

D Y PATIL TECHNICAL CAMPUS, AMBI  
D Y PATIL SCHOOL OF ENGINNERING ACADEMY, AMBI  
**Course Outcomes**

<b>Department of Computer Engineering</b>	
<b>Semester –I</b>	
<b>CO of the Course “Discrete Mathematics”</b>	
CO1	Illustrate concept of set theory, proposition & mathematical induction.
CO2	Discuss the basic concepts associated with relation, functions and their applications.
CO3	Explaining possible outcomes of elementary combinatorial processes such as permutation and combination and calculating the probabilities.
CO4	Explain concept in graph theory & apply algorithm to solve various mathematical problems.
CO5	Illustrate basic terminology in trees & apply algorithms to find minimum spanning tree.
CO6	To identify and prove the properties of groups and rings.
<b>CO of the Course “Digital Electronics and Logic Design”</b>	
CO1	Realize and simplify Boolean Algebraic assignments for designing digital circuits using K-Maps.
CO2	Design and implement Sequential and Combinational digital circuits as per the specifications.
CO3	Apply the knowledge to appropriate IC as per the design specifications.
CO4	Design simple digital systems using VHDL.
CO5	Develop simple embedded system for simple real world application.

<b>CO of the Course “Data Structures and Algorithms”</b>	
CO1	To discriminate the usage of various structures in approaching the problem solution.
CO2	To design the algorithms to solve the programming problems.
CO3	To use effective and efficient data structures in solving various Computer Engineering domain problems.
CO4	To analyze the problems to apply suitable algorithm and data structure.
CO5	To use appropriate algorithmic strategy for better efficiency
<b>CO of the Course “Computer Organization and Architecture”</b>	
CO1	Demonstrate computer architecture concepts related to design of modern processors, memories and I/Os and Outline the structure, function and characteristics of Computer system
CO2	Recognize and observe various functional units and describe the components of digital computer and do case studies, documentation of Intel 8086 operation types.
CO3	Identify the elements of modern instruction sets and judge the impact on processor design
CO4	Identify memory hierarchy, its performance and compare different methods for computer I/O and examine Pentium IV
CO5	Compare simple computer architecture and organization based on established performance metrics and Evaluate various design alternatives in processor organization
<b>CO of the Course “Object Oriented Programming”</b>	
CO1	Analyzing the basic concepts of Object Oriented Programming.
CO2	Depicting the features of Object Oriented Programming
CO3	Studying the basic concept of Virtual Function and their use.
CO4	To understand the concept of Templates and Exception Handling
CO5	Study of Files and Streams.
CO6	Illustrate the Standard Template Library.

<b>CO of the Course “Theory of Computation”</b>	
CO1	Design, manipulate, and reason about formal computational models, such as automata and Turing machines
CO2	Identify relations between classes of computational problems, formal languages, and computational models
CO3	Apply mathematical knowledge and logic in solving problems
CO4	Illustrate various Turing machine and related hypotheses
CO5	Analyze deeper and broader concepts of grammar, parsing and push down automata.
CO6	Apply NP-completeness concepts to create proofs regarding the computational complexity of novel problems
<b>CO of the Course “Database Management Systems”</b>	
CO1	Identify structure of database system using data models and design E-R Model for given requirements and convert the same into database tables.
CO2	Describe database techniques such as SQL & PL/SQL.
CO3	Discuss relational model and database design.
CO4	Explain transaction Management in relational database System.
CO5	Describe different database architecture and analyses the use of appropriate architecture in real time environment.
CO6	Use advanced database Programming concepts Big Data – HADOOP
<b>CO of the Course “Software Engineering and Project Management”</b>	
CO1	Decide on a process model for a developing a software project
CO2	Classify software applications and Identify unique features of various domains
CO3	Design test cases of a software system.
CO4	Understand basics of IT Project management.
CO5	Plan, schedule and execute a project considering the risk management.
CO6	Apply quality attributes in software development life cycle.

<b>CO of the Course “Information Systems &amp; Engineering Economics”</b>	
CO1	Understand the need, usage and importance of an Information System to an organization.
CO2	Understand the activities that are undertaken while managing, designing, planning, implementation, and deployment of computerized information system in an organization.
CO3	Further the student would be aware of various Information System solutions like ERP, CRM, Data warehouses and the issues in successful implementation of these technology solutions in any organizations
CO4	Outline the past history, present position and expected performance of a company engaged in engineering practice or in the computer industry.
CO5	Perform and evaluate present worth, future worth and annual worth analyses on one of more economic alternatives.
CO6	Be able to carry out and evaluate benefit/cost, life cycle and breakeven analyses on one or more economic alternatives.
<b>CO of the Course “Computer Network”</b>	
CO1	Analyze the requirements for a given organizational structure to select the most appropriate networking architecture, topologies, transmission mediums, and technologies
CO2	Demonstrate design issues, flow control and error control
CO3	Illustrate applications of Computer Network capabilities, selection and usage for various sectors of user community.
CO4	Demonstrate different routing and switching algorithms
CO5	Analyze data flow between TCP/IP model using Application, Transport and Network Layer Protocols.
CO6	Illustrate Client-Server architectures and prototypes by the means of correct standards and technology.
<b>CO of the Course “Design and Analysis of Algorithms”</b>	
CO1	Describe the problem solving principles, analyze the asymptotic performance of algorithms and apply recurrence relation, divide and conquer algorithmic design techniques.
CO2	Apply and analyze greedy and dynamic programming algorithmic design techniques.
CO4	Describe computability theory, randomized and approximation algorithms.
CO5	Describe and analyze the parallel and concurrent algorithms.
CO6	Explain the distributed, embedded, Internet of things and algorithms in software.

<b>CO of the Course “Principles of Modern Compiler Design”</b>	
CO1	Explain basic concepts and issues of compiler design, Lexical analysis process and use the knowledge of LEX tool to design the scanner
CO2	Identify the role of parsing and semantic analysis in compiler design, distinguish between different types of parsers, and use YACC tool to design parser
CO3	Describe syntax directed translation and apply the knowledge to develop intermediate code for language constructs.
CO4	Explain and apply knowledge of code generation and code optimization techniques.
CO5	Summarize the concept of language specific compilation and functional languages.
CO6	Experiment compiler tools in basic, concurrent, distributed and embedded environments
<b>CO of the Course “Smart System Design and Applications”</b>	
CO1	Describe fundamental concepts of AI and define rational agent
CO2	Compare the various searching algorithms and apply in game theory.
CO3	Illustrate and represent knowledge and explain various planning techniques
CO4	Compare and Analyze various probability models and summarize decision network.
CO5	Describe various machine learning techniques and develop smart system application.
CO6	Relate machine learning techniques to embedded systems
<b>CO of the Course “Elective-I: Data Mining Techniques and Applications”</b>	
CO1	Understand the basic concepts of Data mining
CO2	Ability to implement concept of frequent patterns and use of Association Rules.
CO3	Analyses different methods of classification.
CO4	Use of Various clustering techniques
CO5	Apply concept of text and web mining
CO6	Explain Reinforcement Learning and Big data mining

<b>CO of the Course “Elective-II: Pervasive Computing”</b>	
CO1	To present a survey on pervasive computing building blocks.
CO2	To create presentations using pervasive computing techniques and devices.
CO3	To solve problems for multi-core or distributed, concurrent/Parallel environments.
<b>Department of Computer Engineering</b>	
<b>Semester –II</b>	
<b>CO of the Course “Software Design Methodologies and Testing”</b>	
CO1	To understand and apply software design methods
CO2	To select and apply architectural design using UML for a given software system
CO3	To choose and apply design patterns
CO4	To understand and apply different software testing models
CO5	To analyzing and apply different software testing strategies
CO6	To design test cases and apply modern software testing tools for client server, Distributed, mobile applications.
<b>CO of the Course “High Performance Computing”</b>	
CO1	To transform algorithms in the computational area to efficient programming code for modern computer architectures
CO2	To write, organize and handle programs for scientific computations
CO3	To create presentation using tools for performance optimization and debugging.
CO4	To present analysis of code with respect to performance, suggest and implement performance improvements.
CO5	To present test cases to solve problems for multi-core or distributed, concurrent/Parallel environment.

<b>CO of the Course “Cyber Security”</b>	
CO1	Critical understanding of basic characteristics, components and policies of information security.
CO2	Analyze and select the appropriate encryption technique and security standard for addressing the problems.
CO3	Analyze public key cryptography, key management to design and implement authentication services
CO4	Able to analyze advanced security requirements, issues and technologies
CO5	Master the characteristic of intrusion detection system and firewall tools.
CO6	Be familiar with network security with the perspective of Hacking and countermeasures
<b>CO of the Course “Business Analytic and Intelligence”</b>	
CO1	Illustrate the technical concepts of Business Intelligence & the role of mathematical model in it.
CO2	Demonstrate Concepts, methodologies and technologies behind DSS
CO3	Summarize the model & technologies of Data Warehouse
CO4	Analyze, Design the Data Analytics Model & select the technique of BI processing
CO5	Design and Manage the BI systems with ethics using engineering practice
CO6	Dealing with Contemporary Tools for Business Analytics & Intelligence with applications indifferent domain
<b>CO of the Course “Design &amp; Analysis of Algorithms”</b>	
CO1	Understand the fundamentals of algorithm designs.
CO2	Solve a problem using an algorithm and evaluate its correctness
CO3	Describe, apply and analyze the complexity of certain divide and conquer, greedy, and dynamic programming, backtracking and branch and bound algorithm techniques to solve problems
CO4	Develop Understand the concepts of time and space complexity, worst case, average case and best case complexities
CO5	Analyze the asymptotic performance of algorithms.
CO6	Describe the classes P, NP, and NP-Complete and be able to prove that a certain problem is NP-Complete.
CO7	Understand analysis techniques such as amortized analysis, probabilistic analysis, randomness and Minimax or Maximin optimality.
CO8	Identify and analyze criteria and specifications appropriate to new problems, and choose the appropriate algorithmic design technique for their solution.

<b>CO of the Course “Systems Programming &amp; Operating System”</b>	
CO1	Analyze and synthesize of assembler
CO2	Analyze and synthesize macro Processor
CO3	Use tools like LEX & YACC.
CO4	Implement operating system functions
CO5	Implement memory management functions of OS.
CO6	Implement I/O management functions of OS.
<b>CO of the Course “Embedded Systems &amp; Internet of Things”</b>	
CO1	Understand the basic concepts of Embedded System and IOT
CO2	Choose different design methodologies for embedded IoT
CO3	Implement an architectural design for IoT for specified requirements
CO4	Classify various IoT protocols and different security models.
CO5	Compare Web of Things and Cloud of Things
CO6	Choose between available technologies and devices for stated IoT challenge
<b>CO of the Course “Software Modeling and Design “</b>	
CO1	To analyze the problem statement (SRS) and choose proper design technique for designing web-based or desktop application
CO2	To design and analyze an application using UML modeling as fundamental tool.
CO3	To apply design patterns to understand reusability in OO design
CO4	To decide and apply appropriate modern tool for designing and modeling.
CO5	To decide and apply appropriate modern testing tool for testing web-based or desktop application.

<b>CO of the Course “Web Technology”</b>	
CO1	To understand web and technologies that makes the web pages.
CO2	To understand the use of JavaScript and jQuery
CO3	To learn the Installation of Tomcat Server and execution of programs on server side.
CO4	Analyze given assignment to select sustainable web development design methodology
CO5	Develop web based application using suitable client side and server-side web technologies
CO6	Develop solution to complex problems using appropriate method, technologies, frameworks, web services and content management.
<b>CO of the Course “Engineering Mathematics III”</b>	
CO1	Apply knowledge of higher order linear differential equations to LCR circuits.
CO2	Solve problems related to Fourier transform, Z-Transform and applications to Signal and Image processing.
CO3	Apply statistical methods like correlation, regression analysis, Curve Fitting for analysis to extract information from research data and data of applied to machine intelligence.
CO4	Apply probability theory for Estimation, predication and decision making to the real time data
CO5	Perform vector differentiation and integration to analyze the vector fields and apply to compute line, surface and volume integrals to solve problem related to fluid mechanics and various engineering applications.
CO6	Apply knowledge of Cauchy’s Integral Formula to evaluate complex line integrals and to evaluate real definite integrals by Residue Theorem and also understand the concept of conformal mapping required in Image processing, Digital filters and Computer graphics
<b>CO of the Course “Computer Graphics”</b>	
CO1	Apply mathematics and logic to develop Computer programs for primitive graphic operations.
CO2	Implement polygon filling, windowing, clipping algorithm and interpret graphical transformations.
CO3	Illustrate the concepts related to Computer vision and virtual reality.
CO4	To summarize and demonstrate advanced animation and gaming techniques by using modern graphics tools.

<b>CO of the Course “Advanced Data Structures”</b>	
CO1	To apply appropriate advanced data structure and efficient algorithms to approach the problems of various domain.
CO2	To design the algorithms to solve the programming problems
CO3	To use effective and efficient data structures in solving various Computer Engineering domain problems.
CO4	To analyze the algorithmic solutions for resource requirements and optimization
CO5	To use appropriate modern tools to understand and analyze the functionalities confined to the data structure usage.
<b>CO of the Course “Microprocessor”</b>	
CO1	To learn basic programming Model of Advanced microprocessor.
CO2	To learn the architecture and management of instructions in advanced microprocessor.
CO3	To understand the protection mechanism in advanced microprocessor
CO4	To identify interrupts, Exception in Input/output operations.
CO5	To understand debugging and testing techniques confined to 80386 DX
CO6	Implement parallel processing and math Co-processor
<b>CO of the Course “Principles of Programming Languages”</b>	
CO1	To learn the software development process and concept of syntax and semantics of language.
CO2	To classify the different data types and construct the structure of computation.
CO3	To infer different programming paradigms
CO4	To understand the basic of Object Oriented Programming Language.
CO5	To demonstrate the principles Object Oriented Programming using java.
CO6	To use the concept of exception handling and develop a program using applet.