

**H. N. G. University , Patan**  
**M.Sc.(CA & IT) – Semester - IV**  
**401: Statistical Methods**

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**Unit: 1**

[25%]

**Measure of Central Tendency : -**

**Arithmetic Mean :**

- Arithmetic Mean for raw data
- Discrete frequency distribution
- Continuous frequency distribution
- Properties of Arithmetic Mean
- Merits & Demerits of A.M.

**Median :**

- Median for raw data
- Discrete frequency distribution
- Continuous frequency distribution
- Merits & Demerits of Median

**Mode :**

- Mode for raw data
- Discrete frequency distribution
- Continuous frequency distribution
- Merits & Demerits of Mode

**Measure of Dispersion :-**

- Introduction
- Range & its Co-efficient
- Quartile deviation & its Co-efficient
- Mean deviation & its Co-efficient
- Standard deviation & its Co-efficient

**Unit: 2**

[25%]

**Correlation Co-efficient : -**

- Definition of Correlation
- Types of Correlation
- Scatter Diagram Method
- Karl Pearson's Correlation Co-efficient
- Correlation Co-efficient for Bivariate frequency distribution
- Probable error for correlation

**Unit: 3**

[25%]

**Regression Analysis :-**

- Definition of Regression
- Regression Lines
- Regression Co-efficients
- Properties of Regression Co-efficients
- Least square fit linear regression curve fitting

**Unit: 4**

[25%]

**Time Series and Business forecasting :-**

- Utility of Time series Analysis
- Components of Time series
  - Secular Trend      -Seasonal Variation
  - Cyclic Variation    -Irregular Variation
- Method of Measurement of components : Moving averages method
- Forecasting Model and Method : Exponential Smoothing Method

**Text Books :-**

1. Fundamental of statistics – Sixth Edition (S.C.Gupta)

**Reference Book : -**

1. Statistical Methods (S.P.Gupta)
2. Business Statistica (R.S.Bhardwarj)
3. Statistics(R.S.N.Pillai and V.Bagavati)

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**M.Sc.(CA & IT) – Semester - IV**  
**402: Digital Electronics**

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**Unit: 1**

**[25%]**

**Data Representation, Number System**

**Representation of number System** Decimal, Binary ,Binary to octal, Binary to Hexadecimal, Binary to Decimal, Decimal to Binary, Binary Operation (Addition, Subtraction, Multiplication, Division), Hexadecimal, Hexadecimal to Binary, Hexadecimal to Octal, Hexadecimal to Decimal Hexadecimal Operation operation (Addition, Subtraction, Multiplication, Division), Octal, Octal to Binary, Octal to Decimal, Octal to Hexadecimal, Octal Operation(Addition, Subtraction, Multiplication, Division)

**Arithmetic:** Addition, Subtraction Using 1's and 2's Complement, BCD Code, Addition, Subtraction Using 8421 BCD Code, XS -3 Code, Addition, Subtraction Using XS-3 Code, Error Detection & Error Correction Code, Floating Point Representation of Number

**Unit: 2**

**[25%]**

**Basic of Digital Computers:**

**Digital Logic Circuits, Digital Computers** : Logic Gates, Logic Circuit , Boolean Algebra, Simplification using Boolean Algebra, K' Map, Simplification using K'map, **Combinational logic circuit** :Half Adder, Full Adder, Binary Adder, 2's Complement Adder-Subtractor, **Sequential Circuit, Types of Sequential Circuit**, Latch: R-S Latch, D-Latch Flip Flop: R-S FF, D-FF,J-K FF, Master Slave J-K FF-Integrated Circuits, Decoders, Multiplexer, Demultiplexer, Registers (Shift Left & Shift Right register), Counter (Asynchronous & synchronous)

**Unit: 3**

**[25%]**

**Memory:**

**Types of Memory**, RAM, Types of RAM, ROM, Types of ROM Operations – Arithmetic Micro Operations, Logical Micro Operations, Shift Micro Operations, Arithmetic Logical Shift Unit, Addressing Techniques, Types of Addressing Techniques, Instruction Format.

**Unit: 4**

**[25%]**

**8085 Microprocessor:**

Microprocessor Overview, Types of Microprocessor 8085 Microprocessor Architecture, Flags, Types of Flags Types of instruction(1 -Byte,2-Byte,3-Byte),Arithmetic instruction, Logical Instruction, Data transfer instruction, Stack instruction, Branch Instruction,I/O instruction.

**Text Books:**

1. Digital Electronics by Anand Kumar, 3<sup>rd</sup> Edition , PHI
2. Computer System Architecture by M. Morris Mano - 3<sup>rd</sup> Edition - PHI
3. Digital Computer Electronics by Malvino & Brown – 2<sup>nd</sup> Edition.
4. Microprocessor Architecture Programming and Application by Ramesh S. Gaonkar

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**403: Object Oriented Programming with JAVA**

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**Unit: 1**

**[25%]**

**Java's Magic:**

The Byte-code, Features of Java, IDE for Java, Object -Oriented Programming in Java, Java Program Structure and Java's Class Library.

**Data Types, Variables, and Operators :**

The Simple Data Types, Literals, Variables, Type Conversion and Casting, Automatic Type Promotion in expressions, Java Operators, Operator Precedence.

**Selection Statements :**

Control Statements – if and switch, Scope of Variable, Iterative Statements – for, while, do.... While, Jump Statements.

**Defining Classes :**

Definition of a Class, Definition of Methods, Constructors, Creating Objects of a Class, Assigning Object Reference Variables, The Variable this, Defining and Using a Class, Automatic Garbage Collection.

**Unit :2**

**[25%]**

**Arrays and Strings :**

Arrays, Arrays of Characters, String Handling Using String Class, Operations on String Handling Using String Buffer Class.

**Extending Classes and Inheritance :**

Using Existing Classes, Class Inheritance, Choosing Base Class, Access Attributes, Polymorphism, Multiple Levels of Inheritance, Abstraction through Abstract Classes, Using Final Modifier, The Universal Super class -Object Class.

**Packages & Interfaces :**

Understanding Packages, Defining a Package, Packaging up Your Classes, Adding Classes from a Package to Your Program, Understanding CLASSPATH, Standard Packages, Access Protection in Packages, Concept of Interface.

**Exception Handling :**

The Idea behind Exceptions, Types of Exceptions, Dealing with Exceptions, Exception Objects, Defining Your Own Exceptions

**Multithreading Programming:**

The Java Thread Model, Understanding Threads, The Main Thread, Creating a Thread, Creating Multiple Threads, Thread Priorities, Synchronization, Inter-thread communication, Deadlocks

**Unit : 3**

**[25%]**

**Input/Output in Java :**

I/O Basic, Byte and Character Structures, I/O Classes, Reading Console Input Writing Console Output, Reading and Writing on Files, Random Access Files, Storing and Retrieving Objects from File, Stream Benefits.

**Creating Applets in Java:**

Applet Basics, Applet Architecture, Applet Life Cycle, Simple Applet Display Methods, Requesting Repainting, Using the Status Window, The HTML APPLET Tag Passing Parameters to Applets.

**Working with Windows:**

AWT Classes, Window Fundamentals, Working with Frame, Creating a Frame Window in an Applet, Displaying Information Within a Window.

**Unit : 4**

**[25%]**

**Working with Graphics and Texts :**

Working with Graphics, Working with Color, Setting the Paint Mode, Working with Fonts, Managing Text Output Using Font Metrics, Exploring Text and Graphics.

**Working with AWT Controls, Layout Managers and Menus :**

Control Fundamentals, Labels, Buttons, Check Boxes and Check, Box Groups, Choice Controls, Lists, Scroll Bars, Text Field and Text Area Controls, Understanding Layout Managers, Flow Layout Manager, Border Layout Manager, Grid Layout Manager, Using Insets Manager, Card Layout Manager, Menu Bars and Menus, Dialog Boxes, File Dialog

**Handling Events in Java :**

Two Event Handling Mechanisms, The Delegation Event Model, The Event Handling Process, Event Classes, Sources of Events, Event Listener Interfaces, Using the Delegation Event Model, Adapter Classes

**Text Book:**

1. The Complete Reference JAVA 2, 4th Edition, TMH Publication.
2. Beginning JAVA 2 (JDK1.3 Edition), Ivor Horton, WROX Public.

**Reference Book : -**

1. Teach Yourself JAVA, Joseph O'Neil & Herb Schildt, Tata McGraw Hill
2. JAVA 2 UNLEASHED, Tech Media Publications.
3. JAVA 2(1.3) API Documentations.
4. Programming with JAVA: A primer, Balagurusamy, 2nd Edition, Tata McGraw Hill

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**M.Sc.(CA & IT) – Semester - IV**  
**404: Operating System & UNIX**

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**Unit: 1**

**[25%]**

**Operating System Overview :**

Introduction to Operating System, Types of Operating system, Operating System Services

**Process Management:**

Process, Process Control Block (PCB), Process States, Scheduling – Types of Schedulers, Scheduling & Performance Criteria, Scheduling Algorithms – FCFS, SJF, Priority & Round Robin (RR) Scheduling. Interprocess Synchronization: Mutual exclusion, Semaphore, Classical Problems in Synchronization, Intraprocess Synchronization: Critical Region, Deadlocks.

**Unit: 2**

**[25%]**

**Memory Management :**

Static Memory Allocation, Dynamic Memory Allocation, Segmentation, Virtual memory – Paging, Demand Paging , Page Replacement, Fragmentation & Defragmentation, Cache memory.

**Unit: 3**

**[25%]**

**I/O Management:**

Program Controlled I/O, Interrupt Driven I/O, USART, PIT File Management: File concept, Access method, Directory structure, Disk Space Management – Continuous allocation, Non continuous allocation, File related system services

**Unit: 4**

**[25%]**

**Distributed Systems:**

Protocol Architecture, TCP/IP Architecture, Client/Server Computing, Message Passing, Remote Procedure Calls.

**UNIX Overview:**

Features of Unix, Types of shell, Unix file system, Editors of Unix: (VI)

**Text Books:**

1. Silberschatz & Galvin: Operating System Concept, Wiley, Sixth Edition
2. Milan Milenkovi'c : Operating Systems, Tata McGraw – Hill, Second Edition.
3. William Stallings : Operating Systems, PHI, Fourth Edition
4. Yashavant Kanetkar : Unix Shell Programming, BPB.

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**M.Sc.(CA & IT) – Semester - IV**  
**405: Advance Database Architecture**

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<b>Unit: 1</b>	<b>[25%]</b>
<b>The Oracle Instance Architecture</b>	
Introduction	
Defining the Instance	
Creating the Instance	
<b>The Oracle Database Architecture</b>	
Defining the Database	
The SYS and SYSTEM Schemas	
Understanding the Components of the Database	
Understanding Database Segments	
Oracle Data Dictionary	
Other Database Objects	
<b>Exploring the oracle Environment</b>	
Creating the Oracle Environment	
Designing an Optimal Flexible Architecture	
Creating Your First Database	
<b>Unit: 2</b>	<b>[25%]</b>
<b>SQL Plus for Administrators</b>	
Administering SQL Plus	
Using the SQL Plus COPY Command	
Using SQL to Create SQL	
Tracing SQL Statements	
<b>Oracle Enterprise Manager</b>	
Understanding the Enterprise Manager Architecture	
Using the Database Administration Tools	
<b>PL/SQL</b>	
Index, View, Sequence, Trigger, Procedure, Function, Package, Cursor, Exception Handling	
<b>Unit: 3</b>	<b>[25%]</b>
<b>IMPORT/EXPORT</b>	
Understanding Import/Export	
Controlling & Configuring Import/Export	
Walkthrough of Import/Export Sessions	
Using SHOW & INDEXFILE Options	
<b>SQL*Loader</b>	
Components of SQL Loader	
Looking at SQL Loader Examples	
Conventional and Direct Path Loading	
<b>Unit: 4</b>	<b>[25%]</b>
<b>Managing Database Storage</b>	
Administering Database Objects	
Understanding Database Fragmentation	
Managing Rollback Segments	
Identifying Storage Problems	
Administering Growing Database	
<b>Integrity Management</b>	
Introduction	
Implementing Locks	
Analyzing v\$lck	
Monitoring Locks on the System	
Avoiding Locks: Possible Solutions	
Implementing Locks with Latches	
<b>BackUp and Recovery</b>	
Types of Backup	
Database Backup in offline and online mode	
Database recovery	
<b>Performance Tuning fundamentals</b>	

Understanding Why You Tune  
Knowing the Tuning Principles  
Tuning Goals  
Using the Return on Investment Strategy

**Text Books:**

1. William Page & Nathan Hughes : Using Oracle8/8i Special Edition, Prentice Hall India.

**Reference Books:**

1. Oracle Unleashed,
2. Oracle10g Complete Reference, Kevin Loney , Tata McGraw-Hill,2004.
3. Oracle Bible,
4. Oracle Architecture, Oracle Press.
5. Oracle Database 10g DBA Handbook, Kevin Loney & Bob Bryla , Tata McGraw-Hill,2005