



**Progressive Education Society's
Modern College of Engineering, Shivajinagar,
Pune-05**

MCA DEPARTMENT

**E-CURRICULUM
BOOKLET
(2020 Pattern)**

**FY – MCA (UNDER ENGINEERING)
SEMESTER II**



Progressive Education Society's
Modern College of Engineering, Pune
MCA Department

Quality Policy of the Institute

We, PES Modern College of Engineering are committed to develop and foster cultured and promising professionals by imparting quality education in the field of Engineering and Management.

Vision of the Institution

"To create a collaborative academic environment to foster professional excellence and ethical values"

Mission of the Institution

- To develop outstanding professionals with high ethical standards capable of creating and managing global enterprises
- To foster innovation and research by providing a stimulating learning environment
- To ensure equitable development of students of all ability levels and backgrounds
- To be responsive to changes in technology, socio-economic and environmental conditions
- To foster and maintain mutually beneficial partnerships with alumni and industry



Departmental Vision

“To develop Competent Technocrats in the field of Computer applications imbued with human values”

Departmental Mission

- To impart knowledge in the field of Computer applications with a focus on developing the required competencies.
- To improve technical skill of the students through practical and hands-on experience.
- To enhance the quality of the students by collaboration with Alumni and Industry.
- To make students socially responsible citizens.

Program Educational Objectives

PEO 1 : Graduates will possess the broad knowledge of computer applications for successful careers in industry.

PEO 2 : Graduates will exhibit professionalism, ethical attitude, communication skills, team work in their profession and adapt to current trends by engaging in lifelong learning.

PEO 3 : Graduates will contribute as responsible citizens with a commitment to the sustainable development of society.



Programme Outcomes

After completing MCA degree student will be able to:

- PO1. Apply knowledge of mathematics, computer science appropriate for real world applications.
- PO2. Identify, formulate, analyze and solve complex computing problems using relevant domain disciplines.
- PO3. Design and evaluate solutions for complex computing problems that meet specified needs for real world applications.
- PO4. Apply programming logic including design of algorithm, programs, analysis and interpretation of data to provide valid solutions
- PO5. Apply appropriate techniques and modern computing tools for development of real world applications.
- PO6. Understand and commit to professional ethics and cyber regulations, responsibilities, and norms of professional computing practices.
- PO7. Understand the need and develop the capacity to persistent learning for continual development as a computer professional.
- PO8. Participate as a member and leader in a team and stand out in multidisciplinary environments to demonstrate computing and management skills.
- PO9. Communicate effectively to comprehend and present effective technical Documentation.
- PO10. Apply the computing knowledge efficiently & effectively with concern for societal, environmental, and cultural aspects relevant to professional computing practices.
- PO11. To contribute effectively as an individual and as a member or leader in diverse teams and in multidisciplinary environments.
- PO12. To identify a timely opportunity and innovation with entire effort to function as an successful entrepreneur.



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**Course Structure
FY MCA Sem II**

Course Code	Course	Teaching Scheme Hours/Week		Examination Scheme						Credit	
		TH	PR	Int	Ext	TW	OR	PR	Total Marks	TH	PR
310912	Database Management System	3	-	30	70		-		100	3	
310913	Computer Network	3	-	30	70		-		100	3	
310914	Java Programming	3	-	30	70		-		100	3	
310915	Operating Systems	3	-	30	70		-		100	3	
310916	Elective-I	3		30	70		-		100	3	
310917	Database Management System Laboratory	-	4	-	-	25	-	50	75		2
310918	Operating System Laboratory	-	2	-	-	50	-		50		1
310919	Java Programming Laboratory	-	4	-	-	25	-	50	75		2
310920	Project Based Learning-I (Mini Project- I)	-	2	-	-	50	-		50		1
	Total	15	12	150	350	150	--	100	750	21	
310921	Audit Course-2									Grade	
310922	*Non Credit Course -2: MOOC Course-II - Swayam/Spoken Tutorial/NPTEL course									Grade	
310921-Audit Course 2(AC2) Options: AC2-I: Foreign Language AC2-II: Environmental Studies AC2-III: Augmented reality and Virtual Reality											
Elective I Mobile Computing Artificial Intelligence Cyber Security Block Chain Open Elective											



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310912

Database Management System



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Teaching Scheme, Credit, Examination Scheme

Teaching Scheme	Credit	Examination Scheme
TH: 03 Hours/Week	03	Internal: 30 Marks External : 70 Marks

Prerequisites (Conceptual knowledge to understand the course contents)

- ❖ Basics knowledge of Discrete Mathematics, Data Structures

Course Objectives

- ❖ To understand the fundamental concepts of database management. These concepts include aspects of database design, database languages, and database-system implementation.
- ❖ To provide a strong formal foundation in database concepts, technology and practice.
- ❖ To give systematic database design approaches covering conceptual design, logical design and an overview of physical design.
- ❖ Be familiar with the basic issues of transaction processing and concurrency control.
- ❖ To learn and understand various Database Architectures and Applications.
- ❖ To learn a powerful, flexible and scalable general purpose database to handle big data.

Course Outcomes

Upon completion of the subject, students will be able to:

- CO1: Design E-R Model for given requirements and convert the same into database tables.
- CO2: Use database techniques such as SQL & PL/SQL.
- CO3: Use modern database techniques such as NOSQL.
- CO4: Explain transaction Management in relational database System.
- CO5: Describe different database architecture and analyses the use of appropriate architecture in real time environment.
- CO6: Students will be able to use advanced database Programming concepts Big Data – HADOOP.



Course Contents

Unit I:

Introduction

Introduction to Database Management Systems, Purpose of Database Systems, Database-System Applications, View of Data, Database Languages, Database System Structure, Data Models, Database Design and ER Model: Entity, Attributes, Relationships, Constraints, Keys, Design Process, Entity Relationship Model, ER Diagram, Design Issues, Extended E-R Features, converting E-R & EER diagram into tables.

Unit II:

SQL AND PL/SQL

SQL: Characteristics and advantages, SQL Data Types and Literals, DDL, DML, SQL Operators, Tables: Creating, Modifying, Deleting, Views: Creating, Dropping, Updating using Views, Indexes, SQL DML Queries: SELECT Query and clauses, Set Operations, Predicates and Joins, Set membership, Tuple Variables, Set comparison, Ordering of Tuples, Aggregate Functions, Nested Queries, Database Modification using SQL Insert, Update and Delete Queries. PL/SQL: concept of Stored Procedures & Functions, Cursors, Triggers, Assertions, roles and privileges, Embedded SQL, Dynamic SQL.

Unit III:

Relational Database Design

Relational Model: Basic concepts, Attributes and Domains, CODD's Rules, Relational Integrity: Domain, Referential Integrities, Enterprise Constraints, Database Design: Features of Good Relational Designs, Normalization, Atomic Domains and First Normal Form, Decomposition using Functional Dependencies, Algorithms for Decomposition, 2NF, 3NF, BCNF.

Unit IV:

Database Transactions and Query Processing

Basic concept of a Transaction, Transaction Management, Properties of Transactions, Concept of Schedule, Serial Schedule, Serializability: Conflict and View, Cascaded Aborts, Recoverable and Nonrecoverable Schedules, Concurrency Control: Need, Locking Methods, Deadlocks, Timestamping Methods, Recovery methods : Shadow-Paging and Log-Based Recovery, Checkpoints, Query Processing, Query Optimization, Performance Tuning



Unit V: Parallel and Distributed Databases

Introduction to Database Architectures: Multi-user DBMS Architectures, Parallel Databases: Speedup and Scale up, Architectures of Parallel Databases.

Distributed Databases: Architecture of Distributed Databases, Distributed Database Design, Distributed Transaction: Basics, Failure modes, Commit Protocols, Concurrency Control in Distributed Database

Unit VI : NoSQL Database

Introduction to NoSQL Database, Types and examples of NoSQL Database- Key value store, document store, graph, Performance, Structured verses unstructured data, Distributed Database Model, CAP theorem and BASE Properties, Comparative study of SQL and NoSQL, NoSQL Data Models, Case Study-unstructured data from social media. Introduction to Big Data, HADOOP: HDFS, MapReduce.

References

Reference Books

1. C J Date, —An Introduction to Database Systems, Addison-Wesley, ISBN: 0201144719
2. S.K.Singh, —Database Systems : Concepts, Design and Application, Pearson, Education, ISBN 978- 81-317-6092-5
3. Kristina Chodorow, Michael Dirolf, —MangoDB: The Definitive Guide, O'Reilly Publications, ISBN: 978-1-449-34468-9.
4. Adam Fowler, —NoSQL For Dummies, John Wiley & Sons, ISBN-1118905628
5. Kevin Roebuck, —Storing and Managing Big Data - NoSQL, HADOOP and More, Emereopt Limited, ISBN: 1743045743, 9781743045749
6. Joy A. Kreibich, —Using Sqlite, O'REILLY, ISBN: 13:978-93-5110-934-1
7. Garrett Golemund, —Hands-on Programming with R, O'REILLY, ISBN : 13:978-93- 5110-728-6

Text books

1. Silberschatz A., Korth H., Sudarshan S., "Database System Concepts", McGraw Hill Publishers, ISBN 0-07-120413-X, 6th edition
2. Connally T, Begg C., "Database Systems", Pearson Education, ISBN 81-7808-861-4
3. Pramod J. Sadalage and Martin Fowler, —NoSQL Distilled, Addison Wesley, ISBN10: 0321826620, ISBN-13: 978-0321826626



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MOOC Courses:

1. <https://www.coursera.org/courses?query=database>
2. <https://cs.stanford.edu/people/widom/DB-mooc.html>
3. www.edx.org

E books links

1. <http://www.freebookcentre.net/database-books-download/Introduction-to-Database-Systems.html>

Continuous Assessment details (Internal Evaluation Scheme)

Scheme	Open Book Test I	Open Book Test II	Unit Test I	Unit Test II	Assignment	MCQ Test
Marks	10	10	10	10	10	10
Unit*	I	II	III	IV	V	VI

[Note: - * indicates unit number may vary]



Unit wise Question Bank

Unit I:

1. What is DBMS? Explain features of DBMS.
2. Explain Database system Application?
3. What is Data Abstraction? Explain level of Abstraction with labelled diagram.
4. Explain DBMS architecture with proper diagram
5. Explain constraints with example

Unit II:

1. What is join? Explain its types.
2. What is the difference between SQL and PLSQL?
3. Explain Function and types of function
4. Explain Trigger with example
5. Explain DML and DDL commands with example

Unit III:

1. Explain any five CODD's rule.
2. What is normalization? Explain types of normalization.
3. Explain in brief functional dependencies.
4. Explain integrity constraint.
5. Explain decomposition.

Unit IV:

1. What is transaction? Explain its properties.
2. Explain states of transaction with suitable diagram.
3. What is Deadlock?
4. Explain in details Shadow-Paging and Log-Based Recovery
5. What are the Properties of Transactions?

Unit V:

1. Explain Parallel Database architecture.
2. Explain Architecture of Distributed Databases.
3. Explain Concurrency Control in Distributed Database.
4. Explain commit protocols.
5. Explain Multi-user DBMS architecture

Unit VI:

1. Difference between SQL and NOSQL
2. Explain Types and examples of NoSQL Database
3. Explain HDFS in HADOOP.
4. Explain Distributed Database Model.
5. Explain CAP theorem.



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Computer Network



Teaching Scheme, Credit, Examination Scheme

Teaching Scheme	Credit	Examination Scheme
TH : 03 Hours / Week	03	Internal: 30 Marks External : 70 Marks

Prerequisites (Conceptual knowledge to understand the course contents)

Basic Knowledge of Computer

Course Objectives

- ❖ To understand the fundamental concepts of networking standards, protocols and technologies
- ❖ To learn different techniques for framing, error control, flow control and routing.
- ❖ To learn role of protocols at various layers in the protocol stacks.
- ❖ To learn network programming.
- ❖ To develop an understanding of modern network architectures from a design and performance perspective.

Course Outcome

Upon completion of the subject, students will be able to:

- CO1: Analyze the requirements for a given organizational structure to select the most appropriate networking architecture, topologies, transmission mediums, and technologies.
- CO2: Demonstrate design issues, flow control and error control.
- CO3: Analyze data flow between TCP/IP model using Application, Transport and Network Layer protocols.
- CO4: Illustrate applications of Computer Network capabilities, selection and usage for various sectors of user community.
- CO5: Illustrate Client-Server architectures and prototypes by the means of correct standards and technology.
- CO6: Demonstrate different routing and switching algorithms.



Course Contents

Unit I: Physical Layer

Introduction of LAN; MAN; WAN; PAN, Ad-hoc Network, OSI Model, TCP/IP Model, Topologies: Star and Hierarchical; Design issues for Layers, Transmission Mediums: CAT5, 5e, 6, OFC and Radio Spectrum, Network Devices: Bridge, Switch, Router, Brouter and Access Point, Manchester and Differential Manchester Encodings; IEEE802.11: Frequency Hopping (FHSS) and Direct Sequence (DSSS)

Unit II: Logical Link Control

Design Issues: Services to Network Layer, Framing, Error Control and Flow Control. Error Control: Parity Bits, Hamming Codes (11/12-bits) and CRC. Flow Control Protocols: Unrestricted Simplex, Stop and Wait, Sliding Window Protocol, WAN Connectivity: PPP and HDLC

Unit III: Medium Access Control

Channel allocation: Static and Dynamic, Multiple Access Protocols: Pure and Slotted ALOHA, CSMA, WDMA, IEEE 802.3 Standards and Frame Formats, CSMA/CD, Fast Ethernet, Gigabit Ethernet, IEEE 802.11a/b/g/n and IEEE 802.15 and IEEE 802.16 Standards, CSMA/CA

Unit IV: Network Layer

Network Layer Services, Switching techniques, IP Protocol, IPv4 and IPv6 addressing schemes, Subnetting, NAT, CIDR, ICMP, Routing Protocols: Distance Vector, Link State, Path Vector, Routing in Internet: RIP, OSPF, BGP, Congestion control and QoS, MPLS, Mobile IP, Routing in MANET: AODV, DSR

Unit V: Transport Layer

Transport Layer Services, UDP: Datagram services, Applications, Berkeley Sockets, Addressing, Connection establishment, Connection release, Flow control and buffering, Multiplexing, TCP: Services, Features, Segment, TCP Timer management, TCP Congestion Control, Real Time Transport protocol (RTP), Stream Control Transmission Protocol (SCTP), Quality of Service (QoS), Differentiated services, TCP and UDP for Wireless.

Unit VI: Application Layer

Client Server Paradigm: Communication using TCP and UDP, Peer to Peer Paradigm, Application Layer Protocols: Domain Name System (DNS), Hyper Text Transfer Protocol (HTTP), Email: SMTP, MIME, POP3, Webmail, FTP, TFTP, TELNET, Dynamic Host Control Protocol (DHCP), Simple Network Management Protocol (SNMP).



References

Reference Books

1. Kurose, Ross “Computer Networking a Top Down Approach Featuring the Internet”, Pearson, ISBN10: 0132856204
2. Matthew S. G, “802.11 Wireless Networks”, O’Reilly publications, ISBN: 81-7656-992-5
3. C. Siva Ram Murthy and B. S. Manoj, “Ad Hoc Wireless Networks: Architectures and Protocols” Prentice Hall, ISBN-10: 8131706885; ISBN-13: 978-8131706886
4. Holger Karl and Andreas Willing, “Protocols and Architectures for Wireless Sensor Networks”, Wiley India , ISBN: 9788126533695
5. Eldad Perahia, Robert Stacey, “Next Generation Wireless LANs”, Cambridge, ISBN-10: 1107016762; ISBN-13: 978-1107016767
6. Efraim Turban, Linda Volonino, Gregory R. Wood “Computer Networking a Top Down Approach Featuring the Internet”, 10th Edition, Wiley; ISBN13: 978-1-118-96126-1sor

Text books

1. Andrew S. Tenenbaum, “Computer Networks”, PHI, ISBN 81-203-2175-8.
2. Fourauzan B., "Data Communications and Networking", 5 th Edition, Tata McGraw- Hill, Publications, ISBN: 0 – 07 – 058408 – 7

E books links :-

1. <http://intronetworks.cs.luc.edu/current/ComputerNetworks.pdf>
2. <http://intronetworks.cs.luc.edu/current/ComputerNetworks.pdf>

MOOC Courses:

1. <https://www.coursera.org/courses?query=computer%20network>
2. <https://www.udacity.com/course/computer-networking--ud436>

Continuous Assessment details (Internal Evaluation Scheme)

Scheme	Open Book Test I	Open Book Test II	Unit Test I	Unit Test II	Assignment	MCQ Test
Marks	10	10	10	10	10	10
Unit*	I	II	III	IV	V	VI

[Note: - * indicates unit number may vary]



Unit wise Question Bank

UNIT I -

- Q1: Illustrate TCP/IP reference model.
- Q2: Short Note: 1) Bridge 2) Switch 3) Router
- Q3: Explain FHSS.
- Q4: Explain DSSS.
- Q5: Explain Topologies and its types.

UNIT II

- Q1: What is Framing? And Explain Need of framing.
- Q2: Difference Between Error Control And Flow Control.
- Q3: Write Short note on PPP
- Q4: Write Short note on HDLC
- Q5: Explain Stop And Wait protocol.

UNIT III -

- Q1: Explain Ststic and dynamic allocation.
- Q2: Write difference between Slotted ALOHA and Pure ALOHA.
- Q3: Explain CSMA and CSMA/CD.
- Q4: Difference between CSMA/CD and CSMA/CA.

UNIT IV -

- Q1: Explain Switching techniques.
- Q2: Difference between IPV4 and IPV6.
- Q3: What is subnetting.
- Q4: Explain Congestion control and QoS.
- Q5: Short Note on: 1)Distance Vector. 2)Link State.

UNIT V -

- Q1: Explain UDP and TCP.
- Q2: What is Datagram Service?
- Q3: Short note on: TCP Timer management and TCP Congestion Control.
- Q4: Explain SCTP.
- Q5: Illustrate QoS.

UNIT VI –

- Q1: Explain Peer to Peer Paradigm.
- Q2: Explain Application Layer Protocols(Any 2).
- Q3: Difference between FTP and SMTP.
- Q4: Short note on DHCP.
- Q5: Illustrate SNMP.



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Java Programming



Teaching Scheme, Credit, Examination Scheme

Teaching Scheme	Credit	Examination Scheme
TH: 03 Hours/Week	03	Internal: 30 Marks External : 70 Marks

Prerequisites (Conceptual knowledge to understand the course contents)

- ❖ Basics of programming languages

Course Objectives

- ❖ To learn the core concept of Java programming
- ❖ To introduce the working environment of Java Program using the multithreading and file handling
- ❖ To get acquainted the purpose of applet and AWT in Java programming
- ❖ To study the use of database connectivity in Java Programming
- ❖ To gain knowledge of Java Servlet and JSP concept in Java

Course Outcome

On completion of the course, learner will be able to–

- CO1: Describe the core concept of Java programming
- CO2: Discover the need for working with the multithreading and file handling
- CO3: Illustrate the purpose of applet and AWT in Java programming
- CO4: Indicate the use of database connectivity using Java Programming
- CO5: Articulate the networking concepts in Java
- CO6: Implement Java Servlet and JSP concept in Java



Course Contents

Unit I: An Introduction to Core Java

An Introduction to Java:

- A Short History of Java, Features of Java, Creating and Running Java Programs using Command Line Arguments and IDE
- Programming Construct (Decision making statement, switch statement, looping statement)
- Class and Object (Defining a class, Adding variables, Adding Methods, Creating Objects, Accessing Class Members, Constructors)
- Object Oriented concepts with respect to Java (Inheritance:
 - Extending a class, Overriding Method, using super, Final variable and Methods, this keyword))
- Interfaces, Packages (Java API package, Using system packages, Creating Packages & Using a Package, Interface Introduction, creating and using interfaces)
- Exception Handling (Types of error, exceptions, try and catch statement, nested try statement, throws and finally statement, build it exceptions, chained exceptions, creating own exception)

Unit II Multithreading and File Handling

Multithreading:

- Multithreading concepts
- Thread Life cycle
- Creating multithreaded application
- Thread priorities
- Thread synchronization
- Java Input Output:
- Java IO package
- Byte/Character Stream
- Buffered reader / writer
- File reader / writer
- Print writer
- File Sequential / Random

Unit III Applets and AWT Programming

Applet As Java Applications:

- Life cycle of Applet
- Creation and Execution of Java Applets,
- Displaying it using Web Browser with appletviewer.exe
- Advantages and Disadvantages of Applet Vs Applications
 - Parameter Passing to applet

Abstract Windows Toolkit:

- Components and Graphics
- Containers, Frames and Panels
- Layout Managers
- AWT basic components



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- Event delegation Model: Event source and handler, Event categories, Listeners, interfaces
- Anonymous classes
- Swing Libraries: Model view Controller design pattern, Different layout, menus dialog boxes, text input

Unit IV JDBC

- Java database connectivity, Types of JDBC drivers
- Writing first JDBC applications
- Types of statement objects (Statement, PreparedStatement and CallableStatement)
- Types of resultset, ResultSetMetadata
- Inserting and updating records
- JDBC and AWT
- Connection pooling

Unit V Networking with Java

- Networking basics: Sockets, port, Proxy servers, Internet addressing 7 URL
- java.net – networking classes and interfaces
- Implementing TCP/IP based Server and Client
- Datagrams – Datagram packet, Datagram server and client
- URL connections

Unit VI Java Servlet and JSP

Servlet:

- Introduction
- Life cycle of servlet
- Handling HTTP Get Request
- Handling HTTP Post Request
- Introduction to JSP:
- Getting Familiar with JSP Server
- First JSP
- Adding Dynamic contents via expressions
- Scriptlets, Mixing Scriptlets and HTML
- Directives, Declaration, Tags and Session



Reference

1. Eckel B., "Thinking in Java", 3rd Edition, Pearson Education
2. "Complete Reference Java" by Herbert Schildt(5th edition)
3. Core Java 2 Volume - I Cay S Horstmann, Fary Cornell
4. Core Java 2 Volume - II Cay S Horstmann, Fary Cornell
5. Developing Java Servlets James Goodwill
6. Beginning Java Networking Chad Darby, John Griffin & others

Text books

1. Programming with Java , A primer ,Forth edition , By E. Balagurusamy
2. Herbert Schilt, "JAVA Complete Reference", 7th Edition, Tata McGraw Hill, ISBN: 9780070636774
3. Java 2 programming black books, Steven Horlzner

Web links

1. <http://tutorialpoint.com>
2. <https://www.w3schools.in/java-tutorial>

MOOC Courses:

1. <https://moocfi.github.io/courses/2013/programming-part-1/>
2. <https://java-programming.mooc.fi/>
3. <https://education.oracle.com/java-se-programming-i-mooc>

Continuous Assessment details (Internal Evaluation Scheme)

Scheme	Open Book Test I	Open Book Test II	Unit Test I	Unit Test II	Assignment	MCQ Test
Marks	10	10	10	10	10	10
Unit*	I	II	III	IV	V	VI

[Note: - * indicates unit number may vary]



Unit wise Question Bank

Unit I

1. Explain features of java?
2. Difference between abstract class and interface.
3. What is inheritance? Explain the use of 'super' keyword with example.
4. What is meant by packages? Explain user defined package with example?
5. Explain checked and unchecked exception?
6. Explain the use of inner classes?
7. Explain the concept of static member of java?
8. What is error? Explain types of errors with example.
9. Explain throws and finally statement.
10. Explain try and catch statement with example.

Unit II

1. Explain thread life cycle with example.
2. Explain the methods weight functions wait(), notify(),notiyAll().
3. What is meant by multithreading. Explain different ways of creating thread in java
4. Demonstrate the concept of multithreading and file handling.
5. What are the reader and writer classes available in java.
6. Write a short note on ByteStream.
7. Explain Buffered reader and Buffered writer with example.

Unit III

1. Explain Life cycle of Applet and its methods
2. Explain Applet tag with example.
3. Explain with example parameters passing to Applet.
4. What is layout manager? Explain any two layer manager in swing.
5. Differentiate between AWT and swing.
6. Explain Listeners Event delegation Model.

Unit IV

1. What is JDBC? Explain JDBC statements.
2. Explain types of JDBC Drivers.
3. Write note on ResultSetMetadata.
4. Explain socket and server socket class with example.
5. Explain Datagram packet class.
6. Explain concept of connection pooling.



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Unit V

1. Explain Life cycle of servlet and its methods.
2. Difference between get and post method.
3. Difference between Connectionless and connection oriented communication.

Unit VI

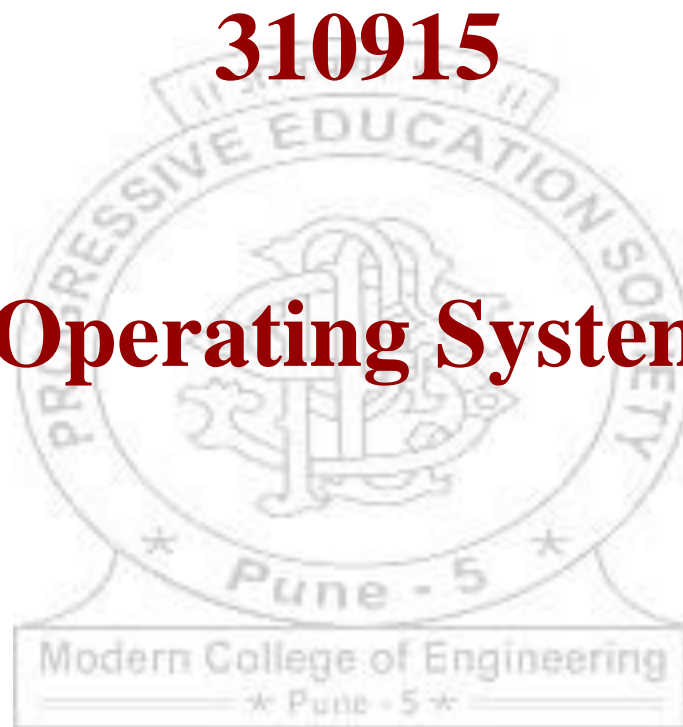
1. Differentiate between servlet and JSP.
2. Explain forward tag in JSP with example.
3. Difference between include action tag and include directives.
4. What is Scriptlets in JSP.
5. Write note on Declaration tag.



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Operating System





Teaching Scheme, Credit, Examination Scheme

Teaching Scheme	Credit	Examination Scheme
TH: 03 Hours/Week	03	Internal: 30 Marks External : 70 Marks

Prerequisites (Conceptual knowledge to understand the course contents)

1. 310902- Data structures and Algorithms

Course Objectives

- ❖ To introduce basic concepts and functions of modern operating systems
- ❖ To understand the concept of process and thread management.
- ❖ To understand the concept of concurrency control
- ❖ To understand the concept of disk scheduling and File management.
- ❖ To understand various Memory Management techniques
- ❖ To understand the features of LINUX operating system

Course Outcome

Upon completion of the subject, students will be able to:

CO1: Fundamental understanding of the role of Operating Systems.

CO2: To understand the concept of a process and thread.

CO3: To apply the concept of process scheduling.

CO4: To apply the concept of process synchronization, mutual exclusion and the deadlock

CO5: To realize the concept of disk scheduling and File system

CO6: To understand the various memory management techniques.



Course Contents

Unit I:

Overview of operating system

Operating System Objectives and Functions, The Evolution of Operating Systems, Developments Leading to Modern Operating Systems, Virtual Machines. BASH Shell scripting: Basic shell commands, shell as a scripting language.

Unit II:

Process description and control

Process: Concept of a Process, Process States, Process Description, Process Control (Process creation, Waiting for the process/processes, Loading programs into processes and Process Termination), Execution of the Operating System. Threads: Processes and Threads, Concept of Multithreading, Types of Threads Scheduling: CPU scheduling, Types of Scheduling, Scheduling criteria, Scheduling Algorithms

Unit III:

Concurrency control

Process/thread Synchronization and Mutual Exclusion: Principles of Concurrency, Requirements for Mutual Exclusion, Mutual Exclusion: Hardware Support-Semaphore and monitor Classical synchronization problems: Readers/Writers Problem, Producer and Consumer problem
Deadlock: Principles of Deadlock, Deadlock Modelling, Strategies to deal with deadlock: Deadlock Prevention, Deadlock Avoidance, Deadlock detection and recovery

Unit IV:

Memory management

Memory Management: Memory Management Requirements, Memory Partitioning: Fixed Partitioning, Dynamic Partitioning, Buddy System, Relocation, Paging, Segmentation. Virtual Memory: Hardware and Control Structures.

Unit V:

Disk Scheduling and File Management

Disk Scheduling (FIFO, SSTF, SCAN, C-SCAN, LOOK, C-LOOK), Disk structure. File Management: Overview, File Organization and Access, Allocation methods, File Directories, File Sharing, Free space management.

Unit VI:

The LINUX Operating System

Linux Design Principles, Linux Booting Process, Kernel Modules, Process Management, Scheduling, Memory Management, File Systems, Input and Output, Inter-process Communication



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Reference Books

1. Tom Adelstein and Bill Lubanovic, Linux System Administration, O'Reilly Media, ISBN-10: 0596009526, ISBN-13: 978-0596009526
2. Harvey M. Deitel, Operating Systems, Prentice Hall, ISBN-10: 0131828274, ISBN-13: 978-0131828278
3. Thomas W. Doempner, Operating System in depth: Design and Programming, WILEY, ISBN: 978-0-471-68723-8
4. Mendel Cooper, Advanced Shell Scripting, Linux Documentation Project

Text books

1. William Stallings, Operating System: Internals and Design Principles, Prentice Hall, ISBN-10: 0-13-380591-3, ISBN-13: 978-0-13-380591-8, 8th Edition
2. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, Operating System Concepts, WILEY, ISBN 978-1-118-06333-0 , 9th Edition
3. Andrew S. Tanenbaum & Herbert Bos, Modern Operating System, Pearson, ISBN-13: 9780133592221, 4th Edition

E-books links

1. <https://www.getfreebooks.com/xv6-a-simple-unix-like-teaching-operating-system/>
2. <https://www.pdfdrive.com/operating-systems-e18726938.html>

MOOC Courses:

1. <https://www.coursera.org/courses?query=operating%20system>
2. <https://www.classcentral.com/tag/operating-systems>
3. <https://www.udacity.com/course/introduction-to-operating-systems--ud923>

Continuous Assessment details (Internal Evaluation Scheme)

Scheme	Open Book Test I	Open Book Test II	Unit Test I	Unit Test II	Assignment	MCQ Test
Marks	10	10	10	10	10	10
Unit*	I	II	III	IV	V	VI

[Note: - * indicates unit number may vary]



Unit wise Question Bank

UNIT I -

- Q1: What is OS/ List the important functions of the OS.
Q2: Explain Kernel and its components.
Q3: What are the types of the strategies?
Q4: Write a short note on assembler.
Q5: Difference between Linker and Loader.

UNIT II -

- Q1: Explain process state in details.
Q2: Define scheduler and explain its types.
Q3: Difference between process and thread.
Q4: Solve the following example using FCFS.

Process	Burst Time	Arrival Time
P1	24	0
P2	3	1
P3	5	2
P4	7	3

- Q5: Consider the following set of process with CPU burst time in milliseconds.

Process	Burst Time	Arrival Time
P1	5	1
P2	3	0
P3	2	2
P4	4	3
P5	8	2

UNIT III -

- Q1: What is concurrency control?
Q2: Explain mutual exclusion?
Q3: Explain Producer-Consumer problem in details.
Q4: Explain Strategies to deal with deadlock protection.
Q5: Consider Given snapshot of system.

A system has 5 processes (P0,P1,P2,P3,P4) and 3 types of resources (A,B,C).

Answer the following questions using banker's algorithm.

- 1) What is the content of need matrix?
- 2) Is the system in a safe state? If Yes, give the safe sequence.

Process	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P0	2	3	2	9	7	5	3	3	2
P1	4	0	0	5	2	2			
P2	5	0	4	11	0	4			
P3	4	3	3	4	4	4			
P4	2	2	4	6	5	5			



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UNIT IV –

- Q1: Difference between Contiguous and non-contiguous memory allocation.
- Q2: Difference between Internal and External Fragmentation.
- Q3: Explain with example - Best fit, Worst Fit And first Fit.
- Q4: Explain with example Belady's anomaly.
- Q5: Difference between Paging and Segmentation.

UNIT V -

- Q1: Write a note on Disk Structure.
- Q2: Explain SSTF when track request- 95,185,35,119,12,120,62,67 starting from track number 50.
- Q3: Difference between SCAN & CSCAN with example.
- Q4: Explain with example any two file allocation methods.
- Q5: Explain File Sharing.

UNIT VI -

- Q1: Explain Inter-process communication.
- Q2: Explain the 6 stages of linux booting process.
- Q3: Explain the functions of kernel in Linux.
- Q4: Write a note on types of process in Linux.
- Q5: Write a note on File System in linux OS.



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Elective-II
Mobile Computing





Teaching Scheme, Credit, Examination Scheme

Teaching Scheme	Credit	Examination Scheme
TH: 03 Hours/Week	03	Internal: 30 Marks External : 70 Marks

Prerequisites

- Basic knowledge of Programming Language and data base system.
- Concept of Networking

Companion Course

Not Applicable

Course Objectives:

- ❖ To understand mobile computing
- ❖ To understand different generation of mobile

Course Outcomes:

- On completion of the course, student will be able to–
- CO1:** Describe the concept and technique of Wireless telephony.
 - CO2:** Explain the concept of wireless networking.
 - CO3:** Describe data management issue of mobile wireless network.
 - CO4:** Discuss the mobile operating system.
 - CO5:** Design Android mobile application.
 - CO6:** Manage database and features of mobile application.



Course Contents

Unit 1: Introduction of Mobile Computing

Introduction, issues in mobile computing, overview of wireless telephony: Cellular networks, Cellular concept, Mobile Phone Technologies (1G, 2G, 3G,4G,5G) , GSM: air-interface, channel structure, location management: HLR-VLR, hierarchical, handoffs, channel allocation in cellular systems, CDMA, GPRS. Protocols Localization and calling, Handover, Value Added Services – SMS, Cell Broadcast Service, MMS, Location Services.

Unit II Wireless Networking

Wireless Networking, Wireless LAN Overview: MAC issues, IEEE 802.11 Blue Tooth, Wireless multiple access protocols, TCP over wireless, Wireless applications, data broadcasting, Mobile IP, WAP: Architecture, protocol stack, application environment, applications.

Unit III Mobile Data management

Data management issues, data replication for mobile computers, adaptive clustering for mobile wireless networks, File system, Disconnected operations.

Unit IV Introduction to Operating System

Introduction of Operating System: Palm OS, Windows CE, Embedded Linux, J2ME, Symbian, Android development: Overview of Android, Devices running android, Why Develop for Android, Features of android, Architecture of Android, Libraries, Software development kit Designing the user interface: Introducing views and view groups, Introducing layouts, Creating new views, Creating and using Menus.

Unit V Android Application

Android Application: Introducing Intents, Adapters, Introducing Dialogs, Capturing Date and Time, Validating and Handling Input data Accessing Location Based Services Application: Selecting Location Provider, Finding your location, Creating map based activities Data Storage, retrieval and Sharing: File system in android, Internal and external storage, Saving and loading files, File Management tools.

Unit VI Management and Trends of Application

Introduction of SQLite database, Peer to peer communication: Accessing Telephony Hardware, Introducing Android Messaging, GTalk Service : Using, binding & Making connection, Managing chat Sessions, Sending and receiving Data messages. Managing Application Data, Performance, Scalability, Modifiability, Availability and Security of Mobile Applications, Testing Methodologies for Mobile Applications, Future Mobile Generations. Introducing Sensor Manager , Android Telephony, Manage network and Wi-Fi connections.



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Books:

Text Books:

1. Mobile Computing: Prasant Pattnaik, Rajib Mall, PHI Publication
2. Mobile Computing: Raj kamal, Oxford
3. Android Application Development: Carmen Delessio, PEARSON INDIA

Reference Books:

1. Mobile Communications J. Schiller, Addition Wesley Publication
2. GSM System Engineering A. Mehrotra, Addition Wesley Publication
3. Understanding WAP M. Heijden, M. Taylor, Artech House Publication
4. Professional Android Application Development Wrox Publications, Reto Meier
5. Upadhyaya, Mobile Computing, Springer
6. Sams teach yourself Android application development, Lauren Dercy and Shande Conder, Sams publishing
7. Mobile Computing: Asoke K Talukdar, Roopa R. Yavagal, TataMcGrawHill
8. Principles of Mobile Computing , Hansmann, Merk, Nicklous, Stober, Springer, second edition

e-Books:

1. <http://freecomputerbooks.com/mobileDeviceProgrammingBooks.html>
2. <http://www.freebookcentre.net/mobile-technology/mobile-technology-books.html>

MOOC Courses:

1. <https://www.coursera.org/courses?query=mobile%20cloud%20computing>
2. <https://www.ed.youth4work.com/course/479-mobile-computing-online-course>

Continuous Assessment details (Internal Evaluation Scheme)

Scheme	Open Book Test I	Open Book Test II	Unit Test I	Unit Test II	Assignment	MCQ Test
Marks	10	10	10	10	10	10
Unit*	I	II	III	IV	V	VI

. [Note: - * indicates unit number may vary]



Unit wise Question Bank

Unit I

1. Explain issues in mobile computing.
2. Explain Protocols Localization and calling.
3. Explain Value Added Services.

Unit II

1. What are the MAC issues?
2. What is Mobile IP?
3. Explain Wireless applications.

Unit III

1. Explain Data management issues.
2. Explain adaptive clustering for mobile wireless networks.
3. Explain File system.

Unit IV

1. Explain Features of android.
2. Explain Architecture of Android.
3. Explain Creating and using Menus.

Unit V

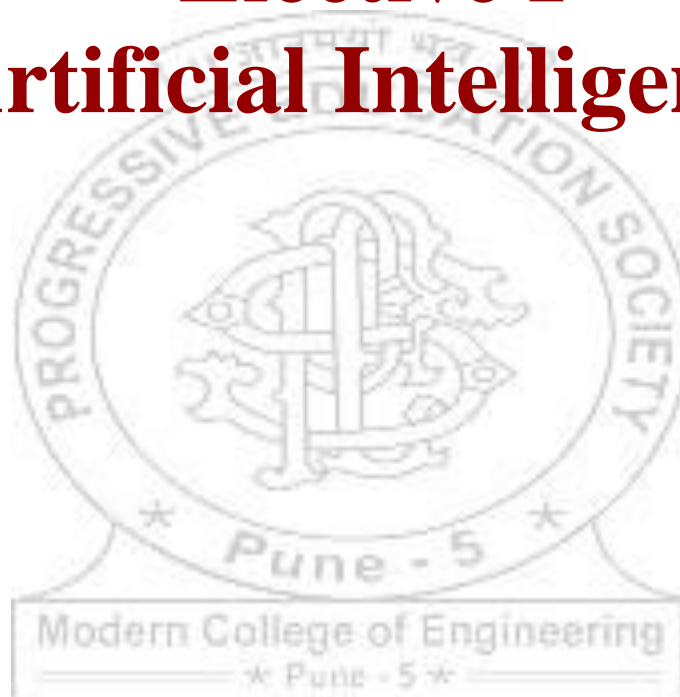
1. What is Intent?
2. Explain File system in android.
3. Explain File Management tools.



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Elective I
Artificial Intelligence





Teaching Scheme, Credit, Examination Scheme

Teaching Scheme:	Credit	Examination Scheme:
TH: 03 Hours/Week	03	Internal: 30 Marks External : 70 Marks

Prerequisites (Conceptual knowledge to understand the course contents)

- ❖ Discrete Mathematics
- ❖ Data Structure and Algorithms

Course Objectives

- ❖ To present an overview of artificial intelligence (AI) principles and approaches.
- ❖ Develop a basic understanding of the building blocks of AI as presented in terms of intelligent agents: Search, Knowledge representation, inference, logic, and learning.
- ❖ To understand Natural language processing and Expert systems

Course Outcome

On completion of the course, learner will be able to–

- CO1: Describe the modern view of AI as the study of agents that receive precepts from the Environment and perform actions.
- CO2: Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.
- CO3: Describe the use of various search techniques
- CO4: Develop knowledge of decision making methods
- CO5: Explain about AI techniques for logical planning
- CO6: Explain the concept of Expert systems.



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Course Contents

Unit I Introduction to Artificial Intelligence

Introduction: What Is AI, The Foundations of Artificial Intelligence, The History of Artificial Intelligence, and Applications of AI. Intelligent Agents and Environments: Good Behavior: The Concept of Rationality, The Nature of Environments, The Structure of Agents, How the components of agent programs work.

Unit II Search Techniques

Solving Problems by Searching: Study and analysis of Various searching algorithms. Implementation of Depth-first search Problem-Solving Agents, Searching for Solutions, Uninformed Search Strategies: Breadth-first search, Uniform-cost search, Depth-first search, Depthlimited search, Iterative deepening depth-first search, Bidirectional search Informed (Heuristic) Search Strategies: Greedy best first search A* search: Minimizing the total estimated solution cost, Conditions for optimality: Admissibility and consistency, Optimality of A*, Heuristic Functions

Unit III Knowledge Representation

Definition of knowledge, properties for knowledge representation system, predicate calculus connectives, variables and quantification, Predicates and arguments, TMS(truth maintenance system), Statistical and probabilistic reasoning.

Unit IV Planning

Introduction : Search in planning, search vs planning, planning as problem solving, components of a planning, Forward planning, Nonlinear planning using constraint posting, Hierarchical planning.

Unit V Learning

Introduction, Learning methods, Introduction to Neural Networks, Working of a Neuron, The basic components of ANN, Issues related to Neural computation, Feedforward Networks, Backpropagation Algorithm, Applications of Neural Networks

Unit VI Expert System

Utilization and Functionality, Architecture of Expert system, Components of expert system, steps for building expert system, Case study on expert system.



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Learning Resources:

Text Books:

1. Artificial Intelligence: A Modern Approach by Peter and Norvig ISBN-0-13- 103805

Reference Books:

1. Artificial Intelligence by Elaine Rich, Kevin Knight and Nair ISBN-978-0-07- 008770-5, TMH,
2. Artificial Intelligence by Saroj Kausik ISBN:- 978-81-315-1099-5, Cengage Learning
3. Artificial Intelligence and Intelligent Systems by Padhy, Oxford University Press,

e-Books:

1. <https://www.cin.ufpe.br/~tfl2/artificial-intelligence-modern-approach.9780131038059.25368.pdf>

MOOC Courses:

1. <https://nptel.ac.in/courses/106/105/106105077/>

Continuous Assessment details (Internal Evaluation Scheme)

Scheme	Open Book Test I	Open Book Test II	Unit Test I	Unit Test II	Assignment	MCQ Test
Marks	10	10	10	10	10	10
Unit*	I	II	III	IV	V	VI

[Note: - * indicates unit number may vary]





Question Bank

Unit I:

1. What Is AI?
2. Explain Applications of AI.
3. Explain The Concept of Rationality.
4. How the components of agent programs work

Unit II

1. Explain Breadth-first search
2. Explain Depth-first search
3. Explain Greedy best first search
4. Explain Admissibility and consistency
5. Explain Heuristic Functions.

Unit III

1. Explain properties for knowledge representation system
2. Explain TMS(truth maintenance system).
3. Explain variables and quantification.

Unit IV

1. Explain planning as problem solving.
2. Explain Nonlinear planning using constraint posting
3. Explain Forward planning.

Unit V

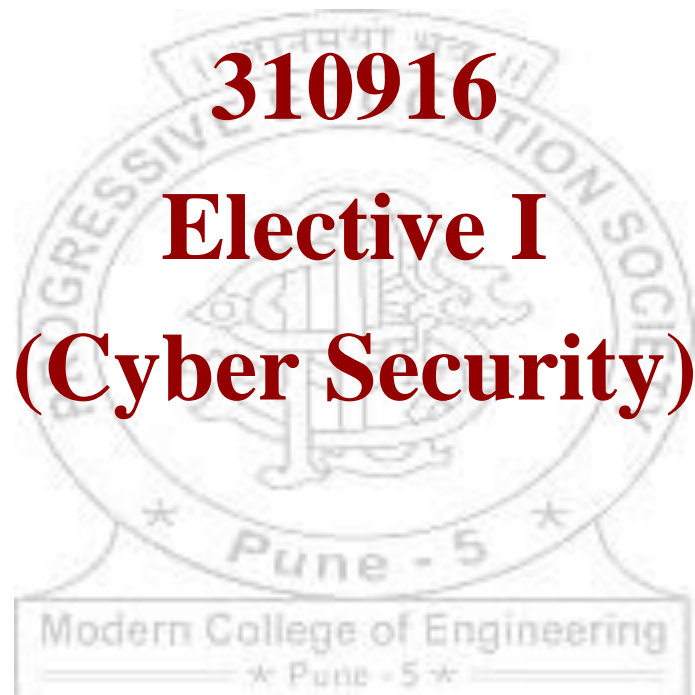
1. Explain Neural Networks
2. Explain Learning methods
3. Explain Applications of Neural Networks
4. Explain Backpropogation Algorithm.

Unit VI

1. Explain Utilization and Functionality.
2. Explain Architecture of Expert system.
3. Explain steps for building expert system,



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Teaching Scheme:	Credit	Examination Scheme:
TH: 03 Hours/Week	03	Internal: 30 Marks External : 70 Marks

Prerequisites: NA

Course Objectives:

- To prepare students with the technical knowledge and skills needed to protect and defend computer systems and networks.
- To develop students that can plan, implement, and monitor cyber security mechanisms to help ensure the protection of information technology assets.
- To develop graduates that can identify, analyze, and remediate computer security breaches

Course Outcomes:

On completion of the course, learner will be able to–

CO1: Analyze and evaluate the cyber security needs of an organization.

CO2: Conduct a cyber-security risk assessment.

CO3: Measure the performance and troubleshoot cyber security systems.

CO4: Implement cyber security solutions.

CO5: Be able to study cyber security, information assurance, and cyber/computer forensics software/tools.

CO6: Identify the key cyber security vendors in the marketplace



Course Contents

Unit I Overview of Cyber Security

Overview of Cyber Security, Internet Governance – Challenges and Constraints, Cyber Threats:- Cyber Warfare-Cyber Crime-Cyber terrorism-Cyber Espionage, Need for a Comprehensive Cyber Security Policy, Need for a Nodal Authority, Need for an International convention on Cyberspace.

Unit II Vulnerabilities and Access Control

Cyber Security Vulnerabilities-Overview, vulnerabilities in software, System administration, Complex Network Architectures, Open Access to Organizational Data, Weak Authentication, Unprotected Broadband communications, Poor Cyber Security Awareness. Cyber Security Safeguards- Overview, Access control, Audit, Authentication, Biometrics, Cryptography, Deception, Denial of Service Filters, Ethical Hacking, Firewalls, Intrusion Detection Systems, Response, Scanning, Security policy, Threat Management.

Unit III Intrusion detection and Prevention

Intrusion, Physical Theft, Abuse of Privileges, Unauthorized Access by Outsider, Malware infection, Intrusion detection and Prevention Techniques, Anti-Malware software, Network based Intrusion detection Systems, Network based Intrusion Prevention Systems, Host based Intrusion prevention Systems, Security Information Management, Network Session Analysis, System Integrity Validation.

Unit IV Cryptography

Introduction to Cryptography, Symmetric key Cryptography, Asymmetric key Cryptography, Message Authentication, Digital Signatures, Applications of Cryptography. Overview of Firewalls- Types of Firewalls, User Management, VPN Security Security Protocols: - security at the Application Layer- PGP and S/MIME, Security at Transport Layer- SSL and TLS, Security at Network Layer-IPSec.

Unit V Roles and Regulations

Introduction, Cyber Security Regulations, Roles of International Law, the state and Private Sector in Cyberspace, Cyber Security Standards. The INDIAN Cyberspace, National Cyber Security Policy 2013.

Unit VI Cyber Forensics

Introduction to Cyber Forensics, Handling Preliminary Investigations, Controlling an Investigation, Conducting disk-based analysis, Investigating Information-hiding, Scrutinizing E-mail, Validating E-mail header information, Tracing Internet access, Tracing memory in real-time.



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Learning Resources:

Text Books:

1. The Hacker Playbook: Practical Guide To Penetration Testing – @Peter Kim.
 2. Applied Network Security Monitoring: Collection, Detection, and Analysis – @Chris Sanders, @Jason Smith.
- Reference Books: 1. Network Security Through Data Analysis: Building Situational Awareness – Michael Collins.

E-Books:

1. https://heimdalsecurity.com/pdf/cyber_security_for_beginners_ebook.pdf
2. <http://larose.staff.ub.ac.id/files/2011/12/Cyber-Criminology-Exploring-Internet-Crimes-and-CriminalBehavior.pdf>
3. <http://docshare04.docshare.tips/files/21900/219006870.pdf>

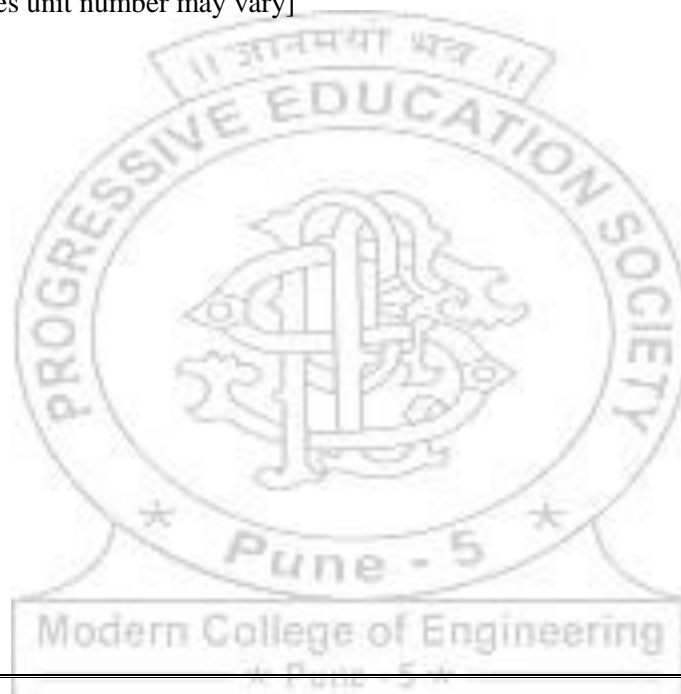
MOOC Courses:

1. https://swayam.gov.in/nd2_cec20_cs15/preview

Continuous Assessment details (Internal Evaluation Scheme)

Scheme	Open Book Test I	Open Book Test II	Unit Test I	Unit Test II	Assignment	MCQ Test
Marks	10	10	10	10	10	10
Unit*	I	II	III	IV	V	VI

[Note: - * indicates unit number may vary]





Unit wise Question Bank

UNIT 1

- 1) Define Cyber Security.
- 2) What is importance of Cyber Security?
- 3) What is Cyber Crime?
- 4) What is need of comprehensive cyber security policy?
- 5) What is Cyber threat and its type?

UNIT 2

- 1) What is biometric authentication?
- 2) Define cryptography in cyber security.
- 3) What is ethical hacking?
- 4) Brief Intrusion detection system?
- 5) What is security policy in cyber security?

UNIT 3

- 1) What is physical theft in cyber security?
- 2) What is malware and examples?
- 3) Brief Intrusion prevention system?
- 4) What is the difference between IPS and IDS?
- 5) What is host-based intrusion detection?

UNIT 4

- 1) What is Symmetric key?
- 2) What is Asymmetric Key?
- 3) Difference between symmetric key and asymmetric key?
- 4) What is digital signature explain?
- 5) Why is security important in the network layer?

UNIT 5

- 1) What is Cyber security laws and regulations?
- 2) What is cyber security standard.
- 3) what is national cyber security policy of India?
- 4) What are the stages of cyber forensic investigation?
- 5) Why memory tracing is important?

UNIT 6

- 1) What is cyber forensics with example?
- 2) What is email forensics in cyber security?
- 3) What is disk based analysis?
- 4) What are different phases of digital forensics?
- 5) What is tracking in cyber forensic?



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Teaching Scheme:	Credit	Examination Scheme:
TH: 03 Hours/Week	03	Internal: 30 Marks External : 70 Marks

Prerequisite courses: Data Structures and Algorithms

Companion Course: Computer Network

Course Objectives:

- Understand how block chain systems (mainly Bitcoin and Ethereum) work,
- To securely interact with them,
- Design, build, and deploy smart contracts and distributed applications,
- Integrate ideas from block chain technology into their own projects.

Course Outcomes:

On completion of the course, students will be able to–

- CO1: Understand the structure of a block chain and why/when it is better than a simple distributed database;
- CO2: Analyze the incentive structure in a block chain based system and critically assess its functions, benefits and vulnerabilities;
- CO3: Explain Nakamoto consensus. Describe differences between proof-of-work and proof-of-stake consensus.
- CO4: Understand what constitutes a “smart” contract, what are its legal implications and what it can and cannot do, now and in the near future,
- CO5: Attain awareness of the new challenges that exist in monetizing businesses around block chains and smart contracts,
- CO6: State-of-the-art, open research challenges, and future directions.



Course Contents

Unit I Distributed Computing

Distributed Database, Two General Problem, Byzantine General problem and Fault Tolerance, Hadoop Distributed File System, Distributed Hash Table, ASIC resistance, Turing Complete. Cryptography: Hash function, Digital Signature -ECDSA, Memory Hard Algorithm, Zero Knowledge Proof.

Unit II Introduction

Block chain: Introduction, Advantage over conventional distributed database, Block chain Network, Mining Mechanism, Distributed Consensus, Merkle Patricia Tree, Gas Limit, Transactions and Fee, Anonymity, Reward, Chain Policy, Life of Block chain application, Soft & Hard Fork, Private and Public block chain.

Unit III Distributed Consensus

Nakamoto consensus, Proof of Work, Proof of Stake, Proof of Burn, Difficulty Level, Sybil Attack, Energy utilization and alternate. Unit IV Cryptocurrency 06 Hours History, Distributed Ledger, Bitcoin protocols - Mining strategy and rewards, Ethereum - Construction, DAO, Smart Contract, GHOST, Vulnerability, Attacks, Side chain, Name coin

Unit V Cryptocurrency Regulation

Stakeholders, Roots of Bitcoin, Legal Aspects – Crypto currency Exchange, Black Market and Global Economy. Internet of Things, Medical Record Management System, Domain Name Service and future of Block chain.

Unit VI Hyperledger Fabric

Introduction to Hyperledger, Architecture, Membership, Transaction, Chaincode, Features of Hyperledger



Learning Resources:

Text Books:

1. Wattenhofer, The Science of the Blockchain.
2. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder, Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction, Princeton University Press (July 19, 2016).

Reference Books:

1. Antonopoulos, Mastering Bitcoin: Unlocking Digital Cryptocurrencies.
2. Satoshi Nakamoto, Bitcoin: A Peer-to-Peer Electronic Cash System.
3. Dr. Gavin Wood, \ETHEREUM: A Secure Decentralized Transaction Ledger,"Yellow paper.2014.
4. Nicola Atzei, Massimo Bartoletti, and Tiziana Cimoli, A survey of attacks on Ethereum smart contracts
5. Josh Thomson, The Blockchain for Beginners Guide to Blockchain Technology and Leveraging Blockchain Programming

e-Books:

1. <https://books.google.co.in/books?id=ogu4DgAAQBAJ&lpg=PR1&dq=blockchain%20ebook&pg=PR1#v=onepage&q&f=false>
2. <https://books.google.co.in/books?id=49VqDwAAQBAJ&lpg=PP1&dq=blockchain%20ebook&pg=PT10#v=onepage&q&f=false>

MOOC Courses:

1. <https://www.my-mooc.com/en/categorie/blockchain-and-cryptocurrency>
2. <https://www.coursera.org/specializations/blockchain>

Continuous Assessment details (Internal Evaluation Scheme)

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Unit*	I	II	III	IV	V	VI

[Note: - * indicates unit number may vary]



Question Bank

Unit 1

1. What is Distributed Database?
2. Explain Byzantine General problem and Fault Tolerance
3. Explain Hadoop Distributed File System
4. Explain Distributed Hash Table
5. Explain Digital Signature -ECDSA, Memory Hard Algorithm, Zero Knowledge Proof.
6. Explain Turing Complete. Cryptography: Hash function

Unit II

1. What is block chain ?
2. What is Mining Mechanism,
3. What is Merkle Patricia Tree, Gas Limit
4. Explain Transactions and Fee, Anonymity.
5. Explain Life of Block chain application
6. Explain Private and Public block chain

Unit III

1. Explain Nakamoto consensus
2. Explain Proof of Work
3. Explain Proof of Stake
4. Explain Proof of Burn
5. Explain Energy utilization and alternate.

Unit IV

1. Explain Distributed Ledger.
2. Explain Bitcoin protocols.
3. Explain Vulnerability.
4. Explain Side chain.

Unit V

1. Explain Roots of Bitcoin.
2. Explain Legal Aspects.
3. Explain Domain Name Service and future of Block chain.

Unit VI

1. Explain Hyperledger.
2. Explain Architecture of Hyperledger.
3. Explain Features of Hyperledger.



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Open Elective



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Teaching Scheme:	Credit	Examination Scheme:
TH: 03 Hours/Week	03	Internal: 30 Marks External : 70 Marks

Open elective proposal can be offered with Industry partner. A proposal with syllabus, (Program educational Outcomes) PEO's be forwarded to the Chairman BOS, before June / December every year. Approved syllabus through appropriate procedure can be taught in various colleges. Industry person and Teacher appointed together conduct the course



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**Database Management System
Laboratory**



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Teaching Scheme, Credit, Examination Scheme

Teaching Scheme	Credit	Examination Scheme
TH: 04 Hours/Week	02	TW : 25 Marks PR : 50 Marks

Companion Course: Database Management System



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Course – MCA-I (Semester-II)
Subject: DBMS Lab assignments
2021-22

Sample Assignment

1. Design and draw an ER/EER diagram using standard notations for Hotel service and map this diagram into Database Tables.
 - a) Create Database Tables in RDBMS
 - b) Use DML statements such as INSERT, UPDATE, DELETE to insert the data into tables.
2. Design and draw an ER/EER diagram using standard notations for Hospital Management System and map this diagram into Database Tables.
 - a) Create Database Tables in RDBMS
 - b) Use DML statements such as INSERT, UPDATE, DELETE to insert the data into tables.

GROUP A - Database Programming Languages – SQL, PL/SQL

1. Implementation of DDL commands of SQL with suitable examples

- Create table
- Alter table
- Drop Table

Create the following tables. Insert the appropriate data in these tables and solve the queries

1. Client_master(client_no,name,address1,address2,city,pincode,state,bal_due)
2. Product_master(product_no, description, profit_percent, unit_measure, qty_on_hand, reorder_lvl, sell_price, cost_price)
3. Salesman_master(salesman_name, address1, address2, city, pincode, state, sal_amt, tgt_to_get,ytd_sales,remarks)
4. Sales_order(order_no,order_date,client_no,dely_addr,salesman_no, dely_type,billed_yn, dely_date, order_status)
5. Sales_order_details(order_no,product_no,qty_ordered,qty_disp,product_rate)

Constraints are

Client_master(Client_no is PK & first letter must start with 'C' , Name Not NULL)

Product_master(product_no is PK & first letter must start with 'P')

Salesman_master(salesman_no is PK & first letter must start with 'S' Name not NULL)

Sales_Order(order_no is PK & first letter must start with 'O',dely_type(Delivery: part(P)/full(f)

Default (F), dely_date can not be less than order_date, order_status values ('In Process', 'Fulfilled' 'BackOrder', 'Cancelled')

1. Alter table sales_order_details add column price.
2. Drop table sales_order_details

2.Implementation of DML commands of SQL with suitable examples

- Insert
- Update
- Delete

1. Add a record to department table with values (50,'PERSONNEL','BOSTON').
2. Make a table called 'Bonus1' having fields name, job, salary and store records from the existing employee table for Analysts and Manager only.



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3. If a new person HERALD joins the organization in place of TURNER on the 5th of September 1992 with employee number 7999, make the required changes.

4. Make changes in the EMP table so that CLARK reports to BLAKE instead of KING

3. Implementation of different types of function with suitable examples

- Number function
- Aggregate Function
- Character Function
- Conversion Function
- Date Function

1. Find out details of employees where commission is greater than 7% of salary.

2. Promote JAMES to the job of Manager of department number 10 with a pay hike of Rs. 10000.

3. Select names of all employees whose name start with 'S'.

4. Display the department name which has more than 3 employees in it.

5. Write a query which concatenates the employee number, his name and manager number. Display the output with spaces in between the columns.

6. List names of people who have salary less than the average salary for department 20.

7. Display details of all employees who were hired earliest and latest

8. Display job, department name and name of employees whose name starts with 'A'.

9. Find out the department in which the maximum number of employees works

10. Display only lengths of all employee names. Eliminate duplicate values.

11. Display details of employees who work as Clerks.

12. Display information about employees who have the maximum number of employees reporting to him

13. Find the day of the week on which SMITH joined.

14. Find time of the day in which ADAMS joined.

15. Find day of month on which SMITH joined.

16. Find out month on which ADAMS joined.

12. Find out which quarter of the year the employees joined. Display their number and names as well.

13. Find out in which century JAMES joined.

14. List employee numbers, names and hire dates of the people working in the department number 20. Display the hire dates in the dd/mm/yy format.

15. Find number of months the PRESIDENT has worked for the company. Round the months to the nearest whole number.

16. Display names and jobs of the people separated by a hyphen. Capitalize the first character of name and job.

17. Retrieve ANALYST records with the hire date formatted as 'the 3rd of December 1984'.

18. List names and hire dates of employees who were hired in the month of December.

19. List names and hire dates of employees hired in the year of 1980.

20. Find the names of all clients having 'a' as the second letter in their names.

21. Find out the clients who stay in a city whose second letter is 'a'.

22. Print the information from Sales_order table for orders placed in the month of 'January'

23. Count the total number of orders.

24. Calculate the average price of all the products.

25. Determine the maximum and minimum product prices. Rename the output max_price and min_price respectively.

26. Count the number of products having price greater than or equal to 1500.

27. Calculate average quantity sold for each client has minimum order value of 15000.



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28. Find out the total sales amount receivable for month of Jan.
4. Implementation of different types of operators in SQL <ul style="list-style-type: none">• Arithmetic Operators• Logical Operators• Comparison Operator• Special Operator• Set Operation
<ol style="list-style-type: none">1. Display names, departments, and positions who work as Analyst or Clerk.2. Display different types of jobs / positions available in the company.3. Display the names of people and their departments working in either Sales or Research department.4. Find the list of all clients who stay in 'Bombay' or 'Delhi' or 'Chennai'.5. Print the list of clients whose bal_due is greater than value 10000.6. Display the order information for client_no 'C00001' and 'C00002'.7. Find products whose selling price is greater than 2000 and less than or equal to 5000.8. Find products whose selling price is more than 1500. Calculate a new selling price as , original selling price * .15. Rename the new column in the above query new_price.
5. Implementation of different types of Joins <ul style="list-style-type: none">• Inner Join• Outer Join• Natural Join etc.
<ol style="list-style-type: none">1. Display the locations of the employees.2. Display name, salary and location of employees who stay in CHICAGO.3. List number, name, job, manager number and manager job of each employee
6. Study and Implementation of <ul style="list-style-type: none">• Group By & having clause• Order by clause• Indexing
<ol style="list-style-type: none">1. Give a list of employees sorted on their names.2. Display names and departments of employees who work in department 10.3. Accept department number from user and display details of all employees in that department.4. Create an index that would permit each salesperson to retrieve his or her orders grouped by date quickly.
7. Study & Implementation of <ul style="list-style-type: none">• Sub queries• Views
<ol style="list-style-type: none">1. Create a view that shows all of the customers who have highest ratings.2. Create a view that shows number of salespeople in each city.3. List the names, city and state of clients who are not in the state of 'Maharashtra'.4. Find all the products whose qty_on_hand is less than reorder level.5. find who has placed order no 'O19001'6. Find out products which has been sold to 'Ivan Baross'7. Find out the product details of moving product.8. Find out name of clients those who have purchased 'CD-Drive'
8. Study & Implementation of PL/SQL
<ol style="list-style-type: none">1. Write a PL/SQL block of code that first inserts a record in an 'emp' table. Update the salary by Rs. 2000. then check to see that the total salary does not exceed 20000. if so, undo the updates made to the salaries.



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2. HRD manager has decided to raise the salary of employees by 0.15. Write a PL/SQL block to accept the employee number & update the salary of that emp. Display message based on the existence of record in employee table.

9. Study & Implementation of SQL Cursors

Create a table and perform the following

1. Increase salary of each customer by 5000
2. Write a program to retrieve the customer name and address.

10. Study & Implementation of SQL function and procedure

Create a stored function to perform item_id check operation. Which accepts an item_id & returns a flag as per the id exist or not.

11. Study & Implementation of SQL Triggers

Application using database triggers – Create a transparent audit system for a table Client_master. The system must keep track of the records that are being deleted or updated. When the record is deleted or modified the original record details & date of operation are stored in audit table & then the delete & update is allowed to go.

GROUP B Large Scale Databases

1. Study of Open Source NOSQL Database: MongoDB (Installation, Basic CRUD operations, Execution)
2. Design and Develop MongoDB Queries using CRUD operations. (Use CRUD operations, SAVE method, logical operators)
3. Design and Implement any 5 query using MongoDB
4. Create simple objects and array objects using JSON



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Continuous Assessment details (Internal Evaluation Scheme)

Scheme	Journal	Viva 1	Viva 2	Total
Marks	05	10	10	25



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310918

Operating System Lab



Teaching Scheme, Credit, Examination Scheme

Teaching Scheme	Credit	Examination Scheme
PR: 02 Hours/Week	01	Term Work : 50 Marks

Prerequisite courses, if any: Data structures and Algorithms

Companion Course, if any: Operating System

Course Objectives:

- To introduce and learn Linux commands required for administration.
- To learn shell programming concepts and applications.
- To demonstrate the functioning of OS basic building blocks like processes, threads
- To demonstrate the functioning of OS concepts in user space like concurrency control (process synchronization, mutual exclusion & deadlock) and file handling in LINUX.
- To aware paging simulation
- To demonstrate the functioning of OS concepts in kernel space like embedding the system call in any LINUX kernel.

Course Outcomes:

On completion of the course, learner will be able to–

CO1: Understand the basics of Linux commands and program the shell of Linux.

CO2: Develop various system programs for the functioning of operating system.

CO3: Implement basic building blocks like processes, threads

CO4: Develop various system programs for the functioning of OS concepts in user space like concurrency control and file handling in Linux.

CO5: Implement page replacement algorithm.

CO6: Develop the system program for the functioning of OS concepts in kernel space like embedding the system call in any Linux kernel.



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P. E. Society's
Modern College of Engineering, Pune – 5.
Course – MCA (Engg)-I (Semester-II)
Subject :- Operating System Lab Assignments

Sample Assignment

Assignment No. 1 : CO1: Understand the basics of Linux commands and program the shell of Linux.

- a) To study of Basic UNIX Commands and various UNIX editors such as vi, ed, ex etc
- b) To write C Programs using the following system calls of UNIX operating system fork, exec, getpid, exit, wait, close, stat, opendir, readdir.
- c) Write simple shell programs by using conditional, branching and looping statements.
 - i) Even and odd no.
 - ii) Find out Factorial
 - iii) Swapping of two integers.

Assignment No. 2 : CO2: Implement various system programs to demonstrate functioning of OS

- a) Write a program to implement FCFS , SJF , Priority and Round Robin algorithms
- b) Implement Bankers algorithm and find safe sequence of processes.
- c) Write a C-program to implement the producer – consumer problem using semaphores.

Assignment No. 3 : CO3: Implement basic building blocks like Threads.

- a) Implement multithreading for Matrix Multiplication using threads.

Assignment No. 4 : CO4 : Implement various Page Replacement Algorithm and memory allocation methods.

- a) Write a program to implement FIFO, LRU, Optimal Page.
- b) First Fit , Worst Fit , Best Fit

Assignment No. 5 : CO5- Develop various system programs for the functioning of OS concepts in user space like concurrency control and file handling in Linux.

- a) Implement File Handling System Calls to read write and open file.

Assignment No. 6: CO6 : Develop the system program for the functioning of OS concepts in kernel space like embedding the system call in any Linux kernel.

- a) Implement an assignment using File Handling System Calls (Low level system calls like open, read, write, etc).



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Continuous Assessment details (Internal Evaluation Scheme)

Scheme	Journal	Viva 1	Viva 2	Total
Marks	05	10	10	25



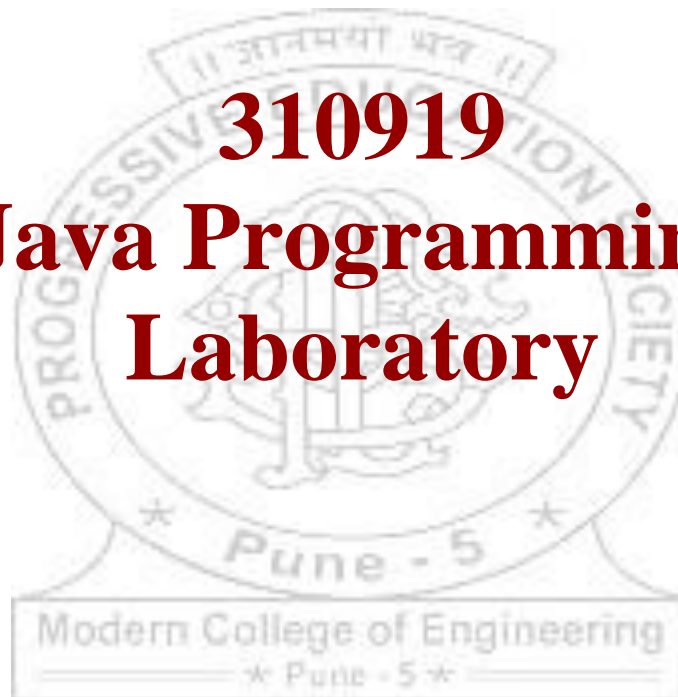


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MCA Department

310919

Java Programming

Laboratory





Teaching Scheme, Credit, Examination Scheme

Teaching Scheme	Credit	Examination Scheme
PR: 04 Hours/Week	02	Term Work: 25 Marks Practical : 50 Marks

Prerequisites:

Basic Computer Programming Concepts

Course Objectives:

- To learn the core concept of Java programming
- To introduce the working environment of Java Program using the multithreading and file handling
- To get acquainted the purpose of applet and AWT in Java programming
- To study the use of database connectivity in Java Programming
- To gain knowledge of Java Servlet and JSP concept in Java

Course Outcomes:

On completion of the course, learner will be able to–

- CO1: Describe the core concept of Java programming
- CO2: Discover the need for working with the multithreading and file handling
- CO3: Illustrate the purpose of applet and AWT in Java programming
- CO4: Indicate the use of database connectivity using Java Programming
- CO5: Articulate the networking concepts in Java
- CO6: Implement Java Servlet and JSP concept in Java



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MCA Department



P.E.Society's
Modern College of Engineering, Pune – 5
Course – MCA-I (Semester-II)
Subject: Java Programming Laboratory

Sample Assignment

Assignment-I (Development Environment)

29. Write down the steps to implement small program from command prompt.
30. Write down the steps to implement small program in Eclipse.
31. Write a program to calculate total and average marks of student in three different subjects as well as display his result.
32. Write a class of Account Holder, which has a Date object. The class should have following functionality:
 - To show the date of account creation, balance, account number and name of account holder.
 - To deposit and withdraw money.
 - To display the current status and transaction.
 - Display balance of both saving, current account using one method.
33. Create a hierarchy of Employee, Manager, Sales Manager, they should have the following functionality:
 - a. Employee: Display name, date of birth and id of Employee.
 - b. Manager: Display all above information with salary drawn.
 - c. Sales Manager: Display all above information and commission if applicable.
34. Create an abstract class shape and also create Point, Circle, and Cylinder hierarchy. Display the area of figures using polymorphism.
35. Implementing the Operations of stack and queue using package and interface
36. Write program to accept roll no. Marks from user. Throw user defined exception Marks Out of Bound if marks are <0 or marks >100 .

Assignment-II (MultiThreading & File Handling)

1. Write a program to create a digital clock using Multithreading.
2. Write a program to display two strings bouncing in opposite directions.
3. WAP that simulates a traffic signal light with short delay between states.
4. Write a program which will accept file name from command line and will show the contents of the file.
5. Write a Java program to concatenate multiple text files sequentially into single file. Accept file names from command line arguments.
6. Write a program to copy content of one file in other file.



Assignment-III (Applet & AWT)

1. Write an applet to display scrolling ball in an applet window.
2. Write an applet program that accepts two input string using <param> tag and concatenate the strings and display it in window.
3. Create an applet to display animation image. Control the animation with two buttons (“Start” and “Stop”) such that when start button is pressed animation should start and when stop button is pressed animation should stop.
4. Write a program to design an admission enquiry form.
5. Write a program, which calculates gross salary. Use two textfields for basic salary and gross salary (as result) and two checkboxes for TA. And DA. When checkbox selection changes gross salary should be updated.
6. Create a Java Desktop application to find the area of circle, rectangle, circumference of circle and area of square. Design the IDE and programming logic with two JPanel containers contains the following:
 - JPanel1. Add three JRadioButtons and set the buttons as : Circle, Rectangle and Square
 - JPanel2. Add four JCheckBoxes and set the buttons as :Area,Perimeter,CircumferenceWhen you select an option from JPanel1, it automatically hide the facilities which is not appropriate for selected option. Similarly, apply the same for JTextfield controls also.
 - (i)Write the code for circle JRadioButton to make available the display controls which are appropriate for Circle operation.
 - (ii)Write the code for Rectangle JRadioButton to make available the display controls which are appropriate for Rectangle operation.
 - (iii)Write the code for Square JRadioButton to make available the display controls which are appropriate for Square operation.
 - (iv)Write the code for Calculate button to calculate the desired operations which you choose from JRadioButtons.
 - (v)Write the code for Exit button to exit application.

Assignment- IV (JDBC)

1. Design GUI based JDBC application to navigate (first, last, next, previous) through student records. (Assume suitable table structure)
2. Write JDBC backend class, which establishes a connection with the database having a table “STUDENT” with structure – rollno, name, class, dob.
 - a. Using the above backend class WAP to accept rollno from command line and display the details with proper error messages.
 - b. Display all the records from table with proper formatting.
3. Oracle db is stored on server.
 - a. Write a java prg. To create vendor table with vendorno, name, balccount
 - b. Write java prg. To insert rows in above-mentioned table. Accept user Input.

Assignment-V (Networking)

1. Write a program to establish connection between client and server.
2. Write a Java Socket program for client server chatting application.
3. Write a program to establish connection between client and server using datagram packet.

Assignment- VI (Servlet & JSP)

1. WAS to create a data entry screen, which accepts name, standard (as a list box) with add button. (Create html page using servlet.)
2. For one online exam write the servlet codes for-
 - a. Write a servlet to accept candidate details in form. Store the entered details in register table.



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- b. Design application for online exam & count the marks. Find out grade. Store the result details in result table & display it to candidate.
 3. Write a JSP program to display the grade of a student by accepting the marks of five subjects.
 4. Write a JSP code for accepting book id from HTML page. Verify it with book table (Assume suitable fields). If book is already exists then display its details. If not, insert new details in to table.
-

Continuous Assessment details (Internal Evaluation Scheme)

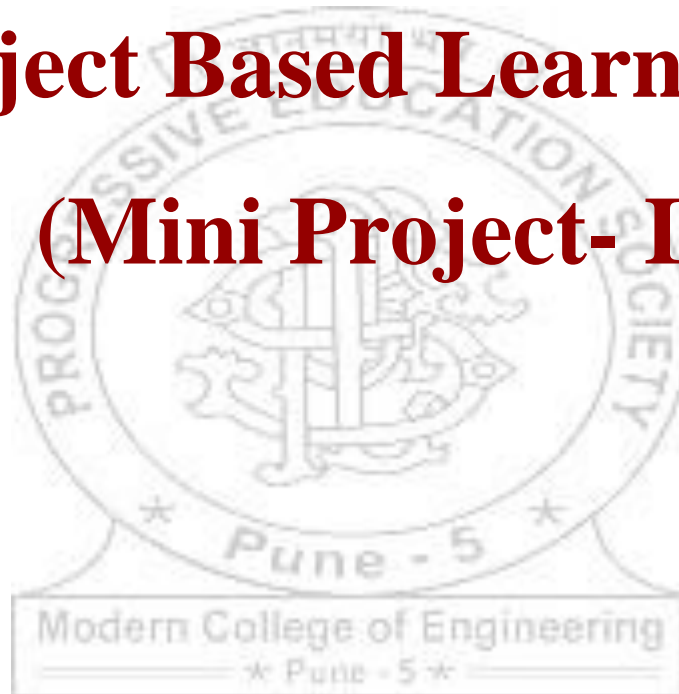
Scheme	Journal	Viva 1	Viva 2	Total
Marks	05	10	10	25



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310920

Project Based Learning-I
(Mini Project-I)





Teaching Scheme, Credit, Examination Scheme

Teaching Scheme	Credit	Examination Scheme
PR: 02 Hours/Week	01	Term Work: 50 Marks

Prerequisite courses:

Basics Programming(C,C++, JAVA, etc) , DBMS(MS-Access, MySql, Oracle etc) , Software Engineering

Course Objectives:

- To identify and solve problems considering social, ethical and legal issues
- To enhance analytical and computational skills
- To inculcate leadership and managerial skills through team work.
- To understand software/system development life cycle
- To gain insight of testing and deployment of applications

Course Outcomes:

On completion of the course, learner will be able to–

- CO1: Able to analyze and solve problems by applying programming knowledge
- CO2: Prepare requirements and Design Documents
- CO3: Develop Inter-personal and leadership qualities
- CO4: Demonstrate system with results and interpretation
- CO5: Describe software testing methods
- CO6: Design and develop technical documentation

Course Execution details

1. Formulation of Team and Topic Finalization:
 - Students should form a group of 3 to 4 members
 - Staff and Students should discuss the relevant problem statement.(Prefer real world problems having some social impact and application)
 - Each team should be allocated a guide.
 - Students should submit Synopsis(should contain Flowchart, Usage of the logic, algorithm, functions and suitable data structure for implementing the solution)



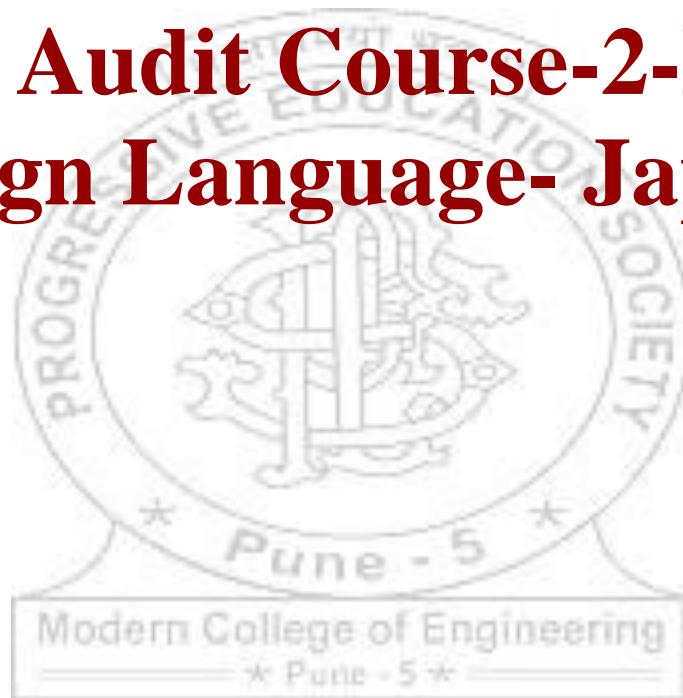
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2. Development
 - Select any suitable programming platform (Open source, window, web, mobile applications or any other suitable)
 - Prefer open source technologies for development.
 - Students can select any programming language they have learnt or in which they are competent.
3. Design and Documentation
 - SDLC has to be followed for design and development
 - Prepare Analysis Specification Document, Input Specification and Design Specification Documents(use Data Design, DFD, Flowcharts, UML diagrams, Data Dictionary, ER dig etc)
 - Follow SDD,SRS
 - Provide Test Specifications(test cases, test results, test methodology etc)
 - Report Generations if needed.
4. Report and Presentation
 - Students should present the working model of the project to the guide and panel of the college.
 - They should prepare a report comprising the above mentioned terminologies.
 - Submit Hard copy/Soft copy of the report which should contain certificate signed by guide,HOD and principal (prefer soft copy)



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310921
Audit Course-2-I
Foreign Language- Japanese





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Course Objectives:

- To meet the needs of ever growing industry with respect to language support.
- To get introduced to Japanese society and culture through language.

Course Outcomes:

On completion of the course learner will

- Have ability of basic communication.
- Have the knowledge of Japanese script.
- Get introduced to reading , writing and listening skills
- Will develop interest to pursue professional Japanese Language course.

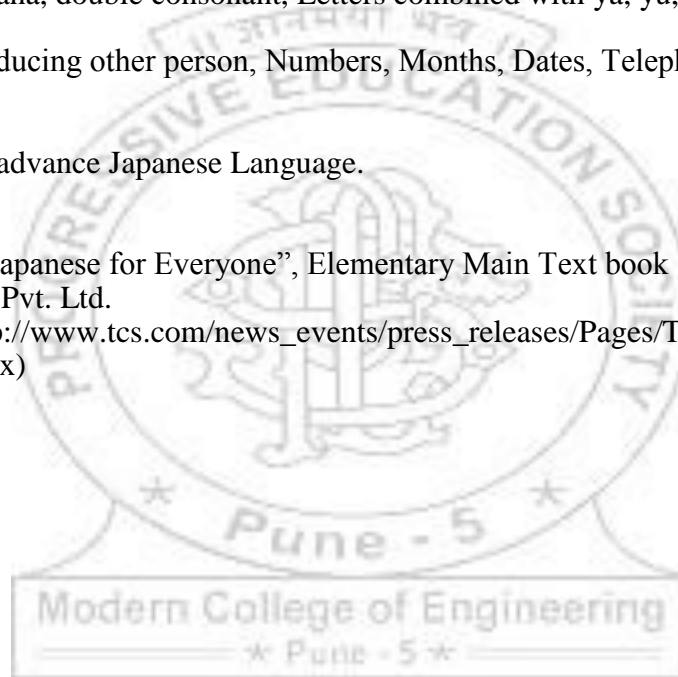
Course Contents

- 1: Introduction to Japanese Language. Hiragana basic Script, colors, Days of the week.
- 2: Hiragana : modified Kana, double consonant, Letters combined with ya, yu, yo Long vowels, Greetings and expressions
- 3: Self Introduction, Introducing other person, Numbers, Months, Dates, Telephone numbers, Stating one's age.

In continuation with this advance Japanese Language.

Reference Books:

1. Minna No Nihongo, "Japanese for Everyone", Elementary Main Text book 1-1 (Indian Edition), Goyal Publishers & Distributors Pvt. Ltd.
2. <http://www.tcs.com>(http://www.tcs.com/news_events/press_releases/Pages/TCS-InauguratesJapancentric-Delivery-Center-Pune.aspx)





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310921
Audit Course-2-I-Foreign
Language- FRENCH





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Course Objectives:

- 1) To introduce French as a foreign language.
- 2) To make the students acquaintance with basic knowledge of the French language and literature
- 3) To develop the skills of translation among the Students

Course Outcomes:

On completion of the course learner will

- Have ability of basic communication.
- Have the knowledge of French script.
- Get introduced to reading , writing and listening skills
- Will develop interest to pursue professional French Language course.

Course Contents

- 1: Introduction to French Language. Months of year, colors, Days of the week
- 2: vowels, Greetings-Good Day, hello, good morning etc. and expressions
- 3: Self Introduction, Introducing other person, Numbers, Months, Dates, Telephone numbers.
4. counting, Communicative skills: 1) How to greet 2) Locating objects and places 3) How to ask and answer questions (reply, refute)

Reference Books:

1. Apprenons le Francais-Simran Batra and Mahitha Ranjit-New saraswati house pvt. Ltd.
2. Nouvel en Échanges, 3rd Revised edition, 2012: Neelima Raddi & Anjali Paranjpye. Published by Oxford University Press, New Delhi.



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310922
Non Credit Course -2
MOOC Course-II-
Swayam/Spoken Tutorial
/NPTEL





Teaching Scheme, Credit, Examination Scheme

*Non Credit MOOC Courses:

- Non Credit course is compulsory.
- No grade points are associated with non-credit courses and are not accounted in the calculation of the performance indices SGPA & CGPA.
- Result of assessment will be PP or NP.
- Set of non-credit courses offered is provided. **Conduction and assessment of performance in said course is to be done at institute level.**
- The selection of 3 distinct non-credit MOOC courses, one per semester (Sem I, II & III) should be decided by respective institute.
- The list of non-credit MOOC courses suggested is given below



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**Suggested MOOC Courses- Swayam /Spoken
Tutorial/NPTEL**

Sr. No.	Non Credit Course -1	Non Credit Course -2
1	C programming -8 weeks	Introduction To Soft Computing-8 weeks
2	Enhancing soft skill and personality – 8 wks	RDBMS Postgres SQL -6 weeks
3	Design and analysis of algorithms -8 weeks	Privacy and Security in Online Social Media -8 weeks
4	Linux (Spoken tutorial)	Employment Communication A Lab based course – 8 weeks
5	Soft Skill Development-8 weeks	PHP and MySQL (Spoken tutorial)
6	Speaking Effectively -8 weeks	Scilab (Spoken tutorial)

**** Institute may choose any one of suggested MOOC Course or decide any other MOOC course at Institute level.**



Course Contents

SWAYAM is a programme initiated by Government of India and designed to achieve the three cardinal principles of Education Policy viz., access, equity and quality. The objective of this effort is to take the best teaching learning resources to all, including the most disadvantaged. SWAYAM seeks to bridge the digital divide for students who have hitherto remained untouched by the digital revolution and have not been able to join the mainstream of the knowledge economy.

(**NPTEL**) National Programme on Technology Enhanced Learning is a project of MHRD initiated by seven Indian Institutes of Technology (**Bombay, Delhi, Kanpur, Kharagpur, Madras, Guwahati and Roorkee**) along with the Indian Institute of Science, Bangalore in 2003, to provide quality education to anyone interested in learning from the IITs. The main goal was to create web and video courses in all major branches of engineering and physical sciences at the undergraduate and postgraduate levels and management courses at the postgraduate level.

Spoken Tutorial is an initiative of national mission on education through ICT, MHRD, Govt. of India to promote IT literacy through Open Source Software. It is a multi-award winning educational content portal. Here one can learn various Free and Open Source Software all by oneself. Anybody with a computer and a desire for learning can learn from any place, at any time and in any language of their choice.

About Course and Grade

Non Credit course is compulsory. No grade points are associated with non-credit courses and are not accounted in the calculation of the performance indices SGPA & CGPA. Result of assessment will be PP or NP. Set of non-credit courses offered is provided. **Conduction and assessment of performance in said course is to be done at institute level.**

PP and NP Grade - The student registered and completed non credit MOOC course shall be awarded the grade PP after satisfactory completion of credit course and shall be included in the Semester grade report for that course, provided student has the minimum attendance as prescribed by the Savitribai Phule Pune University and satisfactory internal assessment



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performance and secured a passing grade in that course. Student who is unable to complete MOOC course will be awarded as NP grade.

Guidelines for Conduction

Students have to enrol themselves for any one course which will be on going and complete the assignments. Grades will be given on the basis of submitted assignments and marks obtained. If student wants to earn a verified certificate, he/she will have to fill the online exam registration form and take the proctored exam conducted by NPTEL/Spoken Tutorial in person at any of the designated exam centres

Suggested List of Courses (Any One)

- 1. Introduction To Soft Computing -8 weeks**
- 2. RDBMS Postgre SQL -6 weeks**
- 3. Privacy and Security in Online Social Media -8 weeks**
- 4. Employment Communication A Lab based course – 8 weeks**
- 5. PHP and MySQL (Spoken tutorial)**
- 6. Scilab (Spoken tutorial)**

Institute may choose any one of suggested MOOC Course or decide any other MOOC course at Institute level.

Learning Resources:

MOOC Courses: <web links>

- [1. https://nptel.ac.in/course.html](https://nptel.ac.in/course.html)
- [2. https://swayam.gov.in/explorer](https://swayam.gov.in/explorer)
- [3. https://spoken-tutorial.org/tutorial-search](https://spoken-tutorial.org/tutorial-search)



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Continuous Assessment details

Assign	Assign	Assign	Assign	Assign	Assign	Assign	Assign	Total	Percentage	Grade
1	2	3	4	5	6	7	8			

Grade Rubrics

Letter Grade Percentile

A+	97-100
A	93-96
A-	90-92
B+	87-89
B	83-86
B-	80-82
C+	77-79
C	73-76
C-	70-72
D+	67-69
D	63-66
D-	60-62
F	Below 60

