

**COURSE OBJECTIVES:**

1. Learn how to solve common types of computing problems.
2. Learn data types and control structures of C
3. Learn to map problems to programming features of C.
4. Learn to write good portable C programs.

**COURSE OUTCOMES:**

Upon successful completion of the course, a student will be able to:

1. Analyse a given problem and develop an algorithm to solve the problem
2. Improve upon a solution to a problem
3. Use the 'C' language constructs in the right way
4. Design, develop and test programs written in 'C'

**UNIT – I: ALGORITHMS AND FLOW CHARTING:** Implementation of algorithms & flowcharts, Overview of C, Constants, variables and Data types, Operators and Expressions, Managing input and output operations, Decision Making and Branching, Decision Making and Looping.

**UNIT - II: FUNCTIONS:** Need for user defined functions, Elements of user defined functions, Definition of functions, Return values and their types, functions calls, function declarations. Category of functions, nesting of functions, recursion, passing arrays to functions, storage classes.

**UNIT – III: ARRAYS:** One-dimensional Arrays- Declaration and Initialization, Two-dimensional Arrays, Initializing Two-dimensional Arrays, Multi-dimensional Arrays.

**STRINGS:** Declaration and Initializing String Variables, Reading and writing of strings, comparison of two strings and String Handling Functions and passing strings to functions.

**UNIT–IV: POINTERS:** Introduction, Understanding Pointers, accessing address of a variable, declaring a pointer variable, accessing a variable through its pointer, chain of pointers, pointer expressions, pointers increments and scale factors.

Pointers and arrays, pointer and character string, Array of pointers, pointers as function arguments, functions returning pointers, pointers to functions.

**UNIT – V: Structures:** Defining and Declaring Structures, Accessing structure members- structure initialization-copying and comparing structure variables, operations on individual members, array of structures, arrays within structure, structures within structures unions.

**File Management:** Introduction, defining and opening a file, closing a file, input/output operations on files, error handling during I/O operations, random access to files. DMA: malloc, calloc, free, realloc.

**Text Books:**

1. Programming in Ansi C – 4<sup>th</sup> edition E. BalaGuruSwamy , Tata Mc Graw Hill, 2004.

**REFERENCE BOOKS**

1. E Balagurusamy: —COMPUTING FUNDAMENTALS & C PROGRAMMING – Tata McGraw-Hill, Second Reprint 2008, ISBN 978-0-07-066909-3.
2. Let us C – Yashwant Kanetkar, Bpb Publications, New Delhi

**STUDENT ACTIVITY:**

1. Write a program for preparing the attendance particulars of students of your college at the end of semester according to following guidelines
  - a. Above 60 % promoted
  - b. Above 65% condoned
  - c. Below 65% detained
2. Write a program for creating timetable or your class taking work load of faculty into consideration.

**PROGRAMMING IN C LAB**

1. Find out the given number is perfect number or not using c program.
2. Write a C program to check whether the given number is Armstrong or not.
3. Write a C program to find the sum of individual digits of a positive integer.
4. A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to print the Fibonacci series
5. Write a C program to generate the first n terms of the Fibonacci sequence.
6. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
7. Write a C program to find both the largest and smallest number in a list of integers.
8. Write a C program that uses functions to perform the following:
  - a. Addition of Two Matrices
  - b. Multiplication of Two Matrices
9. Write a program to perform various string operations
10. Write C program that implements searching of given item in a given list
11. Write a C program to sort a given list of integers in ascending order

### UNIT – 1: JAVA FUNDAMENTALS:

**Fundamentals of Object Oriented programming:** Object Oriented paradigm – Basic concepts of Object Oriented Programming – Benefits of OOP – Applications of OOP.

**Overview of Java Language:** Simple Java Program – Java Program Structure – Java Tokens- Java Statements – Implementing a Java Program – Java Virtual Machine – Command Line Arguments.

**Constants, Variables and Data types:** Constants – Variables – Data types – Declaration of Variables-Giving Values to variables- Scope of Variables-Symbolic Constants-Type Casting.

### UNIT – 2: BASIC CONSTRUCTS AND OBJECT ORIENTED PROGRAMMING CONCEPTS :

**Operators and Expressions:** Arithmetic Operators – Relational Operators- Logical Operators – Assignment Operators – Increment and Decrement Operators – Conditional Operators – Bitwise Operators – Special Operators – Arithmetic Expressions – Evaluation of Expressions – Precedence of Arithmetic Operators – Operator Precedence and Associativity.

**Decision Making and Branching:** Decision Making with If statement – Simple If Statement-If else Statement-Nesting If Else Statement- Else If Ladder- switch Statement – The ?: operator.

**Decision Making and Looping:** while statement –do statement –for statement – Jumps in Loops.

**Class, Objects and Methods:** Defining a Class – Fields Declaration – Methods Declaration – Creating Objects – Accessing class members – Constructors – Methods Overloading – Static Members – Nesting of Methods – Inheritance – Overriding Methods – Final Variables and Methods – Final Classes – Abstract Methods and Classes – Visibility Control.

### UNIT – 3: STRINGS, PACKAGES AND INTERFACES

**Arrays, Strings and Vectors:** One-dimensional Arrays-creating an Array – Two dimensional Arrays –Strings – Vectors – Wrapper Classes – Enumerated Types.

**Interfaces:** Multiple Inheritance: Defining Interfaces – Extending Interfaces – Implementing Interfaces – Accessing Interface Variables.

**Packages:** Java API Packages – Using system Packages – Naming Conventions – Creating Packages Accessing a Package – Using a Package – Adding a Class to a Package – Hiding Classes – Static Import.

**UNIT – 4: EXCEPTIONS AND MULTITHREADING:**

**Multithreaded Programming:** Creating Threads – Extending the Thread Class – Stopping and Blocking a Thread – Life Cycle of a Thread – Using Thread Methods – Thread Exceptions – Thread Priority – Synchronization.

**Managing Errors and Exceptions:** Types of Errors – Exceptions – Syntax of Exception Handling Code – Multiple Catch Statements – Using Finally Statement – Throwing our own exceptions – Using Exceptions for debugging.

**UNIT – 5: APPLETS AND INPUT/OUTPUT STREAMS:**

**Applet Programming:** How Applets differ from Applications – Preparing to write Applets – Building Applet Code – Applet Life Cycle – Creating an executable Applet – Designing a Web Page – Applet Tag – Adding Applet to HTML file – Running the Applet – More about Applet Tag – Passing parameters to Applets – Aligning the display – More about HTML tags – Displaying Numerical Values – Getting Input from the user.

**Managing Input/Output files:** Concepts of Streams -Using Streams--Using the File Class - Creation of files –Reading/Writing Characters-Reading/Writing Bytes- Random Access Files.

**PRESCRIBED BOOKS:**

1. E. Balaguruswamy, Programming with Java, A primer, 3e, TATA McGraw-Hill Company (2008).(Chapters : 1 to 14 and16)

**REFERENCE BOOKS:**

1. Deitel & Deitel. Java TM: How to Program, 7th Edition, PHI (2008).
2. John R. Hubbard, Programming with Java, Second Edition, Schaum’s outline Series, Tata McGrawhill (2007).
3. Timothy Budd, Understanding Object Oriented Programming with Java, Pearson Education (2007).
4. Herbert Schildt, The Complete Reference Java, Seventh Edition, Tata McGraw – Hill Edition(2007)

ST.JOSEPH’S COLLEGE FOR WOMEN (AUTONOMOUS), VISAKHAPATNAM  
 II SEMESTER **COMPUTER SCIENCE** Time: 3 Hrs/Week  
 C 2651/CS 2951/CST 2351(2) **OBJECT ORIENTED PROGRAMMING WITH JAVA** Max. Marks: 50  
 w.e.f. 2017 – 2020 (“17AE”) **COMPUTERS PRACTICALS – I B**

1. Basic language constructs, Operators
2. Object oriented concepts like class, inheritance, polymorphism etc.
3. Arrays, string handling and vectors
4. Interfaces, packages
5. Exception handling and threading
6. Applets, and I/O Streams



### **COURSE OBJECTIVES:**

The student will learn about the cloud environment, building software systems and components that scale to millions of users in modern internet, cloud concepts capabilities across the various cloud service models including IaaS, PaaS, SaaS, and developing cloud based software applications on top of cloud platforms.

### **COURSE OUTCOMES**

- ❖ Compare the strengths and limitations of cloud computing
- ❖ Identify the architecture, infrastructure and delivery models of cloud computing
- ❖ Apply suitable virtualization concept.
- ❖ Choose the appropriate cloud player, Programming Models and approach.
- ❖ Address the core issues of cloud computing such as security, privacy and interoperability
- ❖ Design Cloud Services and Set a private cloud

**UNIT-I: CLOUD COMPUTING OVERVIEW:** – Origins of Cloud computing – Cloud components - Essential characteristics – On-demand self-service , Broad network access , Location independent resource pooling , Rapid elasticity , Measured service

**UNIT-II:** Cloud scenarios – Benefits: scalability, simplicity , vendors ,security. Limitations – Sensitive information - Application development – Security concerns - privacy concern with a third party - security level of third party - security benefits Regularity issues: Government policies

**UNIT – III: Cloud architecture:** Cloud delivery model – SPI framework, SPI evolution , SPI vs. traditional IT Model

**Software as a Service (SaaS):** SaaS service providers – Google App Engine, Salesforce.com and google platform – Benefits – Operational benefits - Economic benefits – Evaluating SaaS

**Platform as a Service ( PaaS ):** PaaS service providers – Right Scale – Salesforce.com – Rackspace – Force.com – Services and Benefits

**UNIT – IV: Infrastructure as a Service (IaaS):** IaaS service providers – Amazon EC2 , GoGrid – Microsoft soft implementation and support – Amazon EC service level agreement – Recent developments – Benefits

**Cloud deployment model:** Public clouds – Private clouds – Community clouds - Hybrid clouds - Advantages of Cloud computing

**UNIT – V: Virtualization:** Virtualization and cloud computing - Need of virtualization – cost, administration, fast deployment, reduce infrastructure cost – limitations

**Types of hardware virtualization:** Full virtualization - partial virtualization - para virtualization

**Desktop virtualization:** Software virtualization – Memory virtualization - Storage virtualization – Data virtualization–Network virtualization

**Microsoft Implementation:** Microsoft Hyper V – Vmware features and infrastructure – Virtual Box - Thin client

#### REFERENCE BOOKS:

1. Cloud computing a practical approach - Anthony T.Velte , Toby J. Velte Robert Elsenpeter  
TATA McGraw- Hill , New Delhi - 2010
2. Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online - Michael Miller - Que 2008
3. Cloud Computing, Theory and Practice, Dan C Marinescu, MK Elsevier.
4. Cloud Computing, A Hands on approach, Arshadeep Bahga, Vijay Madiseti, University Press
5. Mastering Cloud Computing, Foundations and Application Programming, Raj Kumar Buyya, Christenvecctiola, S Tammarai selvi, TMH

#### STUDENT ACTIVITY:

1. Prepare the list of companies providing cloud services category wise.
2. Create a private cloud using local server

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ST.JOSEPH'S COLLEGE FOR WOMEN (AUTONOMOUS), VISAKHAPATNAM  
VI SEMESTER  
CS-C2-6651(2)  
w.e.f. 2015 – 2018 ("15AC")

**COMPUTER SCIENCE**  
**CLOUD COMPUTING LAB**  
**PRACTICAL SYLLABUS - IV C2**

Time: 2 Hrs/Week  
Max: Marks: 50

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**OBJECTIVE:** to enable students to learn web page development and build web applications.

**UNIT - I: Web Essentials:** Internet, World Wide Web (WWW), Components of Web, Types of Websites, Role of web browser and web server, Client, Server and Communication, HTTP –request message- response message.

**HTML:** Document body, Text, Hyperlinks, formatting, List, Tables, Colours, Images and Image Maps, Frames, Forms.

**XML:** Introduction and Feature, Use of XML, XML document, Creating XML, DTD Reading XML

**UNIT – II: STYLE SHEETS:** properties and values in style sheets, Types- Internal, External, In-line style sheets.

**JAVA SCRIPT:**The basic variables, String manipulations, Mathematical functions, Statements, Operators and expressions, Arrays, Loops, Functions, Events and Event handlers

**UNIT – III: PHP:** Variables, Data Types, Operators and Expression, Constants, Switching Flow, Loops, Code block and Browser Output, Working with Functions Calling function, defining function, returning the value from user-defined functions, Creating Arrays, Array related functions, Creating objects, Instance strings manipulation in PHP. Date and Time functions in PHP

**UNIT – IV: Forms:** Creating forms, Accessing form input with user defined arrays, hidden fields, Redirecting a form after submission, mail, File uploads.

**Cookies and Session:** Introduction to cookies, setting cookie with PHP, Session function, start session, working with session variables. destroy session.

**UNIT – V: Files and directories:** create and delete files, opening file for writing, reading or appending. Writing or appending to file. Working with directories, Building a text editor, File Uploading & Downloading.

**MYSQL AND PHP:** interacting with MySQL using PHP, Performing basic database operations, (DML) (Insert, Delete, Update, Select), Setting query parameter, Working with Data.

**TEXT BOOK:** Web Technologies HTML, CSS, JavaScript, ASP.NET, Servlets, JSP, PHP, ADO.NET, JDBC and XML Black Book, Cogent Learning Solutions Inc.

#### REFERENCE BOOKS:

1. Internet and World Wide Web: How to program Deitel & Deitel, PHI
2. Sams Tech Yourself PHP, MySQL and Apache. Pearson Education
3. HTML in 24 hours- Dick Oliver, Tech Media Publications 2000
4. An Introduction to Web Design Plus Programming, Paul S.Wang Sanda S. Katila, Thomson(2007).
5. Programming the World Wide Web, Robert W.Sebesta, Third Edition, Pearson Education (2007).

**UNIT– I: INTRODUCTION, ARRAYS, SORTING** :Introduction to Data structures– overview of Object oriented programming and Java– Java library data structures– Arrays – Operations on arrays– linear search– binary search– big O notation–Sorting methods: Bubble Sort, Selection Sort, Insertion Sort, Quick Sort.

**UNIT– II: STACKS AND QUEUES**: Stacks – Queues – Circular Queue – Deques - Priority Queue – Parsing Arithmetic Expressions.

**UNIT– III: LINKED LISTS**: Simple Linked List – operations on Linked lists – Types of Lists – Sorted Lists – Doubly Linked Lists – operations – Recursion: characteristics, efficiency, simple recursive methods, merge sort.

**Unit –IV: BINARY TREES**: Tree Terminology – Finding a Node – Inserting a Node – Traversing the Tree – Finding Maximum and Minimum values – Deleting a Node – Efficiency & applications of Binary Trees – Trees Represented as arrays – Hashing: open addressing, separate chaining, hash functions.

**UNIT–V: GRAPHS** : Introduction to Graphs – Searches – Minimum Spanning Tree – Topological Sorting with Directed Graphs – Connectivity in Directed Graphs–Warshall's algorithm– Shortest path problem– when to use what: general purpose and special purpose data structures.

**PRESCRIBED BOOKS**: 1. Robert Lafore, Data Structures & Algorithms in Java, Second Edition, Pearson Education (2008) (Chapters: 1, 2, 3, 4, 5, 6, 7(quick sort), 8, 11, 13, 15).

**REFERENCE BOOKS:**

1. Data Structures by Seymour Lipschultz, Schaum's outline Series, International Edition, 1986.
2. John R. Hubbard, Anita Hurry, Data Structures with Java, Pearson Education (2008).

Java programs for implementing the following data structures and also their operations and applications

1. Arrays: operations
2. Sorting & searching methods
3. Stacks: Basic Operations and its applications.
4. Queues: Basic Operations, Circular queue, Deques, Priority Queue.
5. Linked List: operations on singly linked lists, doubly linked lists.
6. Trees: Operations, Traversals, Binary trees–applications.
7. Graphs: Traversals.

**OBJECTIVES:** To enable the students to  
To get an overview of Database Management Concepts.  
To know the rules for designing and working with a database.  
To work with SQL and PL/SQL

**UNIT - I:** Database Systems Introduction and Fundamentals.

**Database Systems:** Introducing the database and DBMS, Why the database is important, Historical  
**Roots:** Files and File Systems, Problems with File System Data Management, Database Systems,  
DBMS architecture.

**Data Models:** The importance of Data models, Data Model basic building blocks, Business Rules,  
The evaluation of Data Models, levels of Data Abstraction.

**UNIT - II: Data Modelling**

**Relational Database Model:** A logical view of Data, Keys, Integrity Rules, Relational Set operators,  
the Data Dictionary and the system catalogue, Relationships within the Relational Database,  
Indexes, Codd's relational database rules.

**Entity Relationship Model:** The ER Model, Developing ER Diagram, Database Design  
**Challenges:** Conflicting Goals.

**UNIT - III: Normalization & SQL**

**Normalization of database tables:** Database Tables and Normalization, The need for  
Normalization, The Normalization Process, Improving the design, Surrogate key Considerations,  
High level Normal Forms, Normalization and database design, de-normalization.

**Introduction to SQL:** Data Definition Commands, Data Manipulation Commands, Select queries,  
Advanced Data Definition Commands, Advanced Select queries, Virtual tables, Joining  
Database Tables.

**UNIT - IV: Advanced SQL & Procedural SQL**

**Advanced SQL:** Relational Set Operators, SQL Join Operators, Sub-queries, SQL Functions,  
Oracle Sequences, Updatable Views,

**PLSQL:** programming statements, triggers, cursors, stored procedures, stored functions.

**UNIT - V:** Transaction management, Database Administration, Distributed Databases

Transaction properties, transaction management with SQL, transaction log

Concurrency control: Lost updates, uncommitted data, inconsistent retrievals.

Database Administration: The evolution of database administration function, database administrator roles and responsibilities, database security.

Distributed Database Management Systems: The evolution of distributed Database Management Systems, DDBMS advantages and Disadvantages, Distribution Processing and Distribution Databases, Characteristics of distributed Database management systems.

**PRESCRIBED TEXT BOOK:**

Database Systems Design, Implementation and Management by Peter Rob, Carlos Coronel, 7th Edition Cengage Learning.

**CHAPTER:** 1, 2, 3, 4, 5, 7, 8, 10.2, 11.1.2, 12.2, 12.3, 12.4, 15.4, 15.5, 15.6.

**REFERENCE BOOKS:**

1. Database management Systems by Raghuramakrishnan & Johannes Gehrke McGrahill.
2. Fundamentals of Database Systems by Elmasri / Navathe, Fifth Edition, Person Addison Wesley.
3. An Introduction to Database Systems by C.J.Date, A.Kannan, S. Swamynathan, Eight Edition, Person Education.
4. Database system Concepts by Avi Silberschatz, Henry F.Korth S. Sudarshan McGraw-Hill.

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V SEMESTER  
C 5651/CS 5951 (2)  
w.e.f. 2015 – 2018 (“15AC”)

**COMPUTER SCIENCE**  
**D.B.M.S. LAB**  
**PRACTICAL – III A**

Time: 3 Hrs/Week  
Max. Marks: 50

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**UNIT – I: DATA WAREHOUSING :** Data warehousing Components –Building a Data warehouse– Data Extraction, Cleanup, and Transformation Tools –Metadata.

**UNIT – II:** Data Warehouse and OLAP Technology for Data Mining Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation.

**UNIT – III: Introduction To Data Mining:** Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Major issues in Data Mining.

**Data Pre-Processing:** Needs Pre-processing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.

**UNIT – IV: ASSOCIATION RULE MINING AND CLASSIFICATION:** Mining Frequent Patterns, Associations and Correlations – Mining Methods – Mining Various Kinds of Association Rules – Correlation Analysis Classification- Basic Concepts - Decision Tree Induction - Bayesian Classification – Rule Based Classification – Classification by Back propagation – Associative Classification.

**UNIT – V: CLUSTERING AND APPLICATIONS AND TRENDS IN DATA MINING :** Cluster Analysis - Types of Data – Categorization of Major Clustering Methods - K-means – Partitioning Methods – Hierarchical Methods - Density-Based Methods - Clustering High Dimensional Data- Outlier Analysis.

**TEXT BOOKS:**

1. Data Mining Concepts and Techniques Jiawei Han and Micheline Kamber Morgan Kaufman Publications.

**REFERENCE BOOKS:**

1. Data Mining Introductory and Advanced Topics, Margaret H Dunhan, Pearson Education.
2. Data Mining, Ian H. Witten Eibe Frank, Morgan Kaufman Publications.

**OBJECTIVES:**

- To understand the concepts of computer networks.
- To study the functions of different layers.
- To introduce IEEE standards employed in computer networking.
- To make the students to get familiarized with different protocols and network components

**UNIT-I: INTRODUCTION:** Uses of Computer Networks – Networks for Companies, Networks for people, Social Issues. Network Hardware – Topologies, LAN, MAN, WAN, Wireless Networks, Internetworks. Network Software– Protocol Hierarchies, Design Issues for the Layers, Interfaces and Services, Connection-Oriented and Connectionless Services, Service Primitives. Reference Models -The OSI Reference Model, The TCP/IP Reference Model, A comparison of the OSI and TCP Reference Model.

**Physical Layer:** Transmission Media – Magnetic media, Twisted Pair, Baseband Coaxial Cable, Broadband Coaxial Cable, Fiber Optics, Wireless Transmission.  
Chapters 1.1, 1.2, 1.3, 1.4(1.4.1, 1.4.2, 1.4.3), 2.2, 2.3

**UNIT-II: DATA LINK LAYER:** Data Link Layer Design Issues, Error Detection and Correction, Elementary Data Link Protocols- A Simplex Stop-and-Wait Protocol, A Simplex Protocol for a Noisy channel. Sliding Window Protocol- A protocol using Go Back n

**UNIT-III: MEDIUM ACCESS SUBLAYER:** Channel Allocation Problem, Multiple Access Protocols, IEEE Standard 802.3: Ethernet, 802.5: Token Ring  
Chapters: 3.1, 3.2, 3.3(3.3.2, 3.3.3), 3.4(3.4.1, 3.4.2), 4.1, 4.2, 4.3(4.3.1, 4.3.3)

**UNIT-IV: NETWORK LAYER:** Network Layer Design Issues, Routing Algorithms-Shortest Path Routing, Hierarchical Routing, Routing for Mobile Hosts, Broadcast Routing and Multicast Routing.  
Chapters: 5.1, 5.2(5.2.1, 5.2.2, 5.2.7, 5.2.8, 5.2.9, 5.2.10)

**UNIT-V: TRANSPORT LAYER:** The Transport Services-Services provided to the Upper Layers, Quality of Service, Transport Service Primitives, Elements of Transport Protocols- Addressing, Establishing a connection, Releasing a connection, Flow control and buffering, Multiplexing, and Crash Recovery.  
Chapters: 6.1, 6.2

**APPLICATION LAYER:** Domain Name System, Simple Network Management Protocol- SNMP Model, SNMP Protocol, Electronic Mail, and World Wide Web.  
Chapters: 7.2, 7.3(7.3.1, 7.3.5), 7.4(7.4.1, 7.4.2, 7.4.3), 7.6(7.6.1, 7.6.2, 7.6.3)

**TEXT BOOK:** Andrew S. Tanenbaum, "Computer networks", Third Edition, Pearson Education.

**REFERENCE BOOK:** Behrouz A. Fourouzan, "Data Communication and Networking", Tata McGraw-Hill, 2004.

ST.JOSEPH'S COLLEGE FOR WOMEN (AUTONOMOUS), VISAKHAPATNAM

VI SEMESTER

CS-C1-6651(2)

w.e.f. 2015 – 2018 ("15AC")

**COMPUTER SCIENCE**  
**PROJECT & VIVA-VOCE**  
**SYLLABUS - IV C1**

Time:3Hrs/Week

Max:Marks:50

The objective of the project is to motivate them to work in emerging/latest technologies, help the students to develop ability, to apply theoretical and practical tools/techniques to solve real life problems related to industry, academic institutions and research laboratories.

The project is of 2 hours/week for one (semester VI) semester duration and a student is expected to do planning, analyzing, designing, coding, and implementing the project. The initiation of project should be with the project proposal. The synopsis approval will be given by the project guides.

The project proposal should include the following:

- Title
- Objectives
- Input and output
- Details of modules and process logic
- Limitations of the project
- Tools/platforms, Languages to be used
- Scope of future application

The Project work should be either an individual one or a group of not more than three members and submit a project report at the end of the semester. The students shall defend their dissertation in front of experts during viva-voce examinations.

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**COURSE OBJECTIVES:**

1. To understand the services provided by and the design of an operating system.
2. To understand the structure and organization of the file system.
3. To understand what a process is and how processes are synchronized and scheduled.
4. To understand different approaches to memory management.
5. Students should be able to use system calls for managing processes, memory and the file system.

**COURSE OUTCOMES:**

1. Analyze the concepts of processes in operating system and illustration of the scheduling of processor for a given problem instance.
2. Identify the dead lock situation and provide appropriate solution so that protection and security of the operating system is also maintained.
3. Analyze memory management techniques, concepts of virtual memory and disk scheduling.
4. Understand the implementation of file systems and directories along with the interfacing of IO devices with the operating system.

**UNIT – I: OPERATING SYSTEM INTRODUCTION:** Operating Systems Objectives and functions, Computer System Architecture, OS Structure, OS Operations, Evolution of Operating Systems - Simple Batch, Multi programmed, time shared, Parallel, Distributed Systems, Real-Time Systems, Operating System services.

**UNIT – II:** Process and CPU Scheduling - Process concepts - The Process, Process State, Process Control Block, Threads, Process Scheduling - Scheduling Queues, Schedulers, Context Switch, Preemptive Scheduling, Dispatcher, Scheduling Criteria, Scheduling algorithms, Case studies: Linux, Windows.  
Process Coordination - Process Synchronization, The Critical section Problem, Synchronization Hardware, Semaphores, and Classic Problems of Synchronization, Monitors, Case Studies: Linux, Windows.

**UNIT – III:** Memory Management and Virtual Memory - Logical & physical Address Space, Swapping, Contiguous Allocation, Paging, Structure of Page Table. Segmentation, Segmentation with Paging, Virtual Memory, Demand Paging, Performance of Demanding Paging, Page Replacement Page Replacement Algorithms, Allocation of Frames.

**UNIT– IV:** File System Interface - The Concept of a File, Access methods, Directory Structure, File System Mounting, File Sharing, Protection, File System Structure, Mass Storage Structure - Overview of Mass Storage Structure, Disk Structure, Disk Attachment, Disk Scheduling.

**UNIT – V:** Deadlocks - System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection and Recovery from Deadlock.

**.REFERENCES BOOKS:**

1. Operating System Principles, Abraham Silberchatz, Peter B. Galvin, Greg Gagne 8th Edition, Wiley Student Edition.
2. Principles of Operating Systems by Naresh Chauhan, OXFORD University Press
3. Operating systems - Internals and Design Principles, W. Stallings, 6th Edition, Pearson.
4. Modern Operating Systems, Andrew S Tanenbaum 3rd Edition PHI.
5. Operating Systems A concept - based Approach, 2nd Edition, D. M. Dhamdhere, TMH.
6. Principles of Operating Systems, B. L. Stuart, Cengage learning, India Edition.
7. Operating Systems, A. S. Godbole, 2nd Edition, TMH

**STUDENT ACTIVITY:**

1. Load any new operating system into your computer.
2. Partition the memory in your system
3. Create a semaphore for process synchronization

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ST.JOSEPH'S COLLEGE FOR WOMEN (AUTONOMOUS), VISAKHAPATNAM

IV SEMESTER

**COMPUTER SCIENCE**

Time: 3 Hrs/Week

C 4651/CS 4951/CST4351(2)

**UNIX LAB**

Max. Marks: 50

w.e.f. 2017 – 2020 ("17AE")

**PRACTICAL SYLLABUS – II B**

1. Simulate the following CPU scheduling algorithms
  - a) Round Robbin    b) SJF    c) FCFS    d) Priority
2. Simulate all file allocation strategies
  - a) Sequential        b) Indexed    c) Linked        d) Priority
3. Simulate Banker's Algorithms Dead Lock Avoidance
4. Simulate Banker's Algorithms Dead Lock Prevention
5. Simulate all page replacement algorithms
  - a) FIFO        b) LRU        c) LFU

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**OBJECTIVES:** The objective of the courses is to make the learner efficiently work as software engineer. Design, implement, and evaluate software- based systems, complements or programs of varying complexity that meet desired needs, satisfy realistic constraints, and demonstrate accepted design and development principles.

**COURSE:**

**UNIT – I: INTRODUCTION TO SOFTWARE ENGINEERING.**

Definition of software and software engineering, characteristics of software, software myths. Modeling with UML:- UML Concepts, diagrams.

**SOFTWARE PROCESS:** software process models - the waterfall model , incremental process model, prototyping model, spiral model, RAD model.

**UNIT – II: SOFTWARE REQUIREMENT ANALYSIS**

Requirements engineering, requirement elicitation for software, developing use cases, requirement validation, requirement specification.

Requirement analysis introduction, elements of the analysis model – data objects, attributes.

**UNIT – III: SOFTWARE DESIGN:-** The software design process , design concepts, object – oriented design concepts. System design activities :- architectural design, user interface design, component level design, pattern based design.

**UNIT – IV: SOFTWARE TESTING:** Software testing fundamentals, white box testing, black box testing Software testing strategies:- unit testing, integration testing, regression testing , smoke testing, validation testing, system testing, debugging.

**UNIT – V: MANAGING CHANGE:** Project management concepts, process improvement, process and product quality, process analysis and modeling, process measurement, process classification, the CMMI process improvement frame work, software maintenance, s/w supportability, s/w reengineering , reverse engineering.

**TEXT BOOK:-**“Software engineering- a practitioners approach “ by roger s. pressman, MCGRAW HILL, 7<sup>th</sup> edition.

**REFERENCE BOOK:-** “Software engineering “by Ian sommersille, pearson education, 7<sup>th</sup> edition. Software engineering – design reliability and management “by Richard Fairley.

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**CS-E1-6651(2)**

**Lab Work**

Project work included in Project Work and Viva Voce of Cluster ‘C’.