



VIRUDHUNAGAR HINDU NADARS' SENTHIKUMARA NADAR COLLEGE
(An Autonomous Institution Affiliated to Madurai Kamaraj University)
Virudhunagar – 626 001.

Course Name: Bachelor of Science
Discipline : Computer Science
 (For those who joined June 2022 and after)

III year B.Sc. COMPUTER SCIENCE

Semester	Part	Subject Name	Hours	Credit	Int + Ext =Total	Local	Regional	National	Global	Professional Ethics	Gender	Human Values	Environment & Sustainability	Employability	Entrepreneurship	Skill Development	Subject Code	Revised / New / No Change / Interchanged & Percentage of Revision
V	Core	Computer Algorithms	4	4	25+75=100				✓					✓		✓	U24CSC51	Revised 20%
	Core	LAB: PHP and MYSQL	5	3	40+60=100				✓					✓	✓	✓	U1CSC5P1/ U24CSCP51	No Change
	Core	LAB: Python Programming	5	3	40+60=100				✓					✓	✓	✓	U3CSC5P2/ U24CSCP52	No Change
	Elective	System Software / Computer Networks/ Data Mining	5	4	25+75=100				✓					✓			U24CSE51/ U24CSE52/ U24CSE53	Credit Change
	Elective	Data Base Management Systems / Information Security/Cloud Computing	5	4	25+75=100				✓							✓	U24CSE54/ U24CSE55/ U24CSE56	Revised 20%/ Credit Change / Credit Change
	SBE-3	LAB: Full Stack development - I	2	2	40+60=100				✓					✓	✓	✓	U24CSP51	Title Change
	SBE-4	Employability Skills	2	1	25+75=100				✓					✓		✓	U24PS51	Revised 50%
	NME1	LAB: Office Automation	2	2	40+60=100	✓								✓			U3CSN5P/ U24CSNP51	No Change
	Total			30	23													
Internship Programme (Extra Credit)			60	2													U24IP51	New
VI	Core	Software Engineering	4	4	25+75=100				✓							✓	U24CSC61	Revised 15%
	Core	Computer Graphics and Digital Image Processing	4	4	25+75=100				✓							✓	U3CSC62/ U24CSC62	No Change
	Core	Mobile Computing	5	4	25+75=100				✓					✓			U2CSC63/ U24CSC63	No Change



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Elective	Project - Software Development	5	4	100+0=100	✓		✓				✓	✓	U24CS6PR	Credit Change
Core	LAB: Mobile APP Development	6	3	40+60=100			✓				✓	✓	U24CSCP61	Title Changed
SBE-5	LAB: DOT NET Programming	2	2	40+60=100			✓				✓	✓	U3CSS6P1/ U24CASP61	No Change
SBE-6	LAB: Full Stack development - II	2	2	40+60=100			✓				✓	✓	U24CASP62	Title Changed
NME2	LAB: Fundamentals of Web Designing	2	2	40+60=100	✓						✓		U3CSN6P/ U24CSNP61	No Change
Total		30	25											



SEMESTER V

COMPUTER ALGORITHMS

Contact Hours per week: 4hrs

Credit: 4

Contact Hours per semester: 60hrs

Subject Code: U24CSC51

Objective:

To give training to develop algorithm for solving problems using Divide and Conquer, Greedy, Dynamic Programming, Backtracking and Branch and Bound Techniques.

COURSE OUTCOMES:

From this course, the students

CO1: will know the importance of developing efficient programs in terms of execution time and memory space.

CO2: will know to analyze the developed programs to compute order of computing time.

CO3: will know to develop programs based on the Algorithmic techniques namely Divide and conquer, Dynamic programming, Greedy method, Backtracking and Branch and Bound.

CO4: will Know how these algorithmic techniques make the program execution faster.

Unit I:

(12 HRS)

Algorithms: Importance of developing efficient algorithms – Analysis – order. **Divide and Conquer:** Binary Search – Merge sort – Quick Sort – Arithmetic with large numbers – when not to use divide and conquer.

Unit II:

(12 HRS)

Dynamic Programming: Binomial coefficients – Floyd's algorithm for shortest paths – Dynamic programming and optimization problems – chained matrix multiplication – Optimal binary search tree – The travelling salesperson problem.

Unit III:

(12 HRS)

Greedy Approach: Minimum spanning trees – Dijkstra's algorithm for single source shortest path – Scheduling - Huffman code.

Unit IV:

(12 HRS)

Backtracking: The Backtracking techniques - n Queens Problem – Monte carlo algorithm to estimate the efficiency of a backtracking algorithm - Sum of Subsets – Graph Colouring – Hamiltonian circuits, 0-1 Knapsack problem.

Unit V:

(12 HRS)

Branch and Bound: Illustrating with 0/1 Knapsack by Breadth First Search and Best First Search, Illustrating with Travelling salesman problem by best first search, Abductive inference. **SORTING :** Heapsort.

Text Books:

- Foundations of Algorithms Using C++ Pseudocode, Third edition, Richard Neapolitan, Kumars Naimipour. Narosa Publication, 2004.
UNITI - Chapter –1 (1.1to1.4,) , Chapter– 2(2.1 -2.4, 2.6)
UNITII- Chapter –3(3.1to 3.6)
UNITIII- Chapter–4(4.1to4.4)
UNITIV- Chapter–5(5.1 to 5.7)
UNITV- Chapter – 6 (6.1,6.2,6.3), Chapter – 7 (7.6)



Reference Books:

1. Fundamentals of Computer Algorithms, Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran, Galgotia publications 2005.
2. Introduction to Algorithms, Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, Prentice Hall of India, 2006.

LAB: PHP and MYSQL

Contact Hours per week: 5hrs

Contact Hours per semester: 75 hrs

Credit: 3

Subject Code: U1CSC5P1/ U24CSCP51

COURSE OUTCOMES:

In this course, the students will

- CO1:** To describe the PHP scripting language, and create basic PHP scripts using proper PHP syntax.
- CO2:** To create elaborate scripts, write HTML forms, and program PHP to handle the form data.
- CO3:** How to use PHP to create dynamic Websites that are responsive to users and can alter content based on differing situations.
- CO4:** Develop the competence to create data bases and tables, and sort and retrieve data using SQL and MySQL.
- CO5:** Understand the usage of PHP and MySQL in dynamic web development.
- CO6:** Enrich the knowledge of PHP language data types, logic controls, built-in and user defined functions.
- CO7:** Make the students learn how to write server-side Web applications.
- CO8:** Gain the PHP programming skills needed to build interactive, data-driven sites successfully
- CO9:** Explore working with form data using cookies and sessions.

Objective:

To make the students as web developers by creating a dynamic web page as well as web sites using PHP Scripting language with database manipulation

1. Write a PHP program to design a client page to get two numbers and add, subtract, multiply and divide them in server and display
2. Write a PHP program to design a page to get age of a person and display he/she is eligible for vote or not in server page.
3. Write a PHP program to design a client page to get five marks of a student and display total, Average, Result, Grade in server page
4. Write a PHP program to Get a value 'n' in the client page and display its factorial value and generate 'n' Fibonacci numbers in the server page
5. Write a PHP program to Get two texts in the client page, perform string manipulation and display in server page (Any five functions)
6. Write a PHP program to find Biggest number, smallest number, odd numbers, and even numbers using Function
7. Write a PHP program to display Book details using For each Loop
8. Write a PHP program to display registration Form
9. Write a PHP program to Copy a data from one file to another file
10. Write a PHP program to Multiples of 7 using REQUIRE
11. Programs using SELECT commands in MY-SQL
12. Programs using DML/TCL commands in MY-SQL



13. Create, process and generate Employee Pay-bill using PHP&MY-SQL
14. Create, process and generate EB-Bill using PHP&MY-SQL
15. Create and perform Inventory shop

CORE– LAB: PYTHON PROGRAMMING

Contact Hours per week: 5hrs

Credit: 3

Contact Hours per semester: 75 hrs

Subject Code: U3CSC5P2/ U24CSCP52

Course Outcomes:

Upon completion of the course, students will be able to

CO1	Describe the Numbers, Math functions, Strings, List, Tuples and Dictionaries in Python
CO2	Express different Decision Making statements and Functions
CO3	Interpret Object Oriented Programming in Python
CO4	Understand and summarize different File handling operations
CO5	Understand Multithreading and Regular expressions Concepts in Python
CO6	Explain how to design GUI Applications in Python and evaluate different database operations
CO7	Design and develop Client Server network applications using Python

LAB LIST

1. Find the sum of two numbers using Command Line argument.
 2. Get one number from user, and prints count-down from that number to zero using While Loop.
 3. Find the sum of all the primes for the given range using for loop.
 4. Program that accepts a sequence of white space separated words as input and prints the words after removing all duplicate words and sorting them alphanumerically
 5. String Manipulation
 6. Find mean, median, mode for the given set of numbers using list data structure.
 7. Compute cumulative product of a list of numbers using function.
 8. Demonstrate use of tuple and its related functions.
 9. Count the numbers of characters in the string and store them in a dictionary data structure
 10. Print the each line of a file in reverse order.
 11. Compute the number of characters, words and lines in a file.
 12. Retrieving data from a file using regular expression.
 13. Retrieving information from HTML file using Regular Expression.
 14. Perform two tasks simultaneously using thread.
 15. Thread communication using queue
 16. Create a GUI for an Expression Calculator using tk.
 17. Chatting Program using TCP.
 18. File Transfer using FDP.
 19. Program to implement DML operations.
 20. Retrieving row from a MySQL database table using GUI.
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Elective 1(1) SYSTEM SOFTWARE

Contact Hours per week: 5hrs
Contact Hours per semester: 75 hrs

Credit: 4
Subject Code: U24CSE51

COURSE OUTCOMES:

Upon Completion of the course, students will be able to

CO1	Understand different process or architectures and system – level design processes.
CO2	Design, analyze and implement one pass, two pass or multi pass assembler
CO3	Interpret the design concepts of Loaders and Linkers.
CO4	Attain Knowledge in Macro Processors functions and its features
CO5	Acquire the knowledge of compiler & its features

UNIT I: (15Hrs)

BACKGROUND: System Software and Machine Architecture – The Simplified Instructional Computer (SIC) – SIC Machine Architecture-SIC/XE Machine Architecture – Traditional Machines – VAX Architecture-Pentium Pro Architecture – RISC Machines – Ultra SPARC Architecture-PowerPC Architecture-Cray T3E Architecture.

OTHER SYSTEM SOFTWARE: Database Management Systems – Basic Concept of a DBMS-Levels of Data Description-Use of a DBMS – Text Editors – Overview of the Editing Process - User Interface - Editor Structure - Interactive Debugging Systems – Debugging Functions and Capabilities - Relationship with other Parts of the System - User-Interface Criteria.

UNIT II: (15Hrs)

ASSEMBLERS: Basic Assembler Functions – A Simple SIC Assembler –Assembler Algorithm and Data Structures - Machine-Dependent Assembler Features – Instruction Formats and Addressing Modes - Program Relocation - Machine-Independent Assembler Features – Literals-Symbol-Defining Statements-Expressions-Program Blocks - Control Sections and Program Linking-Assembler Design Options – One-Pass Assemblers - Multi-Pass Assemblers.

UNIT III: (15Hrs)

LOADERS AND LINKERS: Basic Loader Functions – Design of an Absolute Loader - A Simple Bootstrap Loader - Machine-Dependent Loader Features – Relocation - Program Linking - Algorithm and Data Structures for a Linking Loader - Machine-Independent Loader Features – Automatic Library Search - Loader Options - Loader Design Options – Linkage Editors - Dynamic Linking - Bootstrap Loaders.

UNIT IV: (15Hrs)

MACRO PROCESSORS: Basic Macro Processor Functions – Macro definition and Expansion – Macro Processor Algorithm and Data Structures - Machine-Independent Macro Processor Features – Concatenation of Macro Parameters - Generation of Unique Labels - Conditional Macro Expansion - Keyword Macro Parameters - Macro Processor Design Options – Recursive Macro Expansion - General-Purpose Macro Processors - Macro Processing within Language Translators.

UNIT V: (15Hrs)

COMPILERS: Basic Compiler Functions – Grammars - Lexical Analysis - Syntactic Analysis - Code Generation --Machine-Dependent Compiler Features – Intermediate Form of the Program - Machine-Dependent Code Optimization - Machine-Independent Compiler Features – Structured Variables - Machine-Independent Code Optimization - Storage Allocation - Block-Structured Languages -- Compiler Design Options – Division into Passes – Interpreters – P-Code Compilers – Compiler-Compilers.



Text Book:

1. "System Software–An Introduction to Systems Programming" by Leland L.Beck and D.Manjula, Pearson Education, Third Edition, 2013.

UnitI	:	Chapter1 – 1.1 to 1.5, Chapter7 – 7.1 to 7.3
UnitII	:	Chapter2 – 2.1 to 2.4
UnitIII	:	Chapter3 – 3.1 to 3.4
UnitIV	:	Chapter4 – 4.1 to 4.3
Unit V	:	Chapter5 – 5.1 to 5.4

Reference Books:

1. "Systems programming and Operating Systems" by D.M.DHAMDHARE, Tata McGraw- Hill, Second Revised Edition,1999.
 2. "Systems programming" by John J.Donovan,Tata McGraw-Hill,1972.
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Elective 1(b) COMPUTER NETWORKS

Contact Hours per week: 5hrs

Contact Hours per Semester: 75hrs

Subject Code: U24CSE52

Credit: 4 Hrs

Objective:

The subject helps students to understand the concepts and mechanism of data communications and networking.

COURSE OUTCOMES:

In this course, the students will

CO1: Provide foundation knowledge of Network Hardware and Network Software

CO2: Give an in-depth knowledge about ISO/OSI and TCP/IP protocol stacks

CO3: Classify type of media and IEEE LAN standards

CO4: Present various types of error handling mechanisms

CO5: Gain Knowledge on routing algorithms as well as application layer functions

UNIT I:

Introduction-Data Communication, Networks, Protocols and Standards, Organizations. Basic Concepts-Line Configuration, Topology, Transmission mode, Categories of Networks. OSI Model-Layered Architecture, Functions of the layers, TCP/IP Protocol suite.

15 Hrs

UNIT II:

Transmission Media Guided Media, Unguided media, Transmissions impairment, Performance Error detection and Correction-Types of errors, Detection, VRC, LRC, CRC, Checksum.

15 Hrs

UNIT III:

Datalink control-Line discipline, Flow control, Error Control. Local Area Networks-project 802,Ethernet, Token bus, Token Ring.

15 Hrs

UNIT IV:

Networking and Internetworking devices-Repeaters, Bridges, Routers, Gateways, other devices, Routing Algorithms, Distance Vector Routing, Link State Routing.Transport Layer - Duties, Connection,

15 Hrs



UNIT V:

15 Hrs

Session layer – Services, Synchronization points, Presentation layer - Encryption, Decryption and Authentication and Compression. Application layer - FTAM and VT.

Text Books:

- Data Communications and Networking (2nd Edition) -Behrouz A. Forouzan, Tata McGraw- Hill Publishers

UNITI- Chapters1,2,3

UNIT II - Chapters 7, 9.1 to 9.6

UNITIII-Chapters10,12.1to12.5

UNIT IV - Chapters 21, 22.1, 22.2

UNITV-Chapters 23

Reference Books:

1. Data Communications and Computer Networks, Brijendra Singh. Prentice-Hall of India Pvt Ltd. New Delhi, Second Edition,2007.
2. Computer Networks- A. Tananbaum, Pearson Education Asia, prentice hall India 2007

Elective 1(c) DATA MINING

Contact Hours per week:5 Hrs

Credit:4

Contact Hours per semester: 75 Hrs

Subject Code: U24CSE53

Objective:

To make the students to explore the abundant data repositories available for developing intelligence and knowledge based systems.

COURSE OUTCOMES:

In this course, the students will

CO1: Understand the essentials of data base and knowledge base.

CO2: Analyze the architecture of data mining and its components educated.

CO3: Inculcate the effective ways of data pre-processing educated to students.

CO4: Make the students know the importance of association mining educated to students.

CO5: Learn the essentials of classification mining.

CO6: Impart the knowledge on cluster mining and different clustering techniques.

CO7: Elaborate text mining, spatial mining, web mining etc.

UNITI

(15 HRS)

Introduction: Data mining application – data mining techniques – data mining case studies the future of data mining – data mining software.

Association rules mining: Introduction -Basics-task and a Naive algorithm- Apriori algorithm–improve the efficiency of the Apriori algorithm –mining frequent pattern without candidate generation (FP-growth) – performance evaluation of algorithms.

UNITII

(15 HRS)

Data warehousing: Introduction – Operational data sources- data warehousing – Data Warehousing design – Guidelines for data warehousing implementation - Data warehousing - Metadata.

Online analytical processing(OLAP): Introduction–OLAP characteristics of OLAP system–Multidimensional view and data cube –Data cube implementation-Data Cube operations OLAP implementation guidelines.



UNITIII

(15 HRS)

Classification: Introduction – decision tree – over fitting and pruning - DT rules - Naïve Bayes method- estimation predictive accuracy of classification methods - other evaluation criteria for classification method – classification software

UNITIV

(15 HRS)

Cluster analysis: cluster analysis – types of data – computing distances-types of cluster analysis methods - partitioned methods–hierarchical methods–density based methods – Dealing with large databases – quality and validity of cluster analysis methods - cluster analysis software.

UNITV

(15 HRS)

Web data mining: Introduction- web terminology and characteristics- locality and hierarchy in the web- web content mining-web usage mining- web structure mining – web mining software.

Search engines: Search engines functionality- search engines architecture – Ranking of web pages.

Text Books:

Introduction to Datamining with case studies, G.K.Gupta, PHI Private limited, New Delhi, 2008

Unit I – Chapters 1 & 2

Unit II- Chapters 7 & 8

Unit III – Chapter 3

Unit IV – Chapter 4

Unit V– Chapters5&6

Elective 2.(a) DATABASE MANAGEMENT SYSTEMS

Contact Hours per week:5 Hrs.

Credit: 4

Contact Hours per semester: 75 Hrs.

Course Code: U24CSE54

Objective:

To inculcate the basics of database concepts and its importance in the current world database dominated systems and technology.

COURSE OUTCOMES:

In this course, the students will

CO1: Get educated on the essentials of database and database components in DBMS.

CO2: Know the architecture of database and the languages used to maintain DBMS are to be educated.

CO3: Find the effective ways of modeling a database.

CO4: Recognize the importance of relational data models and its operation educated.

CO5: Acquire the knowledge on relational algebra and relational calculus to know the procedural and declarative ways of manipulating of database.

CO6: Get Enriched on the concepts of functional dependencies and the different ways of normalizing a database.

CO7: Get awareness on the emerging database technologies and the concepts of data mining.

CO8: Be aware of the fundamentals of database and its effective management.



Unit I: (15 HRS)

Databases and Database Users: Introduction – characteristics of Database approaches – actors on the scene- workers behind the scene- advantages of using the DBMS approach- a brief history of Database applications- when not to use a DBMS.

Database System Concepts and Architectures: Data models, schemas, and instances – Three schema architecture and Data Independence- Database Languages and Interfaces- the Database system environment- centralized and client-server architecture for DBMS- classification of Database Management Systems.

Unit II: (15 HRS)

Data modeling using the entity relationship model: Using high-level conceptual data models for database design- entity type, entity set, attributes and keys-relationship types, relationship sets, roles, structural constraints- weak entity types- refining the ER design for the company database- relationship types of degree higher than two.

The Enhanced Entity Relationship Model (EER): Subclasses, Super classes, and Inheritance- Specialization and Generalizations.

Unit III: (15 HRS)

The Relational Data Model and Relational Database Constraints:

Relational Model concepts- relational model constraints and relational database schemas.

The Relational Algebra and Relational Calculus: Unary Relational Operations- SELECT and PROJECT- Relational algebra operations from set theory- binary relational algebra operations: JOIN and DIVISION- additional relational algebra operations- Tuple relational calculus- the Domain relational calculus

Unit IV: (15 HRS)

Functional Dependencies and Normalization for Relational Databases: Informal design guidelines for relation schemas- Functional dependencies –normal forms based on primary keys- general definitions of first, second and third normal forms- Boyce-Codd normal form.

Unit V: (15 HRS)

Data Mining Concepts:

Overview of datamining technology – Association rules – Classification – Clustering – Approaches to other data mining problems – Applications of data mining – Commercial data mining tools.

Emerging Database Technologies:

Mobile databases – Multimedia databases – Geographic Information Systems (GIS) – Genome data management.

Text Book:

Fundamentals of Database Systems

By RAMEZ ELMASRI, SHAMKANT B. NAVATHE - Fifth Edition - Pearson Publications, New Delhi-2009.

UNIT I: Chapters 1.1, 1.3 to 1.8, 2.1 to 2.6

UNIT II: Chapters 3.1 to 3.7, 3.9, 4.1 and 4.2

UNIT III: Chapters 5.1 and 5.2, 6.1 to 6.7

UNIT IV: Chapters 10.1 to 10.5

UNIT V: Chapters 28.1 to 28.7, 30.1 to 30.4

Reference Books:

Database Management Systems - G. K. Gupta-Second Edition- PHI Learning Private Limited, New Delhi-2008.

Database Management concepts – Raghu Rama Krishnan, Johannes Gehrke - Third Edition -Tata Mc Graw Hill, New Delhi-2009.



Elective 2(b) INFORMATION SECURITY

Contact Hours per week: 5hrs

Credit : 4

Contact Hours per semester: 75hrs

Subject Code: U24CSE55

Objective:

To continually strengthen and improve the overall capabilities of the information security management system and also increase professional skills in terms of information security management and technology.

COURSE OUTCOMES:

In this course, the students will

CO1: Give the foundation of information security and its underlying technologies

CO2: Provide a wide coverage of the issues and attacks in information security

CO3: Learn how to deal with security analysis and design pertaining to information security

CO4: Enumerate the logical and physical design of information security systems

Unit 1: Introduction to Information Security (IS) (15 Hrs)

History–Security–InformationSecurity–CriticalCharacteristics–ComponentsofIS– Securing the Components of IS – Life Cycles

Unit 2: Security Investigation (15 Hrs)

Need for Security–Business needs–Threats–Attacks–Legal, Ethical&Professional Issues in IS

Unit 3: Security Analysis (15 Hrs)

Risk Management–Identifying Risks–Risk Assessment–Assessing and Controlling Risks

Unit 4: Logical Design (15 Hrs)

Policies, Standards and Practices–Security Models–Visa Model–Design of Security Architecture – Planning for Continuity

Unit 5: Physical Design (15 Hrs)

Security Technology – Intrusion Detection Systems – Scanning and Analysis Tools – Cryptography and Encryption Based Solutions – Access Control Devices – Physical Security – Security and Personnel

Text Books:

- Information Security, S. Sharanya, Charulatha Publications, July 2012

Reference Books:

1. Scott Barman, “Writing Information Security Policies”, Sams Publishing, 2002.
2. Thomas.R.Peltier, “Information Policies, Procedures and Standards”, CRC Press, 2004

Elective 2(c) –CLOUD COMPUTING

Contact Hours per Week: 5 hrs

Credits: 4

Contact Hours per Semester: 75 hrs

Subject Code: U24CSE56

COURSE OUTCOMES:

- To understand cloud computing in different ways.
- To evaluate cloud based solutions against the time, energy, expense required to leverage them.
- To gain knowledge about how to access the cloud.
- To know the future of cloud computing



Unit I

15 hrs

Cloud Computing – An Overview: Introduction – History of Cloud Computing – Characteristics of Cloud – Cloud Computing Model. Issues and challenges of Cloud Computing–Advantages, Disadvantages of Cloud computing –Security, Privacy and Trust – Virtualization – Threats to Cloud Computing – Next Generation of Cloud Computing. Cloud Computing Architecture – Introduction – Cloud Architecture - Cloud Computing models – Comparison of Service models – Deployment Models – Identity as a Service.

Unit II

15 hrs

Virtualization in Cloud: Introduction – Virtualization – Implementation of Virtualization - Virtualization support at the OS level – Middleware Support for Virtualization - Advantages of Virtualization - Application Virtualization - Virtualization Implementations Techniques – Hardware Virtualization- Types of Virtualization – Load balancing in Cloud Computing- Logical Cloud Computing Model – Virtualization for Data Centre.

Unit III

15 hrs

Security Issues and Challenges in Cloud Computing: Introduction – Security Challenges in Cloud Computing – Information Security in Cloud Computing – Security, Privacy and Trust. **Security Management:** Introduction – Security Reference Architecture – Security Issues in Cloud Computing – Classification of Security Issues – Types of Attackers –Security risks in Cloud Computing – Security Threats against cloud Computing – Novel Security Approaches.

Unit IV

15 hrs

Web Services: Introduction – Amazon Web Services – Microsoft Azure – Google App Engine. **Data Security and Privacy:** Introduction – Data Security – Privacy.

Unit V

15 hrs

Cloud Computing Applications: Introduction – Business Applications – Finance and Banking Application – Cloud Computing in Education.

Mobile Cloud Computing: Introduction – Need of Mobile Cloud Computing – Mobile Computing Architecture – Technologies of MCC – MCC Applications – Issues in MCC – Challenges in Building Applications – Platforms.

Text Book:

Cloud Computing by V.K.Pachghare, PHI Learning Private Limited, 2016.

Unit I	: Chapter 1, 2.
Unit II	: Chapter 3.
Unit III	: Chapter 4, 5.
Unit IV	: Chapter 7, 8.
Unit V	: Chapter 11, 13.

Reference Books:

1. Cloud Computing by A Practical Approach by Anthony T. Velte, Toby J. Velte, Robert Elsenpeter, Tata McGraw-Hill Education Private Limited, New Delhi, 2010 Edition, Fifth Reprint 2011.
 2. Cloud Computing Bible by Barrie Sosinsky, Wiley India Private Limited, Reprint 2011
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SBE - LAB: Full Stack Development - I

Contact Hours per Semester: 30hrs

Credits:2

Subject Code: U24CSSP51

Course Outcomes:

Upon completion of the course, students will be able to

- CO1** Implement built-in directives in AngularJS
- CO2** Interpret the usage of filters
- CO3** Understand the Angular core module
- CO4** Build Angular forms
- CO5** Create a Custom directives and Custom filters

List of Programs

1. To display hello World Application in AngularJS
2. To implement controller in AngularJS
3. To use \$scope Object in AngularJS
4. To implement ng-repeat and ng-init directives in AngularJS
5. To implement ng-model and ng-view directive in AngularJS
6. To develop Custom directives
7. To display the Arithmetic Operations of numbers in AngularJS
8. To implement Arrays in AngularJS
9. To implement the following built in filters
 - a. a)Lowercase b)Uppercase c)Number d)JSON and e)Currency
10. To develop custom filters
11. To implement tAngular JSServices
12. To display list of Book names and author names in a table format.
13. To create Forms in AngularJS
14. To implement database in AngularJS

EMPLOYABILITY SKILLS

Course Title : Employability Skills	Total Hours : 30 Hours
Course Code : U24PS51	Total Credits : 1

COURSE OUTCOMES:

On completing this course, students can/are able to

Cos	CO STATEMENT
CO1:	enhance their skills in solving quantitative aptitude problems
CO2:	expertise themselves in solving verbal and non-verbal reasoning problems.
CO3:	prepare for various public and private sector exams and placement drives.
CO4:	interpret the concepts of LOGICAL REASONING Skills.
CO5:	analyze the problems logically and approach the problems in a different manner

Unit I: Quantitative Aptitude – I

6 Hours

H.C.F. and L.C.M. of Numbers - Average - Percentage - Profit and Loss - Ratio and Proportion - Time and Work - Time and Distance - Train Speed.



Unit II: Quantitative Aptitude – II

6 Hours

Area related problems - Problems on Ages - Boat and Stream - Simple Interest - Compound Interest – True discount – Calendar – Clocks - Data Interpretation - Bar Graphs - Pie Chart.

Unit III: Verbal Reasoning – I

6 Hours

Analogy - Classification – Series - Coding & Decoding - Coded inequality - Blood relations - Direction sense test.

Unit IV: Verbal Reasoning – II

6 Hours

Number Test - Ranking and Time Sequence Test - Seating arrangements - Alphabet Test - Logical Venn Diagram.

Unit V: General Knowledge

6 Hours

Abbreviations & Acronyms - Famous Personalities - Important Days (National & International) - Capital Cities and Currencies – Current affairs - Sports – RBI & Banking Terms – Basics of Computers and Internet.

Reference Books:

1. R.S.Agarwal, Quantitative Aptitude for Competitive Examinations, S Chand Publishing company; Revised edition (21 February 2017).
2. R.S.Agarwal, A modern approach to logical reasoning, S Chand Publishing company; August 2022.
3. R.S.Agarwal, A Modern Approach To Verbal Reasoning (Old Edition), S Chand Publishing company.
4. R.S.Agarwal, Advanced objective general knowledge revised edition, S Chand Publishing company, 2017.

e-RESOURCES:

1. <https://www.cuemath.com/numbers/hcf-and-lcm/>
 2. <https://www.geeksforgeeks.org/speed-time-distance-formula-and-aptitude-questions/>
 3. <chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://cdn1.byjus.com/wp-content/uploads/2020/06/Boat-Stream-Sample-Questions.pdf>
 4. <https://www.hitbullseye.com/Simple-Interest-and-Compound-Interest.php>
 5. <chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://examsdaily.in/wp-content/uploads/2018/09/br.pdf>
 6. <https://testbook.com/objective-questions/mcq-on-direction-and-distance--5eea6a0e39140f30f369e42a>
 7. <https://unacademy.com/content/cat/study-material/data-interpretation-and-logical-reasoning/ranking-and-time-sequence/>
 8. <https://www.toppr.com/guides/computer-aptitude-and-knowledge/basics-of-computers/basic-computer-terminology/>
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Hours: 30 Hrs.

Credit:2

Subject Code: U3CSN5P/ U24CSNP51

COURSE OUTCOMES:

To impart the Students' the designing skills in preparing documents, worksheets, presentation, and to make them effectively utilize the computer in preparation of documents and reports by giving hands-on experience in lab.

After Completing this course, students are able to

CO1	Manipulate the text using the available option
CO2	Demonstrate the working of advanced features
CO3	Perform calculation based on the user requirements
CO4	Prepared ata for the presentations

1. Create a bio data and manipulating a text using MS-Word.
2. Create a document and design a department invitation using formatting option.
3. Create a document and to insert picture in right side and related information in left side using page layout option in MS-Word.
4. Create a text manipulation with scientific notations in MS-Word.
5. Create a class timetable using table option in MS-Word.
6. Create a table along with table formatting options using MS-Word.
7. Write a college invitation letter and merge the draft with student's personal database using mail merge on a letter head MS-Word.
8. Draw a flowchart to find sum of two numbers using drawing toolbars in MS-Word.
9. Create a student personal details using Formatting cell option in MS-Excel.
10. Create a student mark sheet and to find the total and average of each student using formula editor in MS-Excel.
11. Create a student mark sheet and determine rank, class using sorting and filtering function in MS-Excel.
12. Create a worksheet for student mark analysis and prepare the Bar and Pie Charts in MS- Excel.
13. Create a suitable worksheet with necessary information and make out a suitable chart showing gridlines, legends and titles for axes in MS-Excel.
14. Manipulate two worksheet data in a single page in MS-Excel.
15. Create a PowerPoint presentation (five slide minimum) relevant to your course of study or field of work.
16. Create a Power Point presentation using various theme and variant.
17. Create a Power Poin tpresentation using Pictures and Layouts.
18. Create a Power Point presentation using various Slide Transitions and Custom animation.



SOFTWARE ENGINEERING

Contact Hours per week: 4Hrs

Subject Code: U24CSC61

Contact Hours per Semester: 60Hrs

Credit: 4

Objective:

To make the students to understand the steps in Software Development and Maintenance and to make the students to involve themselves into the activities of Software Engineering in the class room.

COURSE OUTCOMES:

In this course, the students will

CO 1: Know the different approaches of developing an efficient software.

CO 2: Facilitate the knowledge of technological and managerial aspects of incorporating a software.

CO 3: Be aware of the development of processing a software.

CO 4: Develop the skills in estimating the cost of software development.

CO 5: Learn how to fulfill good software requirements specification.

CO 6: Delineate the ways of designing a software product effectively.

CO 7: Understand the different validation and verification techniques of software testing.

CO 8: Know the different ways of maintaining a software.

CO 9: Develop a wholesome approach to define and develop a qualitative software.

UNIT I (12 HRS)

Introduction and Planning a Software Project: Definitions - Size Factors - Quality and productivity factors - Defining the Problem -Developing solution strategy - Planning and development Process -Planning the Organizational structure.

UNIT II (12 HRS)

Software Cost estimation: Software Cost Factors - Cost Estimation Techniques - Staffing Level Estimation - Estimating software Maintenance cost.

UNIT III (12 HRS)

Software Requirements Definition: Software Requirements Specification - Formal Specification Techniques - Languages and Processors for Requirements specifications.

UNIT IV (12 HRS)

System Design: Design concepts - Modules and modularization criteria -design notations - design techniques - test plans - design guidelines.

UNIT V (12 HRS)

Verification, Validation, and Software Maintenance: Quality assurance - Static analysis - Symbolic Execution - Unit testing and Debugging – System Testing. - Enhancing Maintainability during Development - Configuration management – Source-Code Metrics - Maintenance Tools and Techniques.

Text Books:

Richard Fairley, Software Engineering Concepts, TMH,1985,27th Reprint 2008

Unit 1: Chapters: 1.1, 1.2,1.3, 2.1, 2.2, 2.3, 2.4

Unit 2: Chapters: 3.1, 3.2, 3.3,3.4

Unit 3: Chapters :4.1,4.2, 4.3

Unit 4: Chapters: 5.1,5.2, 5.3, 5.4, 5.7, 5.9

Unit 5: Chapters: 8.1, 8.3, 8.4, 8.5, 8.6, 9.1, 9.3, 9.4, 9.5.



Reference Books:

1. Software Engineering- K.L. James, Prentice Hall of India Pvt. Ltd, New Delhi-2009.
2. Fundamentals of Software Engineering- Rajib Mall, Prentice Hall of India Pvt. Ltd., New Delhi -2003.

COMPUTER GRAPHICS AND DIGITAL IMAGE PROCESSING

Contact Hours per Semester: 60 hrs

Credits: 4

Subject Code: U3CSC62/ U24CSC62

Course Outcomes:

Upon completion of the course, students will be able to

CO1	Acquire knowledge in the core concepts of computer graphics
CO2	Understand the various algorithms for drawing output primitives.
CO3	Gain knowledge in the fundamentals of Digital Image Processing
CO4	Examine intensity transformations and spatial filtering.
CO5	Interpret image segmentation and representation techniques.

UNIT I

(12hrs)

Overview of Graphics Systems: Video Display Devices–Raster and Random Scan Systems – Input Devices – Hard Copy Devices. **Output Primitive:** Points and Lines - Line Drawing Algorithms - Circle Generating Algorithms - Filled-Area Primitives. **Attributes of Output Primitives:** Line Attributes - Curve Attributes - Color and Gray Scale Levels - Area Fill Attributes - Character Attributes - Bundled Attributes – Inquiry Functions – Anti-aliasing.

UNIT II:

(12 HRS)

Two - Dimensional Geometric Transformations: Basic Transformations – Matrix Representations - Composite Transformations - Other Transformations – Transformations between Coordinate Systems.

UNIT III:

(12 HRS)

Fundamentals of Digital Image Processing: What is Digital Image Processing? – The Origins of Digital Image Processing – Examples of Fields that Use Digital Image Processing – Fundamental Steps in Digital Image Processing – Components of Image Processing System. **Digital Images Fundamentals:** Image Sampling and Quantization - Basic Relationship between Pixels.

UNIT IV:

(12 HRS)

Intensity Transformations and Spatial Filtering: Basic Intensity Transformation Functions – Histogram Processing – Fundamentals of Spatial Filtering – Smoothing (Low pass) Spatial Filters - Sharpening (High pass) Spatial Filters. **Color Image Processing:** Color Fundamentals – Color Models – Pseudo color Image Processing – Basics of Full-Color Image Processing – Color Transformations- Color Image Smoothing and Sharpening.

UNIT V:

(12HRS)

Image Segmentation: Fundamentals – Points and Line. Edge Models, Basic Edge Detection – Thresholding: Basic of Intensity Thresholding.

Text Books:

1. Computer Graphics-Donald Hearn, M.Pauline Baker, Prentice Hall of India Pvt. Ltd., New Delhi, 2nd edition, 1994
UNIT I: Chapters 2.1-2.3, 2.5, 2.6, 3.1-3.2, 3.5-3.6, 3.11



UNITII: Chapters 4.1 – 4.8

2. Digital Image Processing, Fourth Edition, Rafael Gonzalez and Richard Woods, Pearson, 2018.

UNITIII: Chapters 1, 2.4 - 2.5.

UNIT IV: Chapters 3.1 – 3.6, 6.1 – 6.6

UNITV: Chapter 10.1, 10.2 (Detection of Points, Line Detection, Edge Models, Gradient Operators) – 10.3

References:

1. Fundamentals of Computer Graphics, Peter Shirley, Michael Ashikhmin, Second Edition, 2005.
 2. Digital Image Processing, An Algorithmic Introduction Using Java, First Edition, Wilhelm Burger and Mark J. Burge, Springer International Edition, 2008.
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MOBILE COMPUTING

Contact Hours per week: 5 hrs

Contact hours per semester: 75 hrs

Subject Code: U2CSC63/ U24CSC63

Credit: 4

Objective: The subject enables students in understanding the literature pertaining to the emerging discipline of Mobile computing systems.

COURSE OUTCOMES:

In this course, the students will

CO1: Provide a detailed coverage of mobile computing and communication aspects

CO2: Learn how to treat Mobile transport and network protocols

CO3: Give an exhaustive coverage to MANET and WSN

CO4: Deal with mobile application development as well as types of mobile OS

Unit 1:

15 Hrs

Introduction to Mobile Computing and Wireless Networking

Mobile handsets, wireless communications and server applications – Cell phone system – Types of telecommunication networks – Computer networks – LAN – LAN architectures – Components of wireless communication system – Architecture of mobile telecommunication system – Wireless networking standards – WLANs – Bluetooth technology – What is mobile computing – Mobile computing vs Wireless networking – Mobile computing applications – characteristics – Structure of mobile computing application – Cellular mobile communications – GSM – GPRS – UMTS – Software defined radio

Chapters: (1.1 to 1.11, 2.1 to 2.10)

Unit 2:

15 Hrs

Mobile Protocols

Properties of MAC protocols – Issues of wireless MAC protocol – Taxonomy of MAC protocol – Fixed assignment schemes – Random assignment schemes – Reservation based schemes – 802.11 MAC standard – MAC protocol for Ad Hoc networks – Cognitive radio ad hoc network – Mobile IP – Packet delivery – Overview – Features of mobile IP – Key mechanism used in mobile IP – Route optimization – DHCP – overview of TCP/IP – TCP in mobile networks

Chapters: (3.1 to 3.9, 4.1 to 4.7, 5.1 and 5.8.3)



Unit 3:

15 Hrs

Mobile Ad Hoc Networks

A few basic concepts – MANET characteristics – MANET Applications – MANET Design issues – Routing– Routing in MANETs – Popular MANET routing protocols – Vehicular Ad Hoc Networks –MANET vs VANET – Security issues in MANET – Attacks on Ad Hoc Networks – Security attack counter measures

Chapters: (7.1to 7.13)

Unit 4:

15 Hrs

Wireless Sensor Networks

WSN vs MANET – Applications – Architecture of the sensor node – Challenges in the design of effective WSN – Characteristics of Sensor Networks – Wireless sensor network routing protocols – Target coverage – clustered wireless sensor networks.

Chapters: (8.1to 8.8)

Unit 5:

15 Hrs

Mobile operating systems & Mobile application development

A few basic concepts – Special constraints and requirements of Mobile OS – Survey of commercial mobile operating systems –comparative study of mobile OS–Operating systems for sensor networks - Mobile devices as web clients – WAP – J2ME – Android application development – Applications of M Commerce – B2B Applications – Structure of M Commerce – Pros and Cons of M Commerce

Chapters: (9.1 to 9.5, 10.1 to 10.4, 11.1 to 11.4)

Text Book:

- Fundamentals of Mobile Computing by Prasant Kumar Pattnaik & Raji b Mall–EEEPHI second edition 2016

Reference Book:

- Mobile Computing by Asoke K Talukder & Roopa R Yavagal – TMH First edition Reprint2008

Elective: Project: SOFTWARE DEVELOPMENT

Contact Hours per week:5 hrs

Subject Code : U24CS6PR

Contact hours per semester: 75hrs

Credit:4

COURSE OUTCOMES:

In this course, the students will

CO 1: Train the students to develop projects effectively.

CO 2: Give the students an indepth knowledge of developing structured software programming techniques.

CO 3: Exposure the students to pointer programming, file based approaches and usage of language structures.

CO 4: Give the students the knowledge of developing web designing applications and android based programming applications.

Objective: To train the students to develop software applications in web based and data processing domains. Students have to develop to applications. First one is for webpage



development and second one is to be done from the theoretical subjects, like, Data Structure, Computer Algorithm, Operating System, Multimedia, Computer Network, and Computer Graphics.

- Students have to undertake projects individually.
- Every student needs to develop two software applications.
- Of these, first one is to be done using PHP/My Sql or JSP/Accessor.NET/Access environments
- First application must be completed and evaluated for 50 marks at the end of January.
- Second application must be completed and evaluated for 50 marks at the end of March.
- Each application is evaluated with two reviews. PPT presentation is mandatory for second review.
[Review1: 10 Marks, Review 2: 10 Marks, Software Completion:30 Marks: Total: 50 marks]
- Total Marks awarded: 2X50 =100 marks.
- Entire assessment is done on the basis of Internal evaluation only.
- Student needs to score a minimum of 40% mark to pass the subject.

LAB: Mobile App Development

Contact Hours per week:6 hrs
Contact hours per semester: 90hrs

Subject Code: U24CSCP61
Credit:3

COURSE OUTCOMES:

In this course, the students will

CO1: Develop Mobile Application based on open source software.

CO2: Learn to use widgets in linear layout and relative layout.

CO3: Apply style and theme.

CO4: Use menu, submenu and shortcut for the menus.

CO5: Handle Dialog box, toast and status bar.

CO6: Develop app with security feature.

CO7: Use database in the App.

Objective:

To meet out the current trends of mobile app development.

Train the students in developing mobile apps using android.

Lab List:

1. Develop an Android Application to welcome a user.
2. Develop an Android Application using linear layout.
3. Develop an Android Application using relative layout.
4. Develop an Android Application using table layout.
5. Develop an Android Application using frame layout.
6. Develop an Android Application using intents.
7. Develop an Android Application using on Click event.
8. Develop an Android Application using listview.
9. Develop an Android Application using option menu.
10. Develop an Android Application using context sensitive menu.



11. Develop an Android Application to create new widget.
12. Develop an Android Application that displays a alert dialog notification.
13. Develop an Android Application that displays a status bar notification.
14. Develop an Android Application to add data into SQLite.

SBE –5 LAB: DOT NET PROGRAMMING

Contact Hours per Semester: 30hrs

Credits:2

Subject Code: U3CSS6P1/ U24CSSP61

Course Outcomes:

Upon completion of the course, students will be able to

CO1	Design and Create windows programs in Visual Basic.NET programming language
CO2	Work with Visual Basic Forms, Toolbox Controls and Properties
CO3	Use a modern IDE to visually and programmatically create programs with GUI's
CO4	Design and implement applications using an object-oriented methodology
CO5	Use ADO.NET to store data in database and retrieve it.

1. To create login form.
2. To check given number is odd or even and Prime or not.
3. To create function
4. To design simple application using CheckBox, Radio Button, Date Time Picker.
5. Dynamically change the back ground color using Scrollbar.
6. To Design Digital Clock.
7. To Design menu for arithmetic operation.
8. Transfer items between 2 list boxes (single or all)
9. To implement array operation (insert, length, reverse, sort, index of)
10. To implement string operation (compare, equal, remove, replace, contain)
11. To implement Stack operation.
12. Student Mark sheet preparation, connect to database and Perform insert, delete, update, select operation

SBE - 6 - LAB: Full Stack Development - II

Contact Hours per Semester: 30 hrs.

Credits: 2

Subject Code: U24CSSP62

Course Outcomes:

Upon completion of the course, students will be able to

CO1	Understand the basics of the frame work
CO2	Use MySQL to store data in a database
CO3	Create Interface to a MongoDB database and a web service
CO4	Build advanced, scalable and high performance web applications

1. Hello World using Node.js
2. Modules in Node.js
3. Require function in Node.js
4. HTTP module in Node.js
5. File system in Node.js



6. EventsinNode.js
 7. File upload in Node.js
 8. Retrieve contents from MySQL in Node.js
 9. Create and Sort MongoDB using Node.js
 10. Perform Insert, Delete and Update in MongoDB using Node.js
 11. Query MongoDB database using Node.js
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NME – LAB: FUNDAMENTALS OF WEB DESIGNING

Contact Hours per Semester: 30hrs

Credits:2

Subject Code: U3CSN6P/ U24CSNP61

Course Outcomes:

Upon completion of the course, students will be able to

CO1	Create basic web pages
CO2	Insert ordered and unordered lists with in a webpage.
CO3	Insert a graphic within a webpage.
CO4	Create a table within a web page.
CO5	Implement a variety of hyper links to connect pages.
CO6	Apply CSS styles to some page elements

1. Design a web page for displaying a document using basic html elements
 2. Design a web page with <hr>, <div> and heading tags
 3. Design a web page for displaying a document using colors and style attribute
 4. Design a webpage with order and un order lists.
 5. Design a webpage with nested lists and marquee tag
 6. Design a web page with definition lists.
 7. Design a web page with image tag
 8. Design a web page with anchor tag
 9. Design a web page with basic table tag
 10. Design a web page with table tag and row span and col span attributes
 11. Design a web page with frame tag
 12. Design a web page with basic form elements
 13. Design a web page for illustrating Cascading Style Sheets
 14. Design a web page for illustrating Embedded Multimedia.
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