

# Jaihind College of Engineering, Kuran ( 4084)

## Department of Computer Engineering

### Course Outcomes

BE (2019 pattern)		
SEMESTER VII		
Design and Analysis of Algorithms	410241	CO1: Formulate the problem. CO2: Analyze the asymptotic performance of algorithms. CO3: Decide and apply algorithmic strategies to solve given problem CO4: Find optimal solution by applying various methods. CO5: Analyze and Apply Scheduling and Sorting Algorithms. CO6: Solve problems for multi-core or distributed or concurrent environments
Machine Learning	410242	CO1: Identify the needs and challenges of machine learning for real time applications. CO2: Apply various data pre-processing techniques to simplify and speed up machine learning algorithms. CO3: Select and apply appropriately supervised machine learning algorithms for real time applications. CO4: Implement variants of multi-class classifier and measure its performance. CO5: Compare and contrast different clustering algorithms. CO6: Design a neural network for solving engineering problems.
Blockchain Technology	410243	CO1: Identify the needs and challenges of machine learning for real time applications. CO2: Apply various data pre-processing techniques to simplify and speed up machine learning algorithms. CO3: Select and apply appropriately supervised machine learning algorithms for real time applications. CO4: Implement variants of multi-class classifier and measure its performance. CO5: Compare and contrast different clustering algorithms. CO6: Design a neural network for solving engineering problems.
Elective III Pervasive Computing	410244(A)	CO1. Demonstrate fundamental concepts in pervasive computing. CO2. Explain pervasive devices and decide appropriate one as per the need of real time applications. CO3. Classify and analyze context aware systems for their efficiency in different ICT systems. CO4. Illustrate intelligent systems and generic intelligent interactive applications. CO5. Design HCI systems in pervasive computing environment. CO6. Explore the security challenges and know the role of ethics in the context of pervasive computing.
Elective III Multimedia Techniques	410244(B)	CO1: Describe the media and supporting devices commonly associated with multimedia information and systems. CO2: Demonstrate the use of content-based information analysis in a multimedia information system. CO3: Critique multimedia presentations in terms of their appropriate use of audio, video, graphics, color, and other information presentation concepts. CO4: Implement a multimedia application using an authoring system. CO5: Understanding of technologies for tracking, navigation, and gestural control. CO6: Implement Multimedia Internet of Things Architectures.
Elective III Cyber Security and Digital Forensics	410244(C)	CO1: Analyze threats to protect or defend it in cyberspace from cyber-attacks. CO2: Build appropriate security solutions against cyber-attacks. CO3: Underline the need of digital forensic and role of digital evidence. CO4: Explain rules and types of evidence collection. CO5: Analyze, validate, and process crime scenes. CO6: Identify the methods to generate legal evidence and supporting investigation reports.
Elective III Object oriented Modeling and Design	410244(D)	CO1: Describe the concepts of object-oriented and basic class modelling. CO2: Draw class diagrams, sequence diagrams and interaction diagrams to solve problems. CO3: Choose and apply a befitting design pattern for the given problem. CO4: To Analyze applications, architectural Styles & software control strategies CO5: To develop Class design Models & choose Legacy Systems. CO6: To Understand Design Patterns

Elective III Digital Signal Processing	410244(E)	CO1: Understand the mathematical models and representations of DT Signals and Systems CO2: Apply different transforms like Fourier and Z-Transform from applications point of view. CO3: Understand the design and implementation of DT systems as DT filters with filter structures and different transforms. CO4: Demonstrate the knowledge of signals and systems for design and analysis of systems. CO5: Apply knowledge and use the signal transforms for digital processing applications CO6: To understand Filtering and Different Filter Structures
Elective IV Information Retrieval	410245(A)	CO1: Implement the concept of Information Retrieval CO2: Generate quality information out of retrieved information. CO3: Apply techniques such as classification, clustering, and filtering over multimedia to analyze the information. CO4: Evaluate and analyze retrieved information. CO5: Understand the data in various Application and Extensions of information retrieval CO6: Understand Parallel information retrieving and web structure.
Elective IV Information Retrieval	410245(B)	CO1: Describe GPU architecture. CO2: Write programs using CUDA, identify issues and debug them. CO3: Implement efficient algorithms in GPUs for common application kernels, such as matrix multiplication. CO4: Write simple programs using OpenCL. CO5: Identify efficient parallel programming patterns to solve problems CO6: Explore the modern GPUs architecture and its Applications.
Elective IV Information Retrieval	410245(C)	CO1: Develop a strong grounding in the fundamentals of mobile Networks. CO2: Apply knowledge in MAC, Network, and Transport Layer protocols of Wireless Network CO3: Illustrate Global System for Mobile Communications CO4: Use the 3G/4G technology-based network with bandwidth capacity planning and HLR identification algorithms CO5: Classify network and transport layer of mobile communication CO6: Design & development of various wireless network protocols using simulation tools
Elective IV Software Testing and Quality Assurance	410245(D)	CO1: Describe fundamental concepts in software testing such as manual testing, automation testing and software quality assurance. CO2: Design and Develop project test plan, design test cases, test data, and conduct test operations. CO3: Apply recent automation tool for various software testing for testing software. CO4: Apply different approaches of quality management, assurance, and quality standard to software system. CO5: Apply and analyze effectiveness Software Quality Tools. CO6: Apply tools necessary for efficient testing framework.
Elective IV Compilers	410245(E)	CO1: Design and implement a lexical analyzer using LEX tools CO2: Design and implement a syntax analyzer using YACC tools. CO3: Understand syntax-directed translation and run-time environment. CO4 : Generate intermediate codes for high-level statements. CO5: Construct algorithms to produce computer code. CO6: Analyze and transform programs to improve their time and memory efficiency
Laboratory Practice III	410246	CO1: Apply preprocessing techniques on datasets. CO2: Implement and evaluate linear regression and random forest regression models. CO3: Apply and evaluate classification and clustering techniques. CO4: Analyze performance of an algorithm. CO5: Implement an algorithm that follows one of the following algorithm design strategies: divide and conquer, greedy, dynamic programming, backtracking, branch and bound. CO6: Interpret the basic concepts in Blockchain technology and its applications
Laboratory Practice IV	410247	CO1: Apply android application development for solving real life problems. CO2: Design and develop system using various multimedia components. CO3: Identify various vulnerabilities and demonstrate using various tools. CO4: Apply information retrieval tools for natural language processing. CO5: Develop an application using open-source GPU programming languages. CO6: Apply software testing tools to perform automated testing

Project Work Stage I	410248	CO1: Solve real life problems by applying knowledge. CO2: Analyze alternative approaches, apply, and use most appropriate one for feasible solution. CO3: Write precise reports and technical documents in a nutshell. CO4: Participate effectively in multi-disciplinary and heterogeneous teams exhibiting teamwork. CO5: Inter-personal relationships, conflict management and leadership quality.
<b>SEMESTER VIII</b>		
High Performance Computing	410250	CO1: Understand various Parallel Paradigm CO2: Design and develop an efficient parallel algorithm to solve given problem. CO3: Illustrate data communication operations on various parallel architecture. CO4: Analyze and measure performance of modern parallel computing systems. CO5: Apply CUDA architecture for parallel programming. CO6: Analyze the performance of HPC applications
Deep Learning	410251	CO1: Understand the basics of Deep Learning and apply the tools to implement deep learning applications. CO2: Evaluate the performance of deep learning models (e.g., with respect to the bias-variance trade-off, overfitting and underfitting, estimation of test error). CO3: To apply the technique of Convolution (CNN) and Recurrent Neural Network (RNN) for implementing Deep Learning models. CO4: To implement and apply deep generative models. CO5: Construct and apply on-policy reinforcement learning algorithms. CO6: To Understand Reinforcement Learning Process
Elective V Natural Language Processing	410252(A)	CO1: Describe the fundamental concepts of NLP, challenges, and issues in NLP. CO2: Analyze Natural languages morphologically, syntactical, and semantically OR describe the concepts of morphology, syntax, semantics of natural language. CO3: Illustrate various language modelling techniques. CO4: Integrate the NLP techniques for the information retrieval task. CO5: Demonstrate the use of NLP tools and techniques for text-based processing of natural languages. CO6: Develop real world NLP applications.
Elective V Image Processing	410252(B)	CO1: Apply Relevant Mathematics Required for Digital Image Processing. CO2: Apply Special and Frequency Domain Method for Image Enhancement. CO3: Apply algorithmic approaches for Image segmentation. CO4: Summarize the Concept of Image Compression and Object Recognition. CO5: Explore the Image Restoration Techniques. CO6: Explore the Medical and Satellite Image Processing Applications.
Elective V Software Defined Networks	410252(C)	CO1: Interpret the need of Software Defined networking solutions. CO2: Analyze different methodologies for sustainable Software Defined Networking solutions. CO3: Select best practices for design, deploy and troubleshoot of next generation networks. CO4: Develop programmability of network elements. CO5: Demonstrate virtualization and SDN Controllers using Open Flow protocol. CO6: Design and develop various applications of SDN
Elective V Advanced Digital Signal Processing	410252(D)	CO1: Understand and apply different transforms for the design of DT/Digital systems CO2: Explore the knowledge of adaptive filtering and multi-rate DSP. CO3: Design DT systems in the field/area of adaptive filtering, spectral estimation, and multi-rates DSP CO4: Explore use of DCT and WT in speech and image processing CO5: Develop algorithms in the field of speech, image processing and other DSP applications. CO6: Identify Image Processing Techniques
Elective VI Pattern Recognition	410253(A)	CO1: Analyze various type of pattern recognition techniques. CO2: Identify and apply various pattern recognition and classification approaches to solve the problems. CO3: Evaluate statistical and structural pattern recognition. CO4: Percept recent advances in pattern recognition confined to various applications CO5: Implement Bellman's optimality principle and dynamic programming CO6: Analyze Patterns using Genetic Algorithms & Pattern recognition applications.

Elective VI Soft Computing	410253(B)	CO1: Understand requirement of soft computing and be aware of various soft computing techniques. CO2: Understand Artificial Neural Network and its characteristics and implement ANN algorithms. CO3: Understand and Implement Evolutionary Computing Techniques. CO4: Understand the Fuzzy logic and implement fuzzy algorithms for solving real life problems. CO5: Apply knowledge of Genetic algorithms for problem solving. CO6: Develop hybrid systems for problem solving.
Elective VI Business Intelligence	410253(C)	CO1: Differentiate the concepts of Decision Support System & Business Intelligence CO2: Use Data Warehouse & Business Architecture to design a BI system. CO3: Build graphical reports. CO4: Apply different data preprocessing techniques on dataset. CO5: implement machine learning algorithms as per business needs CO6: Identify role of BI in marketing, logistics, and finance and telecommunicate
Elective VI Quantum Computing	410253(D)	CO1: To understand the concepts of Quantum Computing CO2: To understand and get exposure to mathematical foundation and quantum mechanics. CO3: To understand and implement building blocks of Quantum circuits. CO4: To understand quantum information, its processing and Simulation tools. CO5: To understand basic signal processing algorithms FT, DFT and FFT CO6: To study and solve examples of Quantum Fourier Transforms and their applications
Laboratory Practice V	410255	CO1: Analyze and measure performance of sequential and parallel algorithms. CO2: Design and Implement solutions for multicore/Distributed/parallel environment. CO3: Identify and apply the suitable algorithms to solve AI/ML problems. CO4: Apply the technique of Deep Neural network for implementing Linear regression and classification. CO5: Apply the technique of Convolution (CNN) for implementing Deep Learning models. CO6: Design and develop Recurrent Neural Network (RNN) for prediction.
Laboratory Practice VI	410256	CO1: Apply basic principles of elective subjects to problem solving and modeling. CO2: Use tools and techniques in the area of software development to build mini projects. CO3: Design and develop applications on subjects of their choice. CO4: Generate and manage deployment, administration & security.
Project Work Stage II	410256	CO1: Show evidence of independent investigation CO2: Critically analyze the results and their interpretation. CO3: Report and present the original results in an orderly way and placing the open questions in the right perspective. CO4: Link techniques and results from literature as well as actual research and future research lines with the research. CO5: Appreciate practical implications and constraints of the specialist subject