

SIES Graduate School of Technology, Nerul

Department of Computer Engineering

Course Outcomes (CBGS)

Second Year: Sem III

Subject: **Applied Maths III**

- CO1 Find laplce transform and inverse laplace transform of functions using the properties and properties
- CO2 Find inverselaplace transform using convolution theorem and apply laplacetransform to find solution of ordinary differential equation
- CO3 Expnad periodic functions using fourier series and complex form of fourier series and understand the concept of half range sine and cosine series,orthogonal and orthonrml functions
- CO4 Understand the concept of complex variable,analytic functions,harmonic functions,bilinear transformation and conformal mapping.
- CO5 Find z- transform and inverse z- transform of functions using the properties
- CO6 Apply the concept of correlation and regression to find correlation coefficient,rank correlation and regression lines

Subject: **Data Strcutures**

- CO1 Explain and analyze various linear and non linear data structure structures like stacks , queues , linked list etc.
- CO2 Implement data structures to handle operations like searching, insertion, deletion, traversing mechanism etc.
- CO3 implement and analyze various sorting techniques.
- CO4 implement and analyze various searching techniques.
- CO5 Apply the data structure concepts in various domain like dbms, os, and compiler construction.
- CO6 Design and implement a system to a given real life problem using appropriate data structure and algorithm based on the desired needs and realistic constraints

Subject: **Digital Logic Design and Analysis**

- CO1 To understand different number systems and their conversions
- CO2 To analyze and minimize boolean expressions
- CO3 To design and analyze combinational circuits
- CO4 To design and analyze sequential circuits
- CO5 To understand the basic concepts of vhdl, ttl and cmos logic families
- CO6 Develop good communication skills and team work through active learning strategies, seminars on advanced topics of dlda

Subject: **Discrete Structures**

- CO1 Student will be able to understand the notion of mathematical thinking, mathematical proofs and to apply them in problem solving.

- CO2 Student will be able to reason logically
- CO3 Student will be able to understand relations, diagraph ,lattice and ability to understand use of functions, graphs and their use in programming applications.
- CO4 Students will be able to understand use of groups and codes in encoding-decoding
- CO5 Students will be able to apply discrete structures into other computing problems such as formal specification, verification, artificial intelligence, cryptography, data analysis and data mining etc.
- CO6 Student will be able to work in a team/group and enhance communication skill

Subject: Electronic Circuits and Communication Fundamentals

- CO1 To understand the use of semiconductor devices in circuits and analyze them.
- CO2 To understand importance of oscillators and power amplifiers in communication system.
- CO3 To understand basic concepts of operational amplifier and their applications.
- CO4 To understand the fundamental concepts of electronic communication
- CO5 To apply knowledge of electronic devices and circuits to communication applications
- CO6 To study basic concepts of information theory.

Subject: Object Oriented Programming and Methodology

- CO1 To apply fundamental programming constructs.
- CO2 To illustrate the concept of packages, classes and objects.
- CO3 To elaborate the concept of strings, arrays and vectors.
- CO4 To implement the concept of inheritance and interfaces.
- CO5 To implement the notion of exception handling and multithreading.
- CO6 To develop gui based application.

Second Year: Sem IV

Subject: Analysis of Algorithms

- CO1 Analyze the running time and space complexity of algorithms
- CO2 Describe, apply and analyze the complexity of divide and conquer strategy.
- CO3 Describe, apply and analyze the complexity of greedy strategy.
- CO4 Describe, apply and analyze the complexity of dynamic programming strategy
- CO5 Explain and apply backtracking, branch and bound and string matching techniques to deal with some hard problems.
- CO6 Describe the classes p, np, and np-complete and be able to prove that a certain problem is np-complete.

Subject: Applied Maths IV

- CO1 Find eigenvalues and eigen vectors of a matrix
- CO2 Find the minimal polynomial and diagonalizable the square matrix
- CO3 Evaluate integral using cauchys theorem , residue theorem
- CO4 Use binomial, poisson and normal distribution to solve statistical problems
- CO5 To analyze the problem by using large and small sampling theory
- CO6 Optimize the solution of lpp and nlpp

Subject: Computer Graphics

- CO1 Student should be able to explain the basic concepts of computer graphics
Student should be able to describe the working principle, utility of various input/output devices and graphical tools
- CO2 Student should be able to apply various algorithms for drawing output primitives and filling of basic objects and their comparative analysis
- CO3 Student should be able to apply geometric transformations, viewing and clipping on graphical objects.
- CO4 student should be able to explain solid model representation techniques and projections.
- CO6 Student should be able to explain visible surface detection techniques and illumination models

Subject: Computer Organization and Architecture

- CO1 Student should be able to identify and explain basic structure of computer , control unit operations and hierarchical memory organization.
- CO2 Student should be able to describe the arithmetic algorithms for solving alu operations and memory mapping techniques.
- CO3 Student should be able to describe instruction level parallelism and hazards in processor pipelines.
Student should be able to describe superscalar architectures, multi-core architecture and their advantages.
- CO4 Student should be able suggest design of instruction formats and instruction cycle and illustrate micro operations for the instruction given the architecture details.
- CO5 Student should be able identify types of buses, interrupts and i/o operations in computer system.

Subject: OSTL

- CO1 To understand basic concepts in python and perl.
- CO2 To explore contents of files, directories and text processing,data structure using built in functions with python
- CO3 To explore django web framework for developing python based web application.
- CO4 To understand file handling and database handling using perl.
- CO5 To explore basics of two way communication between client and server using python and perl.
- CO6 To develop good communication skills and teamwork through seminars and mini project.

Third Year: Sem V

Subject: Microprocessor

- CO1 Understand different types of signals and systems and its memory organization.(so-a)
- CO2 Designing of 8086 mp layout and implementing it on hardware kits.(so-b)
- CO3 Write programs to run on 8086 microprocessor based systems. (so-c)
- CO4 Design system using memory chips and peripheral chips for 16 bit 8086 microprocessor. (so-d)
- CO5 Devise techniques for faster execution of instructions, improve speed of operations and enhance performance of microprocessors. (so-d)
- CO6 Understand the need for pentium processors and other advanced processors.

Subject: DBMS

- CO1 understand the fundamentals of a database systems
- CO2 Design and draw er and eer diagram for the real life problem.
- CO3 Convert conceptual model to relational model and formulate relational algebra queries
- CO4 Design and querying database using sql.
- CO5 Analyze and apply concepts of normalization to relational database design.
- CO6 Understand the concept of transaction, concurrency and recovery.

Subject: Theory of Computer Science

- CO1 Identify the central concepts in theory of computation and differentiate between deterministic and nondeterministic automata, also obtain equivalence of nfa and dfa.
- CO2 Infer the equivalence of languages described by finite automata and regular expressions.
- CO3 Devise regular, context free grammars while recognizing the strings and tokens
- CO4 Design pushdown automata to recognize the language and develop an understanding of computation through turing machine
- CO5 Acquire fundamental understanding of decidability and undecidability
- CO6 Ability to develop good communication skills and teamwork

Subject: Computer Networks

- CO1 Conceptualize all the osi layers
- CO2 Use appropriate network tools to build network topologies
- CO3 Install and configure an open source tool ns2
- CO4 Test simple protocols in a laboratory scenario
- CO5 Understand working of various protocols in each layer of protocol stack
- CO6 Learn various concepts in application layers and network management

Subject: Advanced Algorithm(Elective

- CO1 Describe analysis techniques for algorithms.

- CO2 Identify appropriate data structure and design techniques for different problems
- CO3 Identify appropriate algorithm to be applied for the various application like geometric modeling, robotics, networking, etc.
- CO4 Appreciate the role of probability and randomization in the analysis of algorithm
- CO5 Analyze various algorithms.
- CO6 Differentiate polynomial and non deterministic polynomial algorithms

Subject: Advanced Operating System(Elective)

- CO1 Demonstrate understanding of design issues of advanced operating systems and compare different types of operating systems.
- CO2 Analyse design aspects and data structures used for file subsystem, memory subsystem and process subsystem of unix os.
- CO3 demonstrate understanding of different architectures used in multiprocessor os and analyse the design and data structures used in multiprocessor operating systems.
- CO4 differentiate between threads and processes and compare different processor scheduling algorithms used in multiprocessor os
- CO5 classify real time os and analyse various real time scheduling algorithms.
- CO6 Explore architectures and design issues of mobile os,virtual os, cloud os.

Subject: Advanced Operating System(Elective)

- CO1 To identify basics of multimedia and multimedia system architecture.
- CO2 To understand different multimedia components
- CO3 To explain file formats for different multimedia components.
- CO4 To analyze the different compression algorithms.
- CO5 To describe various multimedia communication techniques.
- CO6 To apply different security techniques in multimedia environment.

Third Year: Sem VI

Subject: SPCC

- CO1 Identify different system software and use lex tool used for generating lexical analyser.
- CO2 Write macros as and when required to increase readability and productivity
- CO3 Design hand written lexical analyzer & implement various parser types and use yacc
- CO4 Appreciate the role of operating system functions such as memory management as pertaining to run time storage management
- CO5 Apply optimization principles on given code
- CO6 To familiarize and encourage the students to use various software tools for developing system programs

Subject: Software Engineering

- CO1 Students will be able to demonstrate basic knowledge in software engineering.
- CO2 Students will be able to plan, design, develop and validate the software project.
- CO3 Students will be apply advance software methodology to create high quality webapps.
- CO4 Students will have an understanding of impact of sound engineering principles.
- CO5 Student should be able to develop good presentation skills.
- CO6 Student should be able to apply knowledge individually & come to a common concensus with group discussion.

Subject: Distributed Databases

- CO1 Student should be able to identify limitations of Centralized database with Advance Applications
- CO2 Student should be able to design and implement distributed database for enterprise application operations like searching, insertion, deletion, traversing mechanism etc
- CO3 Student should understand Transaction Management and Concurrency cntrol deadlock and recoveryin Distributed Database
- CO4 Student should understand Query optimization techniques in Distributed database
- CO5 Student should be able to design solution for heterogeneous database.
- CO6 Student should be able to design solution for XML for schema integration

Subject: Mobile Communication and Computing

- CO1 Student should be able to understand GSM and CDMA Cellular architecture.
- CO2 Student should be able to Setup and configure wireless access points.
- CO3 Student should be able to Use Network Simulator tool to simulate mobile network.
- CO4 Student should be able to Implement small android based applications.

Subject: Elective-I:OR

- CO1 Model and solve problem using linear and non linear programming techniques
- CO2 Implement algebraic solution using simplex method
- CO3 Define transportation model and apply transportation algorithm in a known situation.
- CO4 use monte carlo simulation technique.
- CO5 Use the spreadsheet as a tool effectively for or topics.

Subject: Network Programming Laboratory

- CO1 Learner will be able to configure linux network ,view and edit routing tables
- CO2 Learner will be able to configure linux router
- CO3 Learner will be able to configure linux ftp server
- CO4 Learner will be able to install and configure dns server
- CO5 Learner will be able to install and configure web server
- CO6 Learner will be able to develop good communication skills, learn ethics and work in teams

Fourth Year: Sem VII

Subject: Digital Signal Processing

- CO1 To understand the concept of dt signal and perform signal manipulation
- CO2 To perform analysis of dt system in time domain
- CO3 To develop fft flow-graph and fast dsp algorithms.
- CO4 To design dsp system for real time signal processing.

Subject: Cryptography and System Security

- CO1 Explain and apply the principles and practices of cryptographic techniques.
- CO2 Explain a variety of generic security threats and vulnerabilities, and identify & analyze particular security problems for given application.
- CO3 Appreciate the application of security techniques and technologies in solving reallife security problems in practical systems.
- CO4 Apply appropriate security techniques to solve security problem
- CO5 Design security protocols and methods to solve the specific security problems.
- CO6 Familiar with current research issues and directions of security.

Subject: Artificial Intelligence

- CO1 Student should be able to get introduced to the basic concepts of ai and the detailed understanding of agents
- CO2 Understand the difference between conventional and ai problems and the various algorithms associated with the problem solving.
- CO3 Explain various ways of representing knowledge and the importance of chaining in ai.
- CO4 Apply appropriate algorithms for problem solving.
- CO5 Understand uncertain knowledge and its representation.
- CO6 Implement simulation of given real world example.

Subject: Image Processing

- CO1 To understand the concept of digital image and video image.
- CO2 To explain image enhancement and segmentation technique.
- CO3 To develop fast image transform flowgraph.
- CO4 To solve image compression and decompression techniques
- CO5 To perform binary image processing operations
- CO6 To develop skills of using recent open source image processing software like scilab.

Subject: Network Threats and Attacks Laboratory

- CO1 Students should be able to use network based tools for network analysis
- CO2 Students should be able to use techniques for network scanning
- CO3 Students should be able to identify network vulnerability
- CO4 Students should be able to use tools to simulate intrusion detection system
- CO5 Students should be able to install firewalls
- CO6 Students should be able to demonstrate any threat

Fourth Year: Sem VIII

Subject: Data Warehouse and Mining

- CO1 students will be enabled to understand and implement classical models and algorithms in data warehousing and data mining.
- CO2 student will further be able to assess the strengths and weaknesses of various methods and algorithms and to analyze their behavior.
- CO3 student should be able to do conceptual, logical, and physical design of data warehouses olap applications and olap deployment
- CO4 student should be able to learn analyzing data and design solution by classifying unseen sample.
- CO5 students will be able to design a data warehouse or data mart to present information needed by management in a form that is usable for management client
- CO6 tudent will be able to perform data analysis using tools such as r and weka

Subject: Human Machine Interaction

- CO1 student should be able to to design user centric interfaces.
- CO2 student should be able to to design innovative and user friendly interfaces.
- CO3 student should be able to apply hmi in their day-to-day activities.
- CO4 student should be able to to criticize existing interface designs, and improve them.
- CO5 student should be able to design application for social and technical application.
- CO6 student should be able to design icons for various websites and applications.

Subject: Parallel and distributed Systems

- CO1 Apply the principles and concept in analyzing and designing the parallel and distributed system.
- CO2 Reason about ways to parallelize problems.
- CO3 Gain an appreciation on the challenges and opportunities faced by parallel and distributed systems. Understand the middleware technologies that support distributed applications such as rpc, rmi and object based middleware.
- CO4 Improve the performance and reliability of distributed and parallel programs
- CO6 develop the distributed applications to offer the services to people at different geographical area

Subject: Elective-III(Big Data Analytics)

- CO1 Student should be able to understand the key issues in big data management and its associated applications in intelligent business and scientific computing.(po1,po2)
- CO2 Student should be able to acquire fundamental enabling techniques and scalable algorithms like hadoop,map reduce and nosql in big data analytics (po2, po3)
- CO3 Student should interpret business models and scientific computing paradigms and apply software tools for big data analytics (po5)
- CO4 Student should achieve adequate perspectives of big data analytics in various applications like recommender systems,social media applications etc.(po2, po4)

- CO5 Student should be able to apply no sql architectural pattern while designing the data bases for big data management using latest dbms like cassandra/mongo db(po10, po11)
- CO6 Student should apply the community detection techniques on social media like fb and linked in to use it for various purposes such as target marketing (po10,po11)

Subject: Project 2

- CO1 Student should be able to identify quality problem on the basis of industry visit,literature survey or current trends
- CO2 Student should be able to define the problem clearly which will have solution that can be applied to solve real world problems.
- CO3 Student should be able to formulate the problem which will be specific to certain domain Like machine learning,Data mining ,networking.
- CO4 Student should be able to clearly define objective and scope of identified problems
- CO5 Student should be able to position their problem based on identification of gap based on literature survey.
- CO6 Student should be able to implement project work to which fulfills the defined objectives and scope.
- CO7 Student should be able to analyze the result and provide valid conclusions.
- CO8 Student should be able to work effectively as an individual or in a team.
- CO9 Student should be able to communicate and comprehend their work in the form of report and oral presentation.