



AVANTHI

INSTITUTE OF ENGINEERING & TECHNOLOGY

(Approved by AICTE, Permanently Affiliated to JNT University, Kakinada,
Accredited by NBA & Recognized Under 2(f) and 12(b) by UGC, New Delhi)
Tamaram, Makavarapalem, Narsipatnam(R.D), Visakhapatnam Dist-531113

1 year 1 semester

FUNDAMENTALS OF COMPUTER SCIENCE

At the end of the course student should be able to

Sno	Course code	CO Statement
1	ES1112	Illustrate the concept of input and output devices of Computers and how it works and recognize the basic terminology used in computer programming.
2	ES1112	Recognize the Computer networks, types of networks and topologies.
3	ES1112	Summarize the concepts of Operating Systems and Databases.
4	ES1112	Recite the Advanced Computer Technologies like Distributed Computing & Wireless Networks
5	ES1112	
6	ES1112	

IT WORKSHOP

At the end of the course student should be able to

Sno	Course code	CO Statement
1	ES1105	Assemble and disassemble components of a PC
2	ES1105	Construct a fully functional virtual machine, Summarize various Linux operating system commands,
3	ES1105	Secure a computer from cyber threats, Learn and practice programming skill in Github, Hackerrank, Codechef, HackerEarth etc.

1year 2semester

PROGRAMMING FOR PROBLEM SOLVING USING C

At the end of the course student should be able to

Sno	Course code	CO Statement
1	ES1201	To write algorithms and to draw flowcharts for solving problems
2	ES1201	To convert flowcharts/algorithms to C Programs, compile and debug programs
3	ES1201	To use different operators, data types and write programs that use two-way/ multi-way selection
4	ES1201	To select the best loop construct for a given problem



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5	ES1201	To design and implement programs to analyze the different pointer applications
6	ES1201	To apply File I/O operations

PROGRAMMING FOR PROBLEM SOLVING USING C lab

At the end of the course student should be able to

Sno	Course code	CO Statement
1	ES1202	Gains Knowledge on various concepts of a C language.
2	ES1202	Able to draw flowcharts and write algorithms.
3	ES1202	Able design and development of C problem solving skills.

Digital logic design

At the end of the course student should be able to

Sno	Course code	CO Statement
1	ES1213	An ability to define different number systems, binary addition and subtraction, 2's complement representation and operations with this representation
2	ES1213	An ability to understand the different switching algebra theorems and apply them for logic functions
3	ES1213	An ability to define the Karnaugh map for a few variables and perform an algorithmic reduction of logic functions
4	ES1213	Students will be able to design various logic gates starting from simple ordinary gates to complex programmable logic devices & arrays.
5	ES1213	Students will be able to design various sequential circuits starting from flip-flop to registers and counters.



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II year I semester

MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

At the end of the course student should be able to

Sno	Course code	CO Statement
1	CS2101	Demonstrate skills in solving mathematical problems
2	CS2101	Comprehend mathematical principles and logic
3	CS2101	Demonstrate knowledge of mathematical modeling and proficiency in using mathematical software
4	CS2101	Manipulate and analyze data numerically and/or graphically using appropriate Software
5	CS2101	Communicate effectively mathematical ideas/results verbally or in writing

SOFTWARE ENGINEERING

At the end of the course student should be able to

Sno	Course code	CO Statement
1	CS2102	Ability to transform an Object-Oriented Design into high quality, executable code
2	CS2102	Skills to design, implement, and execute test cases at the Unit and Integration level
3	CS2102	Compare conventional and agile software methods



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Python Programming

At the end of the course student should be able to

Sno	Course code	CO Statement
1	ES2101	Develop essential programming skills in computer programming concepts like data types, containers
2	ES2101	Apply the basics of programming in the Python language
3	ES2101	Solve coding tasks related conditional execution, loops
4	ES2101	Solve coding tasks related to the fundamental notions and techniques used in objectoriented programming

Data structures though c++

At the end of the course student should be able to

Sno	Course code	CO Statement
1	CS2103	Summarize the properties, interfaces, and behaviors of basic abstract data types
2	CS2103	Discuss the computational efficiency of the principal algorithms for sorting & searching
3	CS2103	Use arrays, records, linked structures, stacks, queues, trees, and Graphs in writing programs
4	CS2103	Demonstrate different methods for traversing trees

Object Oriented Programming through C++

At the end of the course student should be able to

Sno	Course code	CO Statement
1	CS2104	Classify object oriented programming and procedural programming
2	CS2104	Apply C++ features such as composition of objects, operator overloads, dynamic memory allocation, inheritance and polymorphism, file I/O, exception handling
3	CS2104	Build C++ classes using appropriate encapsulation and design principles



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4	CS2104	Apply object oriented or non-object oriented techniques to solve bigger computing problems
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Computer Organization

At the end of the course student should be able to

Sno	Course code	CO Statement
1	CS2105	Develop a detailed understanding of computer systems
2	CS2105	Cite different number systems, binary addition and subtraction, standard, floating-point, and micro operations
3	CS2105	Exemplify in a better way the I/O and memory organization
4	CS2105	Illustrate concepts of parallel processing, pipelining and inter processor communication

Data structures through c++ Lab

At the end of the course student should be able to

Sno	Course code	CO Statement
1	CS2106	Apply the various OOPs concepts with the help of programs.
2	CS2106	Use basic data structures such as arrays and linked list.
3	CS2106	Use various searching and sorting algorithms.

Python programming lab

At the end of the course student should be able to

Sno	Course code	CO Statement
1	ES2102	Write, Test and Debug Python Programs
2	ES2102	Use Conditionals and Loops for Python Programs
3	ES2102	Use functions and represent Compound data using Lists, Tuples and Dictionaries



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II Year II semester

Probability and Statistics

At the end of the course student should be able to

Sno	Course code	CO Statement
1	BS2201	Classify the concepts of data science and its importance (L4) or (L2)
2	BS2201	Interpret the association of characteristics and through correlation and regression tools (L4)
3	BS2201	Make use of the concepts of probability and their applications (L3)
4	BS2201	Apply discrete and continuous probability distributions (L3)
5	BS2201	Design the components of a classical hypothesis test (L6)
6	BS2201	Infer the statistical inferential methods based on small and large sampling tests (L4)

JAVA Programming

At the end of the course student should be able to

Sno	Course code	CO Statement
1	CS2201	Able to realize the concept of Object Oriented Programming & Java Programming Constructs
2	CS2201	Able to describe the basic concepts of Java such as operators, classes, objects, inheritance, packages, Enumeration and various keywords
3	CS2201	Apply the concept of exception handling and Input/ Output operations
4	CS2201	Able to design the applications of Java & Java applet
5	CS2201	Able to Analyze & Design the concept of Event Handling and Abstract Window Toolkit

Operating Systems

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S.No	Course code	CO Statement
1	CS2202	Describe various generations of Operating System and functions of Operating System
2	CS2202	Describe the concept of program, process and thread and analyze various CPU Scheduling Algorithms and compare their performance
3	CS2202	Solve Inter Process Communication problems using Mathematical Equations by various methods
4	CS2202	Compare various Memory Management Schemes especially paging and Segmentation in Operating System and apply various Page Replacement Techniques
5	CS2202	Outline File Systems in Operating System like UNIX/Linux and Windows

Database Management Systems

At the end of the course student should be able to

S.No	Course code	CO Statement
1	CS2203	Describe a relational database and object-oriented database
2	CS2203	Create, maintain and manipulate a relational database using SQL
3	CS2203	Describe ER model and normalization for database design
4	CS2203	Examine issues in data storage and query processing and can formulate appropriate solutions
5	CS2203	Outline the role and issues in management of data such as efficiency, privacy, security, ethical responsibility, and strategic advantage

Formal Language Automata Theory (FLAT)

At the end of the course student should be able to

S.No	Course code	CO Statement
1	CS2204	Classify machines by their power to recognize languages
2	CS2204	Summarize language classes & grammars relationship among them with the help of Chomsky hierarchy
3	CS2204	Employ finite state machines to solve problems in computing
4	CS2204	Illustrate deterministic and non-deterministic machines•
5	CS2204	Quote the hierarchy of problems arising in the computer science



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Database Management Systems Lab

At the end of the course student should be able to

S.No	Course code	CO Statement
1	CS2207	Utilize SQL to execute queries for creating database and performing data manipulation operations
2	CS2207	Examine integrity constraints to build efficient databases
3	CS2207	Apply Queries using Advanced Concepts of SQL

UNIX Operating System Lab

At the end of the course student should be able to

S.No	Course code	CO Statement
1	CS2206	To use Unix utilities and perform basic shell control of the utilities
2	CS2206	Students will be able to use Linux environment efficiently
3	CS2206	To use of an operating system to develop software

Java Programming Lab:

At the end of the course student should be able to

S.No	Course code	CO Statement
1	CS2205	Evaluate default value of all primitive data type, Operations, Expressions,



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		Control-flow, Strings
2	CS2205	Determine Class, Objects, Methods, Inheritance, Exception, Runtime Polymorphism, User defined Exception handling mechanism
3	CS2205	Construct Threads, Event Handling, implement packages, developing applets

III year I semester

Data Warehousing and Data Mining

At the end of the course student should be able to

S.No	Course code	CO Statement
1	CS3101	Design a Data warehouse system and perform business analysis with OLAP tools
2	CS3101	Design a Data warehouse system and perform business analysis with OLAP tools
3	CS3101	Apply frequent pattern and association rule mining techniques for data analysis
4	CS3101	Apply appropriate classification techniques for data analysis
5	CS3101	Apply appropriate clustering techniques for data analysis

Compiler design

At the end of the course student should be able to

S.No	Course code	CO Statement
1	CS3103	Design, develop, and implement a compiler for any language
2	CS3103	Use LEX and YACC tools for developing a scanner and a parser
3	CS3103	Design and implement LL and LR parsers
4	CS3103	Design algorithms to perform code optimization in order to improve the performance of a program in terms of space and time complexity
5	CS3103	Apply algorithms to generate machine code

Computer Networks

S.No	Course code	CO Statement
1	CS3102	Illustrate the OSI and TCP/IP reference model
2	CS3102	Analyze MAC layer protocols and LAN technologies



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3	CS3102	Design applications using internet protocols
4	CS3102	Implement routing and congestion control algorithms
5	CS3102	Develop application layer protocols

Artificial Intelligence

At the end of the course student should be able

S.No	Course code	CO Statement
1	CS3104	Outline problems that are amenable to solution by AI methods, and which AI methods may be suited to solving a given problem
2	CS3104	Apply the language/framework of different AI methods for a given problem
3	CS3104	Implement basic AI algorithms- standard search algorithms or dynamic programming
4	CS3104	Design and carry out an empirical evaluation of different algorithms on problem formalization, and state the conclusions that the evaluation supports

Software Testing Methodologies

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S.No	Course code	CO Statement
1	PE3101	Identify and understand various software testing problems, apply software testing knowledge and engineering methods and solve these problems by designing and selecting software test models, criteria, strategies, and methods
2	PE3101	Design and conduct a software test process for a software project
3	PE3101	Analyze the needs of software test automation
4	PE3101	Use various communication methods and skills to communicate with their teammates to conduct their practice-oriented software testing projects
5	PE3101	Basic understanding and knowledge of contemporary issues in software testing, such as component-based, web based and object oriented software testing problems

Computer Networks Lab

At the end of the course student should be able

S.No	Course code	CO Statement
1	CS3105	Apply the basics of Physical layer in real time applications
2	CS3105	Apply data link layer concepts, design issues, and protocols
3	CS3105	Apply Network layer routing protocols and IP addressing
4	CS3105	Implement the functions of Application layer and Presentation layer paradigms and Protocols

AI Tools & Techniques Lab

At the end of the course student should be able

S.No	Course code	CO Statement
1	CS3106	Identify problems that are amenable to solution by AI methods
2	CS3106	Identify appropriate AI methods to solve a given problem
3	CS3106	Use language/framework of different AI methods for solving problems

Data Mining Lab

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S.No	Course code	CO Statement
1	CS3107	Extend the functionality of R by using add-on packages
2	CS3107	Code statistical functions in R
3	CS3107	Apply the knowledge of R gained to data Analytics for real life applications

III year II semester

Web Technologies

At the end of the course student should be able

S.No	Course code	CO Statement
1	CS3201	Illustrate the basic concepts of HTML and CSS & apply those concepts to design static web pages
2	CS3201	Identify and understand various concepts related to dynamic web pages and validate them using JavaScript
3	CS3201	Outline the concepts of Extensible markup language & AJAX
4	CS3201	Develop web Applications using Scripting Languages & Frameworks
5	CS3201	Create and deploy secure, usable database driven web applications using PHP and RUBY

DISTRIBUTED SYSTEMS

At the end of the course student should be able

S.No	Course code	CO Statement
1	CS3202	Elucidate the foundations and issues of distributed systems
2	CS3202	Illustrate the various synchronization issues and global state for distributed systems
3	CS3202	Illustrate the Mutual Exclusion and Deadlock detection algorithms in distributed systems
4	CS3202	Describe the agreement protocols and fault tolerance mechanisms in distributed systems
5	CS3202	Describe the features of peer-to-peer and distributed shared memory systems



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Design Analysis of Algorithms

At the end of the course student should be able to

S.No	Course code	CO Statement
1	CS3203	Describe asymptotic notation used for denoting performance of algorithms
2	CS3203	Analyze the performance of a given algorithm and denote its time complexity using the asymptotic notation for recursive and non-recursive algorithms
3	CS3203	List and describe various algorithmic approaches
4	CS3203	Solve problems using divide and conquer, greedy, dynamic programming, backtracking and branch and bound algorithmic approaches
5	CS3203	Apply graph search algorithms to real world problems
6	CS3203	Demonstrate an understanding of NP- Completeness theory and lower bound theory

Managerial Economics and Financial Accountancy

At the end of the course student should be able to

S.No	Course code	CO Statement
1	HS3201	The Learning objectives of this paper are to understand the concept and nature of Managerial Economics and its relationship with other disciplines and also to understand the Concept of Demand and Demand forecasting.
2	HS3201	To familiarize about the Production function, Input Output relationship, Cost-Output relationship and Cost-Volume-Profit Analysis.
3	HS3201	To understand the nature of markets, Methods of Pricing in the different market structures and to know the different forms of Business organization and the concept of Business Cycles.
4	HS3201	To learn different Accounting Systems, preparation of Financial Statement and uses of different tools for performance evaluation
5	HS3201	Finally, it is also to understand the concept of Capital, Capital Budgeting and the techniques used to evaluate Capital Budgeting proposals.

Web Technologies Lab

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S.No	Course code	CO Statement
1	CS3204	Analyze and apply the role of languages like HTML, CSS, XML
2	CS3204	Review JavaScript, PHP and protocols in the workings of the web and web applications
3	CS3204	Apply Web Application Terminologies, Internet Tools, E – Commerce and other web services
4	CS3204	Develop and Analyze dynamic Web Applications using PHP & MySql
5	CS3204	Install & Use Frameworks

IV year I semester

Cryptography and Network security

At the end of the course student should be able to

S.No	Course code	CO Statement
1	CS4101.1	Identify information security goals, classical encryption techniques and acquire fundamental knowledge on the concepts of finite fields and number theory
2	CS4101.2	Compare and apply different encryption and decryption techniques to solve problems related to confidentiality and authentication
3	CS4101.3	Apply the knowledge of cryptographic checksums and evaluate the performance of different message digest algorithms for verifying the integrity of varying message sizes
4	CS4101.4	Apply different digital signature algorithms to achieve authentication and create secure applications
5	CS4101.5	Apply network security basics, analyze different attacks on networks and evaluate the performance of firewalls and security protocols like SSL, IPsec, and PGP
6	CS4101.6	performance of firewalls and security protocols like SSL, IPsec, and PGP Apply the knowledge of cryptographic utilities and authentication mechanisms to design secure applications

UML & Design Patterns

At the end of the course student should be able to

S.No	Course code	CO Statement
1	CS4102.1	Illustrate software design with UML diagrams



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2	CS4102.2	Design software applications using OO concepts
3	CS4102.3	Identify various scenarios based on software requirements
4	CS4102.4	Apply UML based software design into pattern based design using design patterns
5	CS4102.5	Illustrate the various testing methodologies for OO software

Machine Learning

At the end of the course student should be able to

S.No	Course code	CO Statement
1	CS4103.1	Identify machine learning techniques suitable for a given problem
2	CS4103.2	Solve the problems using various machine learning techniques
3	CS4103.3	Apply Dimensionality reduction techniques
4	CS4103.4	Design application using machine learning techniques
5	CS4103.5	

Open Elective -II (Inter Disciplinary)

At the end of the course student should be able to

S.No	Course code	CO Statement
1	OE4101.1	
2	OE4101.2	
3	OE4101.3	
4	OE4101.4	
5	OE4101.5	
6	OE4101.6	

Professional Elective- III (Elective)

At the end of the course student should be able to

S.No	Course code	CO Statement
1	PE4101.1	
2	PE4101.2	



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3	PE4101.3	
4	PE4101.4	
5	PE4101.5	
6	PE4101.6	

Professional Elective- IV

At the end of the course student should be able to

S.No	Course code	CO Statement
1	PE4102.1	
2	PE4102.2	
3	PE4102.3	
4	PE4102.4	
5	PE4102.5	

UML lab

At the end of the course student should be able to

S.No	Course code	CO Statement
1	CS4104.1	Know the syntax of different UML diagrams
2	CS4104.2	Create use case documents that capture requirements for a software system
3	CS4104.3	Develop simple applications

IPR & Patents

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S.No	Course code	CO Statement
1	MC4101.1	IPR Laws and patents pave the way for innovative ideas which are instrumental for inventions to seek Patents
2	MC4101.2	Student get an insight on Copyrights, Patents and Software patents which are instrumental for further advancements

IV year II semester

Management and Organizational Behavior

At the end of the course student should be able to

S.No	Course code	CO Statement
1	HS4201.1	After completion of the Course the student will acquire the knowledge on management functions, global leadership and organizational structure
2	HS4201.2	Will familiarize with the concepts of functional management that is HRM and Marketing of new product developments
3	HS4201.3	The learner is able to think in strategically through contemporary management practices
4	HS4201.4	The learner can develop positive attitude through personality development and can equip with motivational theories
5	HS4201.5	The student can attain the group performance and grievance handling in managing the organizational culture

Open Elective- III (Inter Disciplinary)

At the end of the course student should be able to

S.No	Course code	CO Statement
1	OE4201.1	
2	OE4201.2	
3	OE4201.3	
4	OE4201.4	
5	OE4201.5	

Professional Elective-V

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S.No	Course code	CO Statement
1	PE4201.1	
2	PE4201.2	
3	PE4201.3	
4	PE4201.4	
5	PE4201.5	

HOD

Principal