficiency, mobility, scalability, and their unique characteristics in wireless networks.

CO6   Apply knowledge of extensions for mobile and wireless networking.

Parallel Computing (MTCS604)

CO1 Describe different parallel architectures; inter-connect networks, programming models, algorithms, and performance matrices.
CO2 Develop efficient parallel algorithms to solve the processing and computing related problems.
CO3 Analyze parallel code performance, determine computational bottlenecks, and optimize the performance of the code.
CO4 Examine various pipelining and scheduling techniques to manage execution of parallel processors.
CO5 Implement parallel algorithms using MPI, OpenMP, pthreads, or a combination of MPI and OpenMP.

Cloud Computing (MTCS605)

CO1 Understand and compare the different computing paradigms.
CO2 To be able to choose and migrate to a particular deployment model according to scenario.
CO3 Develop an understanding of different cloud services.
CO4 To understand the virtualization technology and its different dimensions.
CO5 To develop an understanding of various issues and challenges in implementing cloud security and mobile cloud computing
CO6 Compare and contrast various open and proprietary cloud platforms.

Big Data (MTCS606)

CO1 Define the fundamental concepts of big data analytics and solve complex analytical problems related to business analytics.

CO2 Classify machine learning approaches concerning business analytical problems in context to Big Data analytics and their applications.

CO3 Utilize the knowledge of data collection methods to apply to hadoop techniques and propose solutions for map reduce paradigms.

CO4 Analyze the statistics for model building and evaluate the building steps using R language.

CO5 Evaluate and Design high Level Query Languages for Big Data.

CO6 Modify the knowledge of modern tools in classifying problems related to application of hadoop, no-sql and mapreduce.

Advanced Operating System (MTCS607)

CO1 Understand the mechanisms of OS to handle processes and threads and their communication
CO2 Understand and simulate activities of various multiprocessor operating systems.
CO3 Design a distributed system that fulfills requirements with regards to key distributed systems properties.
CO4 Analyze the fault tolerance techniques by using security issues
CO5 Analyze the various strategies and techniques handled by deadlock
CO6 Evaluate and report appropriate design choices for solving real-world problems

Object Oriented Analysis and Design Using UML (MTCS608)

CO1   Understand the concepts and modeling techniques in object-oriented analysis and design.

CO2   Identify the key knowledge of the UML diagrams and notations.

CO3   General understanding of a variety of approaches and perspectives of systems development and to evaluate other IS development methods and techniques.

CO4   Create a requirements model using use-cases based on statements of user requirements, and to analyze requirements models.

CO5   Create the OO design of a system in terms of a high-level architecture description, and low-level models of structural organization.

CO6   Analyze information systems in real-world settings and to conduct methods such as Railway reservations, booking and observations.

Software Testing & Quality Assurance (MTCS609)

CO1   Investigate the reason for bugs and analyze the principles in software testing to prevent and remove bugs.

CO2   Understand the fundamental goals, challenges and limitations of software testing, and its relation to other software engineering activities.

CO3   Apply modern software testing processes in relation to software development and project management.

CO4   Create test strategies and plans, design test cases, prioritize and execute them.

CO5   Differentiate between quality control, quality management and quality assurance.

CO6   Produce appropriate documentation for test management, including test plans, test schedules and test progress monitoring.

Compiler Design (MTCS-610)

CO1   Apply knowledge of mathematics and system programming to solve problems related to language translation

CO2   Identify, formulate and solve engineering problems in the area of language translation and compiler design.

CO3   Formulate the machine code by considering the system design components and functionalities involved in compilation.

CO4   Inspect run time structure used to represent constructs of programming language during compilation process.

CO5   Use compiler phases to develop an understanding of their use in building tools used or engineering practice.

CO6   Develop awareness of the functionality and complexity of modern compilers to engage in independent and life-long learning in the broadest context of technological change.

Pattern Recognition (MTCS611)

CO1   Understand the concept of pattern recognition and its usage to solve real-world problems.

CO2   Analyze different representations of patterns and classes and apply them to various fields.

CO3   Study the design of different clustering algorithms and apply them to solve various problems.

CO4   Explore and analyze various feature extraction and selection techniques.

CO5   Understand role of classifiers in pattern recognition and evaluate various classifiers techniques.

CO6   Apply the knowledge of pattern recognition techniques to understand the application of pattern recognition in various fields.

Machine Learning (MTCS 612)

CO1   Discuss simple Machine Learning applications in a range of real-world applications
CO2   Appreciate the underlying mathematical relationships within and across Machine Learning algorithms and the paradigms of supervised and un-supervised learning
CO3   Analyse the concept of neural networks for learning linear and non-linear activation functions
CO4   Apply the concepts of Bayesian analysis from probability models and methods
CO5   Apply and optimize the algorithms such as Support Vector Machine and Hidden Markov Models to a real problem
CO6   To gain experience of doing independent study and research in the field of Machine Learning

Bioinformatics (MTCS613)

CO1   Identify the basic components of body (blood) and learn its compositions.
CO2   Analyse the basics of bioinformatics with the scope and challenge of bioinformatics.
CO3   Determine the different biological databses to know the need and challenge of different databases.
CO4   Classify and study the proteomics and Genomics and also learn its structure prediction techniques.
CO5   Analyse the Sequence Alignment and different formats of file used for sequencing.
CO6   Evaluate the application of Bioinformatics.

Soft Computing (MTCS614)

CO1   Identify and describe soft computing techniques and their roles in building intelligent machines

CO2   Conceptualize and parameterize various problems to be solved through basic soft computing techniques.

CO3   Analyze and integrate various soft computing techniques in order to solve problems effectively and efficiently.

CO4   Apply fuzzy logic and reasoning to handle uncertainty and solve engineering problems.

CO5   Evaluate and compare solutions by various soft computing approaches for a given problem.

CO6   Apply Soft Computing techniques as computational tools to solve a variety of problems related to optimization and machine learning.

Natural Language Processing (MTCS615)

CO1   Apply the knowledge of mathematics and engineering to understand the computational properties of natural languages and the commonly used algorithms for processing linguistic information.

CO2   Examine natural language processing models and algorithms using both the traditional symbolic and the more recent statistical approaches.

CO3   Discuss the key concepts from natural language processing and to describe and analyze language, POS tagging and context free grammar for English language.

CO4   Discover the capabilities and limitations of current natural language technologies, and some of the algorithms and techniques that underlie these technologies.

CO5   Recognize the significance of models and methods of statistical natural language processing for common NLP tasks such as speech recognition, machine translation, text classification, spam filtering, spell checking, speech synthesis, machine learning, optical character recognition, etc.

CO6   Illustrate the concepts of morphology, syntactic analysis, semantic interpretation and pragmatics of the language, demonstrating them with different approaches.

Speech Processing (MTCS616)

CO1   Examine speech production mechanism and understanding speech processing techniques for various speech applications.

CO2   Understand the key concepts of time and frequency domains of speech signal for feature extraction in signal processing concepts.

CO3   Recognize the significance of Linear prediction for analysis of speech signal.

CO4   Discover the capabilities and limitations of Hidden Markov Models for speech modeling applications.

CO5   Illustrate the concepts of Speech Synthesis and Recognition and their techniques for processing linguistic information.

Research methodology (MTCS617)

CO1   Understand of the basic framework of research process & critically analyse various research methodologies in existing literature.

CO2   Propose and distinguish appropriate research designs and methodologies to apply to a specific research project.

CO3   Develop a comprehensive research methodology including sampling criteria, data collection methods & measurement techniques as a solution for a research question.

CO4   Analyse the feasibility and practicality of research methodology for a proposed project.

CO5   Apply appropriate tests for processing and analysis of results as per the proposed research methodology for the project.

CO6   Appreciate the components of scholarly writing and evaluate its quality.

Optimization Techniques (MTCS618)

CO1   Demonstrate knowledge and understanding of the basic theory and techniques of optimization.

CO2   Apply the numerical techniques of optimization theory to engineering design problems.

CO3   Learn the general principles of various advanced optimization techniques.

CO4   Identify and characterize optimization methods for one-variable and multi-variable functions.

CO5   Apply the mathematical results and numerical techniques of optimization theory to concrete Engineering problems.

CO6   Explain the fundamental knowledge of Linear Programming and Dynamic Programming problems

Modelling & Simulation (MTCS619)

CO1   Analyse a real world problem and apply modelling methodologies to develop a discrete-event simulation model.

CO2   Describe the components of continuous and discrete systems and simulate any discrete system using queuing systems

CO3   Understand different methods for random number generation

CO4   Discuss the simulation methods and select the suitable technique on the problems.

CO5   Compare and evaluate alternative system designs using sampling and regression.

CO6   Formulate judgements and synthesize conclusions through research of a simulation topic.

Neural Networks and Fuzzy Logic (MTCS620)

CO1   Apply the knowledge and concepts of artificial neural network and its similarity to human brain and its reasoning techniques and learning methods to formulate neural network architectures.

CO2   Explore and classify different training algorithms and learning techniques of neural network and their application.

CO3   Analyze various algorithms for Counter Propagation Networks and Hopfield Nets.

CO4   Develop comprehensive knowledge of fuzzy logic control and adaptive fuzzy logic and to design the fuzzy control using genetic algorithm

CO5   Study different applications of fuzzy logic control and Fuzzy model.

CO6   Design and evaluate the hybridization of different artificial intelligence techniques to the real world problems and applications.

Project Management (MTCS621)

CO1 Apply knowledge and understanding of principles, theories, and concepts to project situations.
CO2 Manages projects effectively including the management of scope, time, costs, and quality, ensuring satisfying the needs for which the project was undertaken.
CO3 Evaluate the probability and consequences of risks and estimate their implications for project objectives.
CO4 Outline the project to the organization's strategic plans and business justification throughout its life-cycle.
CO5 Illustrate project goals, constraints, deliverables and performance criteria in consultation with stakeholders.
CO6 Examine the tools and techniques in order to achieve project success.

Human Resources Development And Training Methods (MTCS 622)

CO1 To enable the students to understand the HR Management and system at various levels in general and in certain specific industries or organizations.
CO2 To analyze the strategic issues and strategies required to select and develop manpower resources.
CO3 To develop relevant skills necessary for application in HR related issues
CO4 To integrate the knowledge of HR concepts to take correct business decisions.
CO5 To develop necessary skill set for application of various HR issues.
CO6 To understand the Globalization Impact on HRD and how to reduce work force.