

## SEMESTER-III

### COURSE 5: DOCUMENT ORIENTED DATABASE

Theory

Credits: 3

3 hrs/week

#### Course Objective:

- To educate student regarding databases and how to manage databases.
- To handle the large amount of data handling demands of business
- To implement a data store that provides high performance, high availability, and automatic scaling
- To Process an immense diversity of data that needs to be stored and processed.
- To make use of features and functionalities to work on NO SQL Data Base Mongo DB

COURSE OUTCOME NO	Upon successful completion of this course, students should have the knowledge and skills to:	PROGRAM OUTCOM NO
CO1	Have knowledge about database and DBMS Architecture	PO5, PO7
CO2	Able to know No SQL databases, various features of Mongo DB, the installation procedure, and how to interact with MongoDB.	PO5, PO7
CO3	Able to work on Mongo DB's rich query language to support create,read, update, and delete (CRUD) operations.	PO5, PO7
CO4	Analyses the aggregation framework to perform aggregation operations.	PO5, PO7
CO5	Able to work on indexes, types of index, index properties, and the various indexing strategies to be considered. Indexes are used to improvethe performance of a query.	PO5, PO7

#### Unit –I

##### Overview of Database Management Systems:

Introduction ,Data and Information , Characteristics of the Database Approach - Self-Describing Nature of the a Database System , Insulation between Programs and Data, Data Abstraction , Support of Multiple Views of the data , Sharing of Data and multiuser Transaction Processing , Actors on the Scene - Database Administrators , Database Designers , End Users , System Analysts and Application Programmers , Advantages of using a DBMS - Controlling Redundancy ,Restricting unauthorized Access , Providing Persistent Storage for Program Objects and Data Structures, Permitting Inferencing and Actions Using Rules ,Providing Multiple User Interfaces , Representing Complex Relationships Among data , Enforcing Integrity Constraints , Providing Backup and Recovery ,Database System Concepts and Architecture , DBMS Architecture and Data Independence - The Three-Schema Architecture , Data Independence , Database Languages and Interfaces.

## **Unit – II**

Mongo DB Features and Installation, The Need for No SQL Databases, What Are No SQL Databases?

CAP Theorem, BASE Approach, Types of NoSQL Databases, MongoDB Features, Document Database

MongoDB Is Schemaless MongoDB Uses BSON , Rich Query Language, Terms Used in MongoDB, Data Types in MongoDB, Working with Database Commands, Create Database, Drop Database.

## **Unit III**

MongoDB CRUD Operations, Collections, Create a Collection, Create Capped Collections, Create Operations, Insert Documents, Read Operations, Query Documents, Update Operations, Update Documents, Delete Operations, Delete Documents, Working with Arrays.

## **Unit IV**

Data Modelling and Aggregation, Data Models, Embedded Data Models, Normalized Data Models Data Model Relationship Between Documents, Data Model Using an Embedded Document, Data Model Using Document References.

## **Unit V**

Indexes and Working with Indexes, Index Types, Index Properties, Indexing Strategies.

### **Text Book:**

1. “Fundamentals of Database Systems” by R.Elmasri and S.Navathe
2. “Database System Concepts” by Abraham Silberschatz, Henry Korth, and S. Sudarshan, McGrawhill, 2010.
3. MongoDB Recipes: With Data Modeling and Query Building Strategies By Subhashini Chellappan, Dharanitharan Ganesan , Publisher : Apress

### **Reference Book:**

1. “Database Management Systems” by Raghu Ramakrishnan, NcGrawhill,2002
2. “Prinicples of Database Systems” by J.D.Ullman
3. MongoDB Basics 1st ed. Edition , by Peter Membrey (Author) Publisher : Apress Web Resources

### **Web Links:**

1. <https://docs.mongodb.com/manual/tutorial/getting-started>
2. <https://www.tutorialspoint.com/mongodb/index.htm>

### **Recommended Co – Curricular Activities:**

#### **A. Measurable**

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

**B. General**

1. Group Discussion
2. Others

**RECOMMENDED CONTINUOUS ASSESSMENT METHODS:**

1. Programming exercises,
2. Practical assignments and laboratory reports,
3. Observation of practical skills,
4. Individual and group project reports.
5. Efficient delivery using seminar presentations,
6. Viva voce interviews.
7. Computerized adaptive testing, literature surveys and evaluations,
8. Peers and self-assessment, outputs from individual and collaborative work.

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### SEMESTER-III

#### COURSE 5: DOCUMENT ORIENTED DATABASE

Practical

Credits: 1

2 hrs/week

#### Course Objective:

The objective of this course is to enable student to implement database related queries using MongoDB.

COURSE OUTCOME	UPON SUCCESSFUL COMPLETION OF THIS COURSE, STUDENTS SHOULD HAVE THE KNOWLEDGE AND SKILLS TO	PROGRAM OUTCOME NO
CO1	Installation of mongo db ,configuring, running mongo db	PO5, PO7
CO2	Implementation of crud operations	PO5, PO7
CO3	Implementing index methods, aggregation methods	PO5, PO7
CO4	To study and implement DDL, DML commands using MYSQL	PO5, PO7
CO5	Implementing MySQL Programmes using Control Structures and functions.	PO5, PO7

#### WEEK 1:

Installing configuring running of Mongo db

#### Week 2:

Working with data base commands in mongo db

#### Week 3:

Working with crud operations in mongo db

#### Week 4:

Implementing aggregation operations in mongo db

#### Week 5:

Implementing index operations

Working with create, alter, drop, rename and Truncate tables using MYSQL

#### Week 7:

Working with insert, update, delete, select statements using MYSQL

Week 8:

Write an MYSQL Program to retrieve the data from two tables using joins.

Week 9:

Write a MYSQL program to retrieve and display the names of the top5 students with highest marks in a specified course.

Week 10:

Write an MYSQL Program to calculate the average marks of all students and display it along with their name.

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**SEMESTER-III**  
**COURSE 6: OPERATING SYSTEMS**

Theory

Credits: 3

3 hrs/week

**Course Objectives**

1. To understand the services provided by and the design of an operating system.
2. To understand what a process is and how processes are synchronized and scheduled.
3. To understand different approaches to memory management.
4. To understand the structure and commands in unix
5. Students should be able to understand shell programming

**Course Outcomes:**

<b>COURSE OUTCOME NO</b>	<b>UPON SUCCESSFUL COMPLETION OF THIS COU SHOULD HAVE THE KNOWLEDGE AND SKILLS</b>	<b>PROGRAM OUTCOME</b>
<b>CO1</b>	Analyse the services and functions of operating systems	<b>PO5,PO7</b>
<b>Co2</b>	Analyse the concepts of processes in operating system and illustration of the scheduling of processor for a given problem instance.	<b>PO5,PO7</b>
<b>Co3</b>	Analyse memory management techniques, concepts of virtual memory	<b>PO5,PO7</b>
<b>Co4</b>	To understand Introduction to Unix:- Architecture of Unix, Features of Unix , Unix Commands	<b>PO5,PO7</b>
<b>Co5</b>	To understand <b>Shell programming</b> and Simple shell program examples	<b>PO5,PO7</b>

**UNIT – I**

**Operating System:**

Introduction, Operating Systems Objectives and functions, Computer System Architecture, OS Structure, OS Operations. Evolution of Operating Systems ,types of operating system, 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, Process communication. Threads. Process Scheduling Scheduling Queues, Schedulers, Context Switch, Pre-emptive Scheduling, Dispatcher, Scheduling Criteria, Scheduling algorithms, Process Synchronization, The Critical section Problem, Semaphores, Classic Problems of Synchronization,

## **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**

Introduction to Unix:- Architecture of Unix, Features of Unix , Unix Commands – PATH, man, echo, printf, script, passwd, uname, who, date, stty, pwd, cd, mkdir, rmdir, ls, cp, mv, rm, cat, more, wc, lp, od, tar, gzip.

## **UNIT – V      Shell programming:**

Ordinary and environment variables. The profile. Read and read only commands. Command line arguments. exit and exit status of a command. Logical operators for conditional execution. The test command and its shortcut. The if, while, for and case control statements. The set and shift commands and handling positional parameters. The here ( << ) document and trap command. Simple shell program examples.

### **TEXT BOOK:**

"Operating System Concepts"-Silberschatz, Galvin, Gagne—eight Edition-John Willey & Sons INC 1,2,3 units

Sumitabha Das., Unix Concepts and Applications., 4thEdition., Tata McGraw Hill(4,5) units

### **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

### **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.

### **Recommended Co – Curricular Activities:**

Measurable

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

### **B. General**

1. Group Discussion
2. Others

### **RECOMMENDED CONTINUOUS ASSESSMENT METHODS:**

1. Programming exercises,
2. Practical assignments and laboratory reports,

3. Observation of practical skills,
4. Individual and group project reports.
5. Efficient delivery using seminar presentations,
6. Viva voce interviews.
7. Computerized adaptive testing, literature surveys and evaluations,
8. Peers and self-assessment, outputs form individual and collaborative work.

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**SEMESTER-III**  
**COURSE 6: OPERATING SYSTEMS**

Practical

Credits: 1

2 hrs/week

**Course Objective:**

This course enables students to develop OS scheduling logics and also to gain hands-on experience of UNIX OS..

COURSE OUTCOME NO	UPON SUCCESSFUL COMPLETION OF THIS COURSE, STUDENTS SHOULD HAVE THE KNOWLEDGE AND SKILLS TO:	PROGRAM OUTCOME NO
CO1	To implement CPU scheduling algorithms in c programming language	Po5,po7
CO2	To implement file/directory handling commands in Unix.	Po5,po7
CO3	To display list of currently logged users in Unix shell script	Po5,po7
CO4	To implement binary search using shell script	Po5,po7
CO5	To implement Fibonacci series using shell script	Po5,po7

**LAB LIST**

1. Write the program to implement CPU scheduling algorithm for first come first serve
2. Scheduling
3. Write the program to implement CPU scheduling algorithm for first come first serve
4. Scheduling
5. Write a program to implement CPU scheduling algorithm for shortest job first scheduling.
6. write a program to implement CPU scheduling algorithm for shortest job first scheduling.
7. Write a 'C' program to perform priority scheduling.
8. Write a 'C' program to perform priority scheduling.
9. Write a program to implement CPU scheduling for Round Robin Scheduling.
10. Execute various file/directory handling commands in UNIX.
11. Execute various file/directory handling commands in UNIX.
12. Write a Simple shell script for basic arithmetic and logical calculations.
13. Write a shell script to display list of users currently logged in.
14. Write a shell script to delete all the temporary files.
15. Write a shell script to search an element from an array using binary searching.
16. Write a shell script to determine whether a given number is a prime number or not
17. Write a shell script to print the first  $n$  Fibonacci numbers.
18. Execute various system administrative commands

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## SEMESTER-III

### COURSE 7: OBJECT ORIENTED PROGRAMMING

Theory

Credits: 3

3 hrs/week

#### Course Objectives:

The Objective of the course is to assist the student in understanding the concepts of Object Oriented Programming using Java language.

**Course Outcomes:** At the end of this course the student is able to

**CO1:** Overview of java programming, history and its features.(PO5,PO7)

**CO2:** Understand fundamentals of programming such as variables, conditional and iterative execution, statements, etc.(PO5,PO6,PO7)

**CO3:** Understand the principles of arrays, inheritance, packages and multi-threading.(PO5,PO6,PO7)

**CO4:** Understand the Fundamental features of Managing Errors, Exceptions and Applet Programming.(PO5,PO6,PO7)

**CO5:** Understand the Files concept in java.(PO5,PO6,PO7)

#### UNIT -I

JAVA Evolution: History – Features, Overview of Java Language: Introduction - Simple Java program - Structure - Java tokens - Statements - Java virtual Machine.  
Constants - Variables - Data types - Operators and expressions.

#### UNIT -II

Decision making and Branching: Simple If Statement, the IF...Else statement, The Else... If ladder, The Switch Statement, The? : Operator, Decision making and looping: The While statement, The do Statement - The for Statement - Jumps in loops - labelled loops - Classes, Objects and Methods. Arrays, Strings

#### UNIT -III

Vectors – Interfaces- Multiple Inheritance – Packages: Putting classes together –Threaded Programming - Thread life cycle, Multi threads, Deadlocks. Managing Errors and Exceptions, I/O Exceptions.

#### UNIT -IV

Applet Programming – advantages and disadvantages of Applets, Applet life cycle - Event Handling in Applet, Applet Parameters and Communications; Graphics programming: The Graphics class- Lines and rectangles-Circles and ellipses-Drawing arcs -Line graphs -Drawing Bar charts.

#### UNIT -V

Files: Introduction – concept of streams – Stream classes – Using stream – I/O classes – File class – creation of files – Reading / Writing characters/ Bytes.

Text Books:			
	Author	Title	Publisher
1	E. Balaguruswamy,	Programming with JAVA - A Primer, 2015	McGraw Hill Professional

Reference Text Books:			
	Author	Title	Publisher

1	Sachin Malhotra	Programming in Java	OXFORD University Press
2	John Hubbard R.	Programming with Java, Second Edition	Schaum's outline Series, TATA McGraw-Hill Company.
3	Deitel & Deitel.	Java TM: How to Program 2007	PHI
4	D.S Mallik	Java Programming: From Problem Analysis to Program Design	
5	P. Radha Krishna	Object Oriented Programming Through Java, 2008	Universities Press

**Course Delivery method:** Face-to-face / Blended

**Course has focus on:** Skill Development.

**Recommended Co – Curricular Activities:**

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

**A. Measurable**

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging).
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

**B. General**

1. Group Discussion
2. Others

**RECOMMENDED CONTINUOUS ASSESSMENT METHODS:**

Some of the following suggested assessment methodologies could be adopted;

1. The oral and written examinations (Scheduled and surprise tests),
2. Closed-book and open-book tests,
3. Programming exercises,
4. Practical assignments and laboratory reports,
5. Observation of practical skills,
6. Individual and group project reports.
7. Efficient delivery using seminar presentations,
8. Viva voce interviews.
9. Computerised adaptive testing, literature surveys and evaluations,
10. Peers and self-assessment, outputs form individual and collaborative work.

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## SEMESTER-III

### COURSE 7: OBJECT ORIENTED PROGRAMMING

Practical

Credits: 1

2 hrs/week

#### Course Objective:

The Objective of this course is to apply programming skills in java.

#### Course Outcomes: At the end of this course the student is able to

**CO1:** Overview of java programming. (PO5,PO7)

**CO2:** Understand fundamentals of programming such as variables, conditional and iterative execution, statements, etc. (PO5,PO7)

**CO3:** Understand the principles of arrays, inheritance, packages and multi-threading. (PO5,PO7)

**CO4:** Understand the Fundamental features of Exceptions and Applet Programming. (PO5,PO7)

**CO5:** Understand the Files concept in java. (PO5,PO7)

#### LAB LIST

1. Write a java program to print Hello World.
2. Write a java program on Variables.
3. Write a java program to use various Data types.
4. Write a java program to implement main method inside and outside of a class.
5. Write a java program on Operators.
6. Write a java program on Looping.
7. Write a java program to display Fibonacci series.
8. Write a java program to find out the given number is palindrome or not.
9. Write a java program on single and Multi-dimensional array.
10. Write a java program on Strings.
11. Write a java program on interface.
12. Write java programs on various types of Inheritance.
13. Write java programs on Packages.
14. Write a java program on Multi-Threading.
15. Write java programs on various types Exceptions.
16. Write an Applet program to draw a Line, Rectangle, Circle, Ellipse, Arcs a.
17. Write an Applet program to draw Line graphs and Bar charts.
18. Write a java program to create a file.
19. Write a java program to perform read data from a file.
20. Write a java program to perform write data from a file.

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**SEMESTER-III**  
**COURSE 8: INFERENCE STATISTICS**

Theory

Credits: 3

3 hrs/week

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**Course Objective:**

This course enables students to gain knowledge in sampling, hypothesis testing and non parametric methods.

**Course Outcomes:**

After going through this course, the students will get

CO1: a fundamental understanding of Parametric models for developing relevant inferences on associated parameters,

CO2: knowledge of point and interval estimation procedures and different methods of point estimation,

CO3: using Neyman Pearson Lemma and finding Uniformly Most Powerful Test,

CO4: various basic concepts on sampling distributions and large sample tests based on normal distribution,

CO5 : small sample tests based on chi-square, Student's and Snedecor's F distributions

**Unit I**

Theory of Estimation: Parameter, Statistic, Standard Error of the statistic, concept of bias and mean square error of an estimate, Criteria of good estimator - unbiasedness, consistency, efficiency, and sufficiency. Methods of estimation- Maximum Likelihood estimator(MLE) and Method of Moments(MME). Concepts of confidence interval and confidence coefficient, confidence intervals for the parameters of univariate normal,

**Unit II**

Testing of Hypothesis : Statistical hypotheses, critical region, size and power of a test, most powerful test, two types of errors. Neyman Pearson lemma(WITHOUT PROOF) and its applications, uniformly most powerful unbiased test . One and two tailed tests. Procedure for testing of hypothesis, Tests of significance of large samples - Single proportion and difference of proportions, single mean and difference of means.

**Unit III**

Exact Sampling distributions : Student's t-distribution, Chi-square distribution, Snedecor's F distribution – definitions, properties and applications. Tests of significance for small samples: Student's t-distribution - single mean, difference of means and paired t-test. Chi-square distribution- test for goodness of fit and independence of attributes.

#### Unit IV

F-distribution – definition, properties and applications – F-test for equality of two population variances. ANOVA one way and two-way classifications

#### Unit V

Non-parametric methods- definition, advantages and disadvantages. One sample test- Sign test, Run test, Wilcoxon-signed rank test. Two independent sample tests: Median test, Wilcoxon- Mann Whitney U - test, Kruskal Wallis test - Simple Problems Note: Without proofs of named theorems and more importance to applications.

#### TEXT BOOK:

S.C. Gupta, (2019), Seventh Edition, Fundamentals of Statistics, Mumbai: Himalaya Publishing House.

#### REFERENCE BOOKS

1. Sharma, J. K. (2013), Business statistics, New Delhi: Pearson Education
2. Levine, D.M., Berenson, M. L. & Stephan, D. (2012), Statistics for managers using Microsoft Excel, New Delhi: Prentice Hall India Pvt.
3. Aczel, A. D. & Sounderpandian, J. (2011), Complete Business Statistics, New Delhi: Tata McGraw Hill.
4. Anderson, D., Sweeney, D., Williams, T., Camm, J., & Cochran, J. (2013), Statistics for Business and Economics, New Delhi: Cengage Learning.
5. Davis, G., & Pecar, B. (2014), Business Statistics using Excel, New Delhi: Oxford University Press.

#### Websites of Interest:

<http://onlinestatbook.com/rvls/index.html>

#### Co-Curricular Activities in the class:

1. Pictionary
2. Case Studies on topics in field of statistics
3. Snap test and Open Book test
4. Architectural – To be build the procedures
5. Extempore – Random concept to students
6. Interactive Sessions
7. Teaching through real world examples

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