

**MANONMANIAM SUNDARANAR UNIVERSITY  
TIRUNELVELI**

**UG COURSES – AFFILIATED COLLEGES**

**B.Sc. Mathematics with Computer Applications**

**(Choice Based Credit System)**

**(with effect from the academic year 2016-2017 onwards)**

**(45<sup>th</sup> SCAA meeting held on 09.02.2017)**

V	I	25	Core - 7	Real Analysis –II	7	5	25	75	100	30	40
	II	26	Core - 8	Mechanics	7	5	25	75	100	30	40
	III	27	Major Elective-I	A)Java Programming B)Data Communication and Computer Network C) Relational Database Management System	6	5	25	75	100	30	40
		28	Major Elective-II	A)Fuzzy Mathematics B)Operations Research C) Statistics	6	5	25	75	100	30	40
	IV	29	Skilled Based subject (Common)	Personality Development/ Effective Communication / Youth Leadership	4	4	25	75	100	30	40
				Subtotal	30	24					
VI	I	30	Core - 9	Abstract algebra –II	6	5	25	75	100	30	40
	II	31	Core - 10	Complex Analysis	6	5	25	75	100	30	40
	III	32	Core – 11	Number Theory	6	5	25	75	100	30	40
		33	Core - 12	Graph Theory	6	5	25	75	100	30	40
	IV	34	Major Elective	A) Data Mining B) Computer graphics and Visualization C) Web Technology	6	5	25	75	100	30	40
				Subtotal	30	25					

**MSU/2016-17/UG-Colleges/Part-IV (B.Sc. Mathematics with Computer Applications)/Semester-V/ Ppr.no.25/ Core -7**

**REAL ANALYSIS - II**

- Unit I** Metric spaces – Examples – bounded sets – open ball – open sets – subspaces – Interior of a set.
- Unit II** Closed sets – closure – Limit points – Dense sets – complete metric space – Cantor’s intersection theorem – Baire’s Category Theorem.
- Unit III** Continuous functions on metric spaces : Functions - continuous at a point on the real line – Functions - Continuous – uniform continuous in a metric space – Discontinuous function on  $\mathbb{R}^1$ .
- Unit IV** Connectedness and compactness : Connectedness – connected subset of  $\mathbb{R}$  – connectedness and continuity – compact metric spaces – compact subset of  $\mathbb{R}^1$  – Heine Borel theorem.
- Unit V** **Riemann Integral :**  
Sets of measure zero – Existence of the Riemann integral – Derivatives – Rolle’s theorem – Fundamental theorem of Calculus – Mean value theorem – Cauchy’s mean value theorem – Taylor’s theorem.

**Text Books:**

Arumugam & others – Modern Analysis  
Malic .S.C - Mathematical Analysis, Wiley Eastern Limited, New Delhi.

**Books for Reference :**

- Tom .M. Apostol – Mathematical Analysis, II Edition, Narosa Publishing House, New Delhi (Unit I) (1997)
- Goldberg .R – Methods of Real Analysis Oxford and IBH Publishing Co. New Delhi (200)
- Viswanath Naik .K – Real Analysis, Emerald Publishers, Chennai.
- Berberian .S.K – First course in Real Analysis, Springer Verlag, New York.

**MSU/2016-17/UG-Colleges/Part-IV (B.Sc. Mathematics with Computer Applications)/Semester-V/ Ppr.no.26/ Core -8**

**MECHANICS**

- Unit I**      **Forces acting at a point :** Forces acting at a point – types of forces – Triangle of forces – Polygon of forces – Lami’s theorem – Parallel Forces and moments – Resultant of two like parallel forces, unlike and unequal parallel forces – moment of a force – Varignon’s theorem of moments.
- Unit II**      **Equilibrium of Strings and Chains :** Equilibrium of strings and chains – Common catenary – Suspension bridge.
- Unit III**      **Projectiles :** Projectiles : Equation of Path – Maximum height – Time of flight – Range.
- Unit IV**      **Simple Harmonic Motion :** Simple harmonic motion (SHM) in a straight line – Geometrical representation – Composition of SHM’s of same period in the same line and along two perpendicular direction – SHM as a curve – Simple pendulum – Simple equivalent pendulum. The seconds pendulum.
- Unit V**      **Motion under the action of Central Forces :** Velocity and acceleration in Polar co-ordinates – Differential equation of Central Orbit – Pedal equation of Central Orbit

**Text Books:**

- .Venkataraman .M.K., - Statics, Agastiar Publications 2002, Trichy.
- Venkataraman .M.K., - A text book on Dynamics, 2001, Agastiar Publications, Trichy.

**Book for Reference :**

- Duraipandian .P, Laxmi Duraipandian and Muthumizh Jayapragasam, Mechanics, 2003, S.Chand and Company.

**MSU/2016-17/UG-Colleges/Part-IV (B.Sc. Mathematics with Computer Applications)/Semester-V/ Ppr.no.27(A)/ Elective – I (A)**

## **Java Programming**

### **UNIT I**

**Data Types, Variables and Arrays:** Primary types – Integers – Floating point types – Characters – Booleans – A Closer Look at Literals – Variables – Type Conversion and Casting – Automatic type Promotion in Expressions - One Dimensional Arrays– Multi Dimensional Arrays. **Operators:** Arithmetic Operators – Bitwise operators – Relational Operators – Boolean Logical Operators – Assignment Operator – Conditional Operator – Operator Precedence-Using parentheses.

### **UNIT II**

**Introducing Classes:** Class Fundamentals – Declaring objects- Assigning object Reference variables- Introducing Methods- Constructors-Garbage collection – Finalize() Method **A Closer Look at Methods and classes:** Overloading Methods-Using objects as parameters- Argument passing –Returning objects- Recursion-Introducing Access control – understanding static –Introducing final – Nested and Inner classes- String class- Using command line arguments. **Inheritance:** Inheritance Basics –Using super- creating Multilevel Hierarchy - Method overriding –Dynamic Method Dispatch –Using Abstract class –Using final with inheritance-The object class.

### **UNIT III**

**Packages and interfaces:** Packages –Access Protection – Importing packages-Interfaces. **Exception Handling:** Introduction- Exception Types – Uncaught Exceptions- Using try and catch – Multiple catch clauses –Nested try statements- throw – throws-finally. **Multithreaded programming :** Java Thread Model –Main Thread –Creating a Thread –Creating Multiple Threads – Using is Alive() and join() –Thread priorities

### **UNIT IV**

**The Applet class:** Applet Basics – Applet Architecture –Applet Skeleton- Applet Display method –Requesting Repainting – HTML APPLET tag- Passing Parameters to Applet.  
**Event Handling:** Event Handling Mechanisms –Delegation Event Model –Event classes(The Action Event ,Item Event , Key Event, Mouse Event) – Sources of Events - Event Listener Interfaces(Action Listener, Item Listener, Key Listener, Mouse Listener).

## UNIT V

**Introducing the AWT:** AWT Classes – Window fundamentals – working with Frame Windows –working with Graphics– Working with color – Working with Fonts.**Using AWT Controls:** Controls Fundamentals – Labels – Using Buttons –Applying check Boxes – Check Box group – Choice Controls – Using a Text field – Using a Text Area – Understanding Layout Managers [Flow Layout Only ] – Menu Bars and Menus.

### Text Book:

Java, The Complete Reference 8/e , Herbert Schildt, TMH

### Reference Book:

- Programming with Java –C.Muthu
- Java Programming A Practical Approach, C.Xavier, TMH
- Programming in Java, Sachin Malhotra, Saurabh Choudhary, OXFORD University Press
- Programming with Java a primer 3/E E.BALAGURUSWAMY
- Core Java, Mahesh P. Matha, PHI Learning Private Limited

## Java Programming - Practical List (30 hours)

### Internal only

1. Define a class called Student with the attributes name, reg\_number and marks obtained in four subjects(m1,m2,m3,m4).Write a suitable constructor and methods to find the total mark obtained by the student and display the details of the student.
2. Write a Java program to find the area of a square, rectangle and triangle by
  - (i) Overloading Constructor

(ii) Overloading Method.

3. Write a java program to add two complex numbers.  
[Use passing object as argument and return object].
4. Define a class called Student\_super with data members name, roll number and age. Write a suitable constructor and a method output () to display the details. Derive another class Student from Student\_super with data members height and weight. Write a constructor and a method output () to display the details which overrides the super class method output(). [Apply method Overriding concept].
5. Write a java program to create a package —Employee which contains the classes Emp and Memp. The data members of Emp are name, emp\_id, category and Bpay. write suitable constructors and methods to compute net pay of the employee. The class Memp contains the main method.
6. Write a java program to create an interface called Demo, which contains a double type constant, and a method called area () with one double type argument. Implement the interface to find the area of a circle.
7. Write a java program to create a thread using Thread class.
8. Write a java program to Design a calculator to perform only addition and division. It must contain three Buttons with labels +, / and =, and a TextField to get input and display the result.
9. Create an applet with four Checkboxes with labels MARUTI-800, ZEN, ALTO and ESTEEM and a Text area object. The program must display the details of the car while clicking a particular Checkbox.
10. Write a Java program to throw the following exception,
  - 1) Negative Array Size
  - 2) Array Index out of Bounds

**MSU/2016-17/UG-Colleges/Part-IV (B.Sc. Mathematics with Computer Applications)/Semester-V/ Ppr.no.27(B)/ Elective – I (B)**

**Data communication and Computer Network**

**Unit I**

**Introduction** - Data communication – Networks-the Internet –Protocols and Standards –  
**Network Models** –Layered tasks –OSI model- layers in OSI model-TCP/IP protocol Suite-  
Addressing.

**Unit II**

**Physical layer** – Analog and digital – Transmission Impairment –Data rate limits-  
Performance- Transmission mode -**BandWidth Utilization**- Multiplexing Spread Spectrum-  
**Transmission media** – Guided and Unguided media.

**Unit III**

**Switching** – Circuit Switched Network-Datagram Network – Virtual Circuit Network-  
Structure of a Switch. **Using telephone and cable networks** – Telephone Network- Dial-Up  
Modem–Digital Subscriber Line – Cable TV Network and Cable TV for Data transfer. **Data Link  
Layer** : Error Detection and Correction- Introduction- Checksum.

**Unit IV**

**Data link control**-Framing-Flow and Error Control-Protocols-Noiseless Channels-Noisy  
Channels. **Wired LANs**-IEEE standards-Standard Ethernet- Changes in the Standard – Fast  
Ethernet-Gigabit Ethernet. **Wireless LANs**: IEEE 802.11-Blue tooth. **Connecting LANs** :  
Connecting devices, Backbone networks. **Wireless WANs**: Cellular Telephony, Satellite  
Networks.

## **Unit V**

**Network Layer-** IPv4 Address-IPv6 Address-Internetworking.**Transport Layer-**Process to Process delivery –UDP-TCP. **Application Layer-** Name space-DNS- DNS in the internet. **WWW and HTTP-**Architecture-web documents-HTTP.

## **Text Book**

Data Communication and Networking –“BEHROUZ A FOROUZAN “ , The McGraw- Hill- 4th ed.

UNIT I : 1.1-1.4,2.1-2.5,

UNIT II: 3.1,3.4-3.6,4.3,6.1,6.2,7.1,7.2

UNIT III : 8.1-8.4,9.1-9.5,10.1,10.5

UNIT IV: 11.1-11.5,13.1-13.3,13.4,13.5,14.1,14.2,15.1,15.2,16.1,16.2  
UNIT V: 19.1,19.2,20.1,23.1,23.2,23.3,25.1,25.2,25.4,27.1-27.3.

## **References**

- 1.Data Communication and Computer Networks – “ Prakash C.Gupta
- 2.Computer Networks Protocols,Standards and Interfaces- “ Uyles Black
3. Data Communications and Computer Networks – Brijendra Singh



**MSU/2016-17/UG-Colleges/Part-IV (B.Sc. Mathematics with Computer Applications)/Semester-V/ Ppr.no.27(C)/ Elective – I (C)**

**Relational Database Management System**

**UNIT I**

**Introduction:** Database - system applications-Purpose of Database Systems - View of Data- Database languages -Relational Databases - Database Design - Data Storage and Querying - Transaction Management - Database Architecture - Data Mining and Information Retrieval-Specialty Databases - Database Users and Administrators — Intelligent Database System.

**UNIT II**

**Introduction to the Relational Model and Introduction to SQL:** Structure of Relational Databases -Database Schema-Keys-Schema Diagrams- Relational Query Languages- Relational Operations- Overview of the SQL Query Language -SQL Data Definition-Basic Structure of SQL Queries

**UNIT III**

**SQL operations and Intermediate SQL :** Additional Basic Operations-Set Operations- Null values-Aggregate functions- Nested Sub queries-Join Expressions – Views - Transactions- Integrity Constraints - SQL Data Types and Schemas-Authorization

**UNIT IV**

Entity-relationship(E-R) Modeling – Enhanced Entity-Relationship(EER) Model – Data Normalization

**UNIT V**

**Implementation using Oracle:** Creating Table-Modifying Table-Creating SEQUENCE-creating Views-PL/SQL- triggers-Stored procedures and Functions-cursors

**Text Book:**

- 1.Database System Concepts – Abraham Silberschatz, Henry F.Horth and S.Sudarashan, McGraw-Hill International Sixth Edition.
2. Essentials of Database Management Systems – Alexis Leon, Mathews Leon  
(Chapter 4,5,8 – IV unit)
3. Oracle8i Jose A.Ramalho BPB Publications

## Reference Books:

- Database Management Systems, R.Panneerselvam, PHI Learning Private Limited
- Database Management Systems, Ramakrishnan and Gehrke, Mc Graw Hill Publications
- Relational Database Management Systems, P. Simon Navis, Ave Maria Publications
- RDBMS Concepts and Database Designing, Dr. R.C. Goyal –  
Ebookurl[http://www.vssut.ac.in/lecture\\_notes/lecture1423726199.pdf](http://www.vssut.ac.in/lecture_notes/lecture1423726199.pdf)
- Fundamentals of Database Systems, RamezElmasri, Fourth Edition, Pearson Addison Wesley- EBook URL: [http://www.uoitc.edu.iq/images/documents/informatics-institute/Competitive\\_exam/Database\\_Systems.pdf](http://www.uoitc.edu.iq/images/documents/informatics-institute/Competitive_exam/Database_Systems.pdf)
- An Introduction Relational Database Theory, Hugh Darwen, EBook URL: <http://www.zums.ac.ir/files/research/site/ebooks/it-programming/an-introduction-to-relational-database-theory.pdf>

## RDBMS with Oracle - Practical List (30 HOURS)

### Internal only

1. Create an employee database with tables department, employee details, address, pay details and project details. Alter the tables and add constraints relevant to the fields in the tables. Insert records into all the tables.
2. Create queries to retrieve relevant information from a table.
3. Create a table from the existing tables. Create views from the tables.
4. Develop queries to retrieve information from more than one table. Develop summary queries to retrieve relevant information from the tables.
5. Create a partition table and query the records.
6. Create the table with abstract data type and query the records.
7. Write a PL/SQL program to print multiplication table
8. Write a PL/SQL program to check whether given string is palindrome or not
9. Write a PL/SQL program to print student details using Report
10. Write a PL/SQL program to find factorial of numbers using function and procedure

**MSU/2016-17/UG-Colleges/Part-IV (B.Sc. Mathematics with Computer Applications)/Semester-V/ Ppr.no.28(A)/ Elective – II (A)**

**FUZZY MATHEMATICS**

- Unit I**      **Crisp Sets – Fuzzy Sets** – Basic Types – Basic Concepts – Characteristics and Significance of the Paradigm shift.
- Unit II**      Additional properties of  $\alpha$ -cuts – representations of fuzzy sets – Extension principle for fuzzy sets.
- Unit III**     **Fuzzy set operations** – Fuzzy complements – Fuzzy intersections : t-norms – Fuzzy Unions : t-conorms – Combinations of operations – Aggregation operations.
- Unit IV**     **Fuzzy Numbers** – Linguistic variables – Arithmetic operations on intervals – Arithmetic operations of fuzzy numbers – Lattice of fuzzy numbers – Fuzzy Equations.
- Unit V**      Fuzzy Decision Making – Individual Decision Making – Multi-person decision making – Fuzzy linear Programming.

**Text Book:**

- George J. Klir and Bo Bo Yuan – Fuzzy sets and Fuzzy Logic Theory Applications, Prentice Hall of India, 2002, New Delhi.

**Book for Reference :**

- George J. Klir and Tina .A Folger – Fuzzy sets, uncertainty and Informations – Prentice Hall of India, 2003, New Delhi.

**MSU/2016-17/UG-Colleges/Part-IV (B.Sc. Mathematics with Computer Applications)/Semester-V/ Ppr.no.28(B)/ Elective – II (B)**

**Operations Research**

- Unit I**      **Linear Programming Problem** : Mathematical formulation of LPP – Simplex Method – Artificial variable technique – Concept of Duality – Primal and Dual Problems – Duality – Dual Simplex Method.
- Unit II**      **Transportation Problem** : North-West Corner Rule – Matrix Minima method – Vogel’s Approximation Method – MODI Method – Degeneracy and Unbalanced Transportation Problem.
- Assignment Problem** : Hungarian Method – Unbalance Assignment Problem
- Unit III**      **Games and Strategies** : Two Person Zero sum Games – The Maximin – Minimax Principle – Games without Saddle Points – Mixed Strategies – Graphical Solution of  $2 \times n$  and  $m \times 2$  games – Dominance Property.
- Unit IV**      **Network scheduling by PERT / CPM** : Network and basic components – Rules of Network Construction – Time Calculation in network – Critical Path Method – PERT Calculation.
- Unit V**      **Inventory Control** : Introductions – Types of Inventories – Inventory decisions – Deterministic inventory Problem – EOQ problems with shortages.

**Text Book:**

- KantiSwarup, P.K. Gupta and Manmohan – Operations Research – Sultan Chand & Sons – 2006, 12<sup>th</sup> edition.

**Books for Reference :**

- Gupta .P.K and D.S. Hira – Operations Research – S. Chand and Company.
- Mokhtar S. Bazaraa, John J. Jarvis and Hanif D. Sherali - Linear Programming and Network Flows, 2<sup>nd</sup> Ed., John Wiley and Sons, India, 2004.
- Hillier, F.S. and G.J. Lieberman - Introduction to Operations Research, 9<sup>th</sup> Ed., Tata McGrawHill, Singapore, 2009.
- Hamdy A. Taha, - Operations Research, An Introduction, 8<sup>th</sup> Ed., Prentice – Hall India, 2006.
- Hadley .G. - Linear Programming, Narosa Publishing House, New Delhi, 2002.

**MSU/2016-17/UG-Colleges/Part-IV (B.Sc. Mathematics with Computer Applications)/Semester-V/ Ppr.no.28(C)/ Elective – II (C)**

**Statistics**

- Unit I** Curve fitting - method of least squares – Fitting lines – Parabolic, Exponential and Logarithmic curves-Correlation and Regression - Karl Pearson's coefficient of correlation – Lines of Regression – Coefficient of Regression- Rank Correlation(Problems only)
- Unit II** Association of Attributes – Consistency of data – criteria for independence – Yule's coefficient of Association
- Unit III** Statistical Quality control – Definition– Control chart, Mean chart, Range chart, P-chart-Testing of Hypothesis – Type I and Type II errors - Level of significance
- Unit IV** Test of significance for large samples – Testing a single proportion – Difference of proportions. Testing a single mean and Difference of means.Tests based on t-distribution – single mean and Difference of means – Tests based on F-distribution – Variance Ratio test
- Unit V** Analysis of variance – one way and two way classified data – Basis of experimental design ( simple problems)

**Text Book:**

- Vittal, V.R. – Mathematical Statistics (2004) Maragatham Publications

**Books for Reference :**

- Gupta .S.C and V.K. Kapoor – Fundamentals of Mathematical Statistics – (2002) Sultan Chand & Sons, New Delhi.
- D.C. Sancheti & Kapoor – Statistics
- M.L. Khanna – Statistics
- S. Arumugam & others – Statistics

**MSU/2016-17/UG-Colleges/Part-IV (B.Sc. Mathematics with Computer Applications)/Semester-VI/ Ppr.no.30/ Core -9**

**COMPLEX ANALYSIS**

**Unit I (Analytic functions)**

Functions of a complex variable – Derivatives – Cauchy – Riemann equations – sufficient conditions – Polar form – Analytic functions – Harmonic functions.

**Unit II (Integrals)**

Definite integrals – Contours – Cauchy – Goursat theorem – antiderivatives and independence of path – Cauchy Integral formula – Morera's theorem.

**Unit III (Series)**

Taylor's series – Examples – Laurent's series – Zeros of analytic functions – Residues – Residue theorem – Principal part of functions – Residues at poles.

**Unit IV (Evaluation of Integrals)**

Evaluation of improper real integrals – improper integrals involving sines and cosines – Definite integrals involving sines and cosines.

**Unit V (Transformations)**

Conformal mappings – basic properties – Bilinear maps – fixed points - Applications

**Text Book:**

- Arumugam .S and T. Issac – “Complex Analysis” – Scitech Publishing House – Chennai.

**Books for Reference :**

- Churchill .R.V. and J.W. Brown – “Complex variables and Applications” – IV edition – McGraw Hill International Editions.
- Ponnuswamy .S – “Foundations of Complex Analysis”, Narosa Publication House, New Delhi, II edition 2005.
- Duraipandian .P and Lakshmi Duraipandian – “Complex Analysis” – Emerald Publications, Chennai (2001)
- Shakarchi .R, Problems and solutions of Complex Analysis. Springer – Verlag, New York 1999.

**MSU/2016-17/UG-Colleges/Part-IV (B.Sc. Mathematics with  
Computer Applications)/Semester-V/ Ppr.no.31/ Core -10**

**NUMBER THEORY**

- Unit I** Peano's Axioms – Mathematical Induction – The Binomial Theorem – Early Number Theory.
- Unit II** Division Algorithm – GCD – Euclidean Algorithm – The Diophantine Equation  $ax + by = c$ .
- Unit III** The fundamental Theorem of Arithmetic – The Sieve of Eratosthenes – The Goldbach conjecture.
- Unit IV** Basis properties of congruences – Linear congruence and the Chinese Remainder Theorem.
- Unit V** Fermat's Theorem – Wilson's Theorem – The Fermat – Kraitchik Factorization Method.

**Text Book:**

- David .M. Burton - Elementary Number Theory (Sixth Edition) Tata McGraw Hill Education Pvt. Ltd.

**Books for Reference :**

- Ivan Niven and H, Zuckerman - An Introduction to Theory of Numbers.
- Kumaravelu .S, and Susheela Kumaravelu - Elements Theory - Nagercoil, 2002.

**MSU/2016-17/UG-Colleges/Part-IV (B.Sc. Mathematics with  
Computer Applications)/Semester-V/ Ppr.no.32/ Core -11**

**GRAPH THEORY**

- Unit I** Finite and infinite graphs – degree – Isolated vertex, pendent vertex and null graph – walks, paths and cycles (Definite and examples only) subgraphs – connected and disconnected graph, Eulerian and Hamiltonian
- Unit II** Trees and fundamental circuits – properties of Trees - distance and centre, binary tree, spanning tree, cut set and cut vertices - properties – connectivity.
- Unit III** Planar and dual graphs - different representation of planar graphs – Detection of planarity.
- Unit IV** Graph operations (unions, composition, product) matrix representation – incident, adjacency matrix – rank – cell set matrix – Relations, path matrix
- Unit V** Chromatic number – chromatic partitioning. Chromatic polynomial – domination – Covering (definition and examples only) - colouring – five colour Theorem - Four Colour problem.

**Text Book:**

- Arumugam .S and S. Ramachandran - Invitation to Graph Theory - Scitech Publications India Pvt. Limited Chennai (2004 edition)

**Books for Reference :**

- Narasing Deo – Graph Theory with applications to Engineering and Computer Science - Hall of India Pvt. Ltd.
- Kumaravelu .S – Graph Theory – Edition 1
- Gowthem - Graph Theory
- Roberts .F.S - Graph Theory and its Applications to problems of Society - SIAM. Odyssey Press, New Hampshire 1978.



**MSU/2016-17/UG-Colleges/Part-IV (B.Sc. Mathematics with  
Computer Applications)/Semester-VI/ Ppr.no.33/ Core -12**

**ABSTRACT ALGEBRA II**

- Unit I**      **Vector Spaces** : Definition and examples – elementary properties – subspaces – linear transformation – fundamental theorem of homomorphism.
- Unit II**      Span of a set – linear dependence and independence – basis and dimension - theorems
- Unit III**      Rank and nullity Theorem – matrix of a linear transformation  
**Inner product space** : Definition and examples – orthogonality – orthogonal complement – Gram Schmidt orthogonalisation process.
- Unit IV**      **Matrices** : Elementary transformation – inverse – rank – test for consistency – solving linear equations.
- Unit V**      Cayley Hamilton theorem – Applications of Cayley Hamilton theorem – Eigen values and Eigen vectors – Properties and problems.

**Text Book:**

Arumugam & others – Modern Algebra

**Books for Reference :**

- Shama .J.N and Vashistha .A.R, “Linear Algebra”, Krishna Prakash Nandir, 1981.
- John B. Fraleigh, “A First Course in Abstract Algebra”, 7<sup>th</sup> edition, Pearson, 2002.
- Strang G., “Introduction to Linear Algebra”, 4<sup>th</sup> edition, Wellesly Cambridge Press, Wellesly, 2009.
- Artin M., “Abstract Algebra”, 2<sup>nd</sup> edition, Pearson, 2011.

## **Data Mining**

### **Unit I**

Introduction: What is Data Mining – why Data Mining Now – The data Mining Process – Data Mining Applications – Data Mining Techniques – Practical examples of Data Mining – The Feature of Data Mining – Guidelines for Successful Data Mining – Data Mining Software.

### **Unit II**

Association Rule Mining: Introduction – Basics – The Task and Naïve Algorithm – The Apriori Algorithm – Improving the efficiency of the Apriori Algorithm – Apriori -TID – Direct Hashing and Pruning DHP-Mining Frequent Patterns without Candidate Generation – Performance Evaluation of Algorithms – Software for Association Rule Mining.

### **Unit III**

Classification: Introduction – Decision Tree – Building a decision Tree- The Tree Induction Algorithm – Split Algorithm Based on the Information Theory – Decision Tree Rules – Decision tree summary – Naïve Bayes Method – Estimating Predictive Accuracy of classification Methods- Other Evaluation Criteria for classification methods – classification software.

### **Unit IV**

Cluster Analysis: What is Cluster Analysis – Desires Features of cluster analysis – – Types of cluster analysis methods – Partitioned Methods – Hierarchical Methods – Density Based Methods- Dealing with Large Databases – cluster Analysis Software.

## **Unit V**

Web Data Mining: Introduction – Web Mining- Web Technology and characteristics – Locality and Hierarchy in the web – Web content Mining – Web Usage Mining – Web Structure Mining – Web Mining Software.

### **Text Book:**

Introduction to Data Mining with Case studies, G.K. Gupta, PHI Third Edition, 2015

### **Reference Books**

- Data Mining Concepts & Technologies, Jiawei Han, Micheline Kamber, Morgan Kaufmann, Second Edition, 2005.
- Data Mining, Vikram Pudi, P. Radha Krishna, Oxford University Press, First Edition, 2009.
- Data Warehousing – Reema Thareja Oxford University Press – 2009.
- Insight into Data Mining Theory and Practice – K.p. Soman, Shyam Diwakar, V. Ajay, Prentice Hall of India – 2008.

## **Computer Graphics and Visualization**

### **Unit I**

**Overview of Graphics System:** Video Display Devices – Input Devices - Hard Copy Devices – Graphics Software. **Output Primitives:** Points and Lines –Line drawing algorithms – DDA algorithm- Bresenham’s line algorithm- Circle drawing algorithms: properties of circles – Midpointcircle algorithm – Filled Area primitives.

### **Unit II**

**Attributes of Output Primitives:** Line attributes – Curve attributes – Character attributes. **Two-Dimensional Geometric Transformation:** Basic Transformations – Matrix Representations and homogenous coordinates – Composite and other Transformations - Transformation between coordinate systems.

### **Unit III**

**Two-Dimensional Viewing:** The viewing pipeline, Viewing co-ordinate reference frame – Window to view port co-ordinate transformation – Two-dimensional viewing function. **Clipping Operations:** Point clipping – Line clipping (only Cohen-Sutherland line clipping) – Polygon Clipping (only Sutherland-Hodgeman polygon clipping).

### **Unit IV**

**Interactive Input Methods:** Input of graphical data – Input functions – Three dimensional display methods. **Three Dimensional Geometric and Modeling Transformations:** Translation - Rotation - Scaling

## **Unit V**

**Three Dimensional Viewing:** Viewing Pipeline, Projections. **Visible-surface deduction methods:** Back-face deduction – Depth buffer method-Scan Line Method.**Color Models and Color Applications:** RGB, YIQ, CMY and HSV color models

### **Text Book:**

Computer Graphics C version, Second Edition, Donald Hearn, M.Pauline Baker, Pearson Publications.

Chapters: 2.1, 2.6, 2.7, 3.1, 3.2, 3.5, 4.1, 4.2, 4.5, 5.1 to 5.4, 6.1 to 6.8, 8.2, 8.3, 9.1,11.1 to 11.3, 12.1,12.3, 13.1 to 13.3,13.5, 15.4 to 15.7

### **Reference Books**

1. Express Learning - Computer Graphics and Multimedia-ITL Education Solution Ltd.
2. Computer Graphics-A programming Approach 2/e-Steven Harrington-Mc Graw Hill Education Private Limited.
3. Computer Graphics, Multimedia and Animation - Malay K. Pakhira - PHI

## **Web Technology**

### **Unit I**

**Introduction:** What is the Internet-History of Internet-Internet Services and Accessibility-Uses of the Internet-Protocols-Web concepts-The client/server model at the web-Retrieving data from the web.**Internet Protocols:** Introduction – Internet protocols-transmission control protocols-User Datagram protocols - Host Names - Internet applications and application protocols.

### **Unit II**

**HTML:** Introduction-SGML-DTD-DTD Elements- attributes-outline of an HTML document-Head section-Body section- HTML Tags - HTML forms. **Dynamic HTML:** Introduction- cascading style sheets-DHTML Document object model and collections-Event handling - filters and transitions.

### **Unit III**

**JavaScript:** Introduction-language elements-objects of JavaScript-other objects- Arrays. **VBScript:** Introduction-embedding VBScript code in an HTML document- comments-variables-operators-procedures-conditional statements-looping constructs- objects & VBScripts-Cookies.

### **Unit IV**

**Extensible Mark-Up Language (XML):** Syntax of the XML Document – XML Attributes – XML Validation – XML DTD – Building blocks of XML Documents – XSL - XSL Transformation – XML Schema. **Common Gateway Interface(CGI):**Server- Browser interaction –CGI Script Structure – CGI Environment variables - Processing forms- CGI security issues.

## Unit V

**Servlets:** Advantages of Servlets over CGI – Installing Servlets – The Servlet Life Cycle – Servlet API – A simple Servlet – Handling HTTP GET requests -Handling HTTP POST requests – Cookies – Session Tracking – Multi-tier Applications using Database Connectivity – Servlet Chaining. **Java Server Pages(JSP):** Advantages of JSP – Components of JSP – Reading Request Information – Retrieving the Data Posted from a HTML file to a JSP file – JSP Sessions – Cookies – Disabling Sessions. **Active Server Pages (ASP):** Advantages of using ASP – Processing of ASP Scripts with Forms – Variables and Constructs – Subroutines – Include/Virtual – ASP Cookies – ASP Objects – Connecting to data with ASP..

### Text Book:

Web Technology A Developer's Perspective, N.P.Gopalan, J. Akilandeswari ,PHI

### Reference Book:

- Web Technology and Design, C.Xavier, New Age International Publishers
- Web Technologies TCP/IP Architecture and Java Programming Second Edition, Achyut S. Godbole&AtulKahate, Tata McGraw Hill
- Web Technology, S. Padma Priya, SCITECH Publications (India)Pvt. Ltd

### Practical List (30 HOURS)

#### Internal only

1. Write a HTML code to create an Ordered list
2. Write a HTML code to create an Unordered list
3. Write a HTML code to Display your class time table.
4. Write a HTML code to display any Five formulae with superscript and subscript.
5. Write a HTML code create a college application form.
6. Design a Web page to display the information about your university.
7. Design a simple web page to demonstrate how to include an image to that web page.
8. Write a program to display the details of the students