



**JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY,  
JAIPUR**

**Faculty of Education and Methodology  
Department of Science and Technology**

**SYLLABUS**

**MASTER OF COMPUTER  
APPLICATION - LATERAL ENTRY  
(MCA - LE)**

**SESSION - 2022-23**

**DURATION - 2 YEARS / 4 SEMESTER**

**SYLLABUS FOR:  
1-2 YEARS**



**PROGRAM DETAIL**

<b>Name of Program</b>	Master of Computer Application Lateral Entry (MCA-LE)
<b>Program Code</b>	MCA-LE
<b>Mode of Program</b>	Semester
<b>Duration of Program</b>	2years/ 4 Semester
<b>Total Credits of Program</b>	171
<b>Curriculum Type and Medium Choice</b>	English

**Program Outcomes:**

**On completion of MCA degree, the graduates will be able to:**

- Apply the knowledge of mathematics and computing fundamentals to various real life applications for any given condition
- Design and develop applications to evaluate and solve all computer science related problems
- Design applications for any desired needs with appropriate considerations for any specific need on societal and environmental aspects
- Analyze and review literatures to invoke the research skills to design, interpret and make inferences from the resulting data
- Integrate and apply efficiently the contemporary IT tools to all computer applications



# JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

## SYLLABUS DETAIL

### III Semester

Nature of Course	Course Name	C	T	P
Core computer Science	Java Programming With GUI	6	4	2
Core computer Science	Data Ware Housing and Data Mining	6	6	0
Core computer Science	Cognitive psychology	6	6	0
Electrical and electronics	Digital Electronics	6	4	2
Core Computer Science	Multimedia System and Animation	6	4	2
University Compulsory Course	Language Proficiency (English Communication/ Hindi / Sanskrit / Foreign Language)/Fundamentals of Computer/ Environmental Science & Disaster Management/Cyber Security Applicable :English Communication	1	1	0
Academic Exposure	Extra-Curricular Activities(ECA)	1	0	1
Academic Exposure	Community Development Activities(CDA)	1	0	1
Academic Exposure	Portfolio (Government/Corporate/Entrepreneur)	1	0	1
Academic Exposure	Mentorship	1	0	1
Co-Curricular Activites	Internship /Industrial Visit /Paper Publication/Conference/Symposium	-	-	-
	<b>Total Credits</b>	<b>35</b>	<b>21</b>	<b>14</b>



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## SYLLABUS DETAIL

### IV Semester

Nature of Course	Course Name	C	T	P
Core Computer Science	Cryptography & Network Security	6	6	0
Core Computer Science	Computer Graphics	6	4.5	1.5
Core Computer Science	Advanced Web Technologies	6	4	2
Core Computer Science	Cloud Computing	6	4.5	1.5
Management	Organizational Behavior	6	6	0
University Compulsory Course	Language Proficiency (English Communication/ Hindi / Sanskrit / Foreign Language)/ Fundamentals of Computer/ Environmental Science & Disaster Management/ Cyber Security	0	0	0
University Mission Course	Women's Rights And Law/Self Defence/Help Aid/Yoga & Meditation/Gender Sensitization/My Behaviour & Ethics <b>Applicable : My Behaviour &amp; Ethics</b>	1	0.5	0.5
Academic Exposure	Extra-Curricular Activities	1	0	1
Academic Exposure	Community Development Activities	1	0	1
Academic Exposure	Portfolio (Government/Corporate/Entrepreneur)	1	1	0
Academic Exposure	Mentorship	-	-	-
Co-Curricular Activites	Internship /Industrial Visit /Paper Publication/Conference/Symposium	-	-	-
	<b>Total Credits</b>	<b>40</b>	<b>26.5</b>	<b>7.5</b>



# JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

## SYLLABUS DETAIL

### V Semester

Nature of Course	Course Name	C	T	P
Core Computer Science	Advance Database Management System	6	4	2
Core Computer Science	Artificial Intelligence & Applications	6	6	0
Core Computer Science	Network programming	6	4	2
Electronics and Communication	Microprocessor	6	4	2
Core Computer Science	Web Intelligence , HADOOP And Big Data Analysis	6	4	2
University Compulsory Course	Language Proficiency (English Communication/ Hindi / Sanskrit / Foreign Language)/Fundamentals of Computer/ Environmental Science & Disaster Management/Cyber Security <b>Applicable :English Communication</b>	1	1	0
Academic Exposure	Extra-Curricular Activities(ECA)	1	0	1
Academic Exposure	Community Development Activities(CDA)	1	0	1
Academic Exposure	<b>Portfolio (Government/Corporate/Entrepreneur)</b>	1	0	1
Academic Exposure	<b>Mentorship</b>	1	0	1
Co-Curricular Activites	Internship /Industrial Visit /Paper Publication/Conference/Symposium	-	-	-
	<b>Total Credits</b>	<b>35</b>	<b>25</b>	<b>10</b>



# JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

## SYLLABUS DETAIL

### VI Semester

Nature of Course	Course Name	C	T	P
Core Computer Science	Introduction to Data Science	4	4	0
Core Computer Science	Neural Network	4	4	0
Core Computer Science	Internship	48	0	48
University Compulsory Course	Language Proficiency (English Communication/ Hindi / Sanskrit / Foreign Language)/Fundamentals of Computer/ Environmental Science & Disaster Management/Cyber Security <b>Applicable :English Communication</b>	1	1	0
Academic Exposure	Extra-Curricular Activities(ECA)	1	0	1
Academic Exposure	Community Development Activities(CDA)	1	0	1
Academic Exposure	<b>Portfolio (Government/Corporate/Entrepreneur)</b>	1	0	1
Academic Exposure	<b>Mentorship</b>	1	0	1
Co-Curricular Activities	Internship /Industrial Visit /Paper Publication/Conference/Symposium	-	-	-
	<b>Total Credits</b>	<b>61</b>	<b>9</b>	<b>52</b>



# JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

## Faculty of Education and Methodology Department of Computer Science & Engineering MCA-LE Syllabus

### III- SEMESTER

#### Course: Java Programming With GUI

**Course Outcomes:** To learn how to design a graphical user interface (GUI) with Java Swing. To understand how to use Java APIs for program development. To learn how to expand Java classes with inheritance and dynamic binding. To learn how to use exception handling in Java applications.

#### UNIT- I (Introduction)

(Credit-1.5)

Designing Graphical User Interfaces in Java, Components and Containers, Basics of Components, Using Containers, Layout Managers, AWT Components, Adding a Menu to Window, Extending GUI Features Using Swing Components, Java Utilities (java. util Package) The Collection Frame work : Collections of Objects , Collection Types, Sets , Sequence, Map, Understanding Hashing, Use of Array List& Vector.

Introduction the Abstract Window Toolkit (AWT): Working with Windows and AWT, AWT classes, Windows Fundamentals, Working with frame windows, applet vs servlet.

S.No.	Name of Practical
1	Write a program to create a textfield and input the value from the user.
2	Write a program to create a basic calculator using text filed, checkbox, and buttons.
3	Write a program to create a form and get the value from the user.
4	Write a program to create a login form and perform authentication if the username is Admin and Password is Admin.
5	Write a program to create a signup form and perform authentication if the username is Admin and Password is Admin

#### UNIT- II (Overview of Packages)

(Credit-1.5)

**Applets:** Applet fundamentals, implementation of applet, creating a frame window in applet, paint method, drawing polygons.

**Basics :** SwingIntroduction,MVC,Events and listeners.,Adapters.,TextComponents,Look and feel.

**Swing Components:** JCoponent, JLabael, JButton, Actions,JScrollBar, JSlider, JProgressBar,JList, JComboBox,Containers and Frames,JPanel, JRootPane,JInternalFrame,JDialog, JOptionPane

**Layout Managers:**Layout managers overview,FlowLayout,GridLayout,Borderlayout,Working without layouts,Gridbag Layout.

**Menus and Toolbar:**JMenuItem,JMenuBar,JPopupMenu,JToolBar.



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S.No.	Name of Practical
1	Write programs to demonstrate use of Grid Layout.
2	Write programs to demonstrate use of flow and Layout.
3	Write programs to demonstrate use of Border Layout.
4	Write a program to display any string using available Font and with every mouse click change the size and / style of the string. Make use of Font and Font metrics class and their methods.
5	Write a program to design a form using basic swing components
6	Write a program to demonstrate the use of scroll panes in Swing.
7	Write a program to create a menu bar with various menu items and sub menu items. Also create a checkable menu item. On clicking a menu Item display a suitable Dialog box.

## UNIT- III (Data Base Connectivity) (Credit-1)

**Java Database Backend End:** Database client/server methodology, Two-Tier Database Design, Three-Tier Database Design, A JDBC Database Example JDBC Drivers, JDBC-ODBC Bridge, Current JDBC Drivers.

**Basics Of Servlet:** The Life Cycle of a Servlet, The Java Servlet Development Kit, The Simple Servlet, The Servlet API, The javax.servlet Package, Reading Servlet Parameters, Reading Initialization Parameters, The javax.servlet.http package, Handling HTTP Requests and responses.

S.No.	Name of Practical
1	Write an Application program /Applet to make connectivity with database using JDBC API
2	Write a servlet for printing My first servlet Program.
3	Write an Application program /Applet to create a table and insert the values in database using JDBC API
4	Write an Application program /Applet to implement DML on database using JDBC API
5	Write an Application program /Applet to fetch the data from database and create a user defined report database using JDBC API
6	Write a servlet for demonstrating the generic servlet class.
7	Write a servlet to demonstrate the Http Servlet class using do Get ().
8	Write a servlet to demonstrate the Http Servlet class using do Post ().

### Recommended text Books:

1. Deitel and Deitel, Java, How to Program, Pearson Education Asia.
2. C. Thomas Wu, An Introduction to OOP with Java, McGraw Hill.

### Reference Books:

1. Cay S. Horstmann and Gary Comell, Core Java, Pearson Education Asia.



# JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

## Course: Data Ware Housing and Data Mining

**Course Outcomes:** To extract information from data repository for data analysis, frequent pattern, classification and prediction.

### UNIT I (Basics of Data Warehouse)

(Credit-2)

Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Major issues in Data Mining, Data Warehouse and OLAP Technology for Data Mining, Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, Further Development of Data Cube Technology From Data Warehousing to Data Mining.

### UNIT II (DATA PREPROCESSING, LANGUAGE, ARCHITECTURES, KDD)

(Credit-2)

Needs Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation, Online Data Storage. Data Mining Primitives, Data Mining Query Languages, Designing Graphical User Interfaces Based on a Data Mining Query Language Architectures of Data Mining Systems. Concepts Description: Characterization and Comparison: Data Generalization and Summarization-Based Characterization, Analytical Characterization: Analysis of Attribute Relevance, Mining Class Comparisons: Discriminating between Different Classes, Mining Descriptive Statistical Measures in Large Databases.

### UNIT III (CLASSIFICATION & CLUSTERING)

(Credit-2)

Mining Association Rules in Large Databases: Association Rule Mining, Mining Single-Dimensional Boolean Association Rules from Transactional Databases, Mining Multilevel Association Rules from Transaction Databases, Mining Multidimensional Association Rules from Relational Databases and Data Warehouses, From Association Mining to Correlation Analysis. Classification and Prediction: Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Classification by Back propagation, Classification Based on Concepts from Association Rule Mining. Cluster Analysis Introduction: Types of Data in Cluster Analysis, Partitioning Methods, Density-Based Methods, Grid-Based Methods,

### Recommended Text Books:

1. Jiawei Han and Micheline Kamber, "Data Mining : Concepts and Techniques", Harcourt India Private Limited, First Indian Reprint, 2001
2. Margaret H. Dunham, "Data Mining : Introductory and Advanced Topics", Pearson Education, First Indian Reprint, 2003

### Reference Books:

1. Data Mining – Concepts and Techniques - JIAWEI HAN & MICHELINE KAMBER Harcourt India.
2. Data Mining: Introductory and Advanced Topics- Margaret H. Dunham, S. Sridhar
3. Data Warehousing in the Real World,- Sam Anahory, Dennis Murry, Pearson Education.
4. The Data Ware House Toolkit – Ralph Kimball



## Course: Cognitive Psychology

**Course Outcomes:** Cognitive Psychology is a sub-field of Psychology and is a scientific study of mental processes which caters to aspects such as creativity, thinking, language use, memory, perception.

The main objective of cognitive psychologists is to focus on the mental processes which affect the behavior. They focus on sensory memory storage, which holds sensory information, short term memory loss, where analysis and research work is done, and long term memory loss, which holds information for over a period of time.

### UNIT I (history of the cognitive approach)

(Credit-2)

A Brief history of the cognitive approach, cognitive science, Neuro science, Artificial intelligence, The Parallel processing approach. Perceptual Process: Perception, pattern recognition, theories of pattern recognition, Bottom-up vs Top-down Processing, Template matching, feature analysis, prototype matching, pattern recognition: The role of the perceives.

### UNIT II (Communication and Language Processing)

(Credit-2)

Communication and Language Processing: Linguistic Hierarchy, Chomsky's theory of grammar, Psycho-linguistic aspects, Abstraction of linguistic ideas, knowledge and comprehension, non-verbal abstraction – musical syntax, The language of motion. Memory Modules: Memory, process, storage, Short term memory, long term memory, organization in memory, simulation modules of learning and memory, mnemonics, syntactic and semantic issues, Concept formation, problem solving.

### UNIT III (Contribution of cognitive psychology)

(Credit-2)

Contribution of cognitive psychology to advances in Artificial Intelligence, computer based learning/teaching systems, knowledge acquisition and knowledge based systems, expert systems.

#### Recommended text Books:

1. Marc de May, "The cognitive Paradigm", Reidel, 1982

#### Reference Books:

1. R. C. Shank, P. Childers, "Cognitive computer on language, Learning and AI", 1984
2. P.C. Kendall, "Advances in Cognition behavioural research and therapy", Academic Press, 1984.
3. Solso, R.L. "Cognitive Psychology (3<sup>rd</sup> Edition), 1991, Allyn&Balon.
4. Matlin M.W., "Cognition (3<sup>rd</sup> Edition), 1995, Harcourt Brace (Prism Indian Edition).
5. Leahey T.H. & Harris R.J., "Learning and Cognition (4<sup>th</sup> Edition), 1997, PHI.



# JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

## Course: Digital Electronics

**Course Outcomes:** To familiarize with the different number systems, logic gates, and combinational and sequential circuits utilized in the different digital circuits and systems. Be able to design and analyze combinational logic circuits. Be able to design and analyze sequential logic circuits. Understand the basic software tools for the design and implementation of digital circuits and systems.

### UNIT –I

(Credit-1.5)

Review of Number Systems & Logic Gates, Non Functional Properties of Logic gates: Minimization Techniques: Using Boolean identities

#### Lab Experiments:

1. Study of AND, OR, NOT gates and comparison with discrete components. (0.2 Practical) (0.1 Practice)
  2. Design of different types of gates using Universal logic gates. (0.2 Practical) (0.1 Practice)
- (a) AND gate (b) OR gate (c) NOT gate (d) EX-OR gate (e) EX-NOR gate.

### UNIT-II

(Credit-1.5)

Karnaugh Map, Map entered variables, Quine- Mc Cluskey method. Combinational Circuits: Adder, Subtractor, Encoder, Decoder, Tristate, Multiplexer, Demultiplexer, Parity checker & generator.

#### Lab Experiments:

1. De-Morgan's Theorem.
2. Half adder and full adder circuits.
3. Multiplexer/ Demultiplexer combinational logic circuit.

### UNIT-III

(Credit-1)

Fundamental concepts of sequential logic: Introduction, Synchronous and Asynchronous operation, Latches, Flip Flops,

#### Recommended Text Books

1. Sandige – Modern Digital Design – MGH
2. Kohavi, Switching and Automata Theory

#### References Books

1. Bartee T.C. Digital Electronics, TMH
2. Moris-Mano- Digital Electronics
3. Parag K. Lala, Practical Digital Logic Design and Testing – PHI



# JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

## Course: Multimedia and Animation

**Course Outcomes:** This course will offer skill development in the use of software to develop storyboards and 2-dimensional animation including creating, importing and sequencing media elements to create multi-media presentations. Emphasis will be on conceptualization, creativity, and visual aesthetics.

### UNIT- I (Introduction)

(Credit-1.5)

Introduction to Multimedia and animation, Multimedia Systems, Design Fundamentals, Elements of multimedia and animation and their use, Back ground of Art, Color theory overview, Sketching & illustration, Storyboarding, different tools for animation.

**Multimedia Projects:** Multimedia Skills, Hardware, Use of Graphics in Multimedia, Overview of Vector and Raster Graphics, Basic software tools, Multimedia Authoring Tools, Planning and Costing, Designing and Producing, Contents and talent, Delivering, Enhancing and Testing Multimedia Projects.

1. Procedure to create an animation to represent the growing moon. **(0.2 Credit)**
2. Procedure to create an animation to indicate a ball bouncing on steps. **(0.2 Credit)**
3. Procedure to simulate movement of a cloud. **(0.2 Credit)**
4. Procedure to draw the fan blades and to give proper animation. **(0.2 Credit)**

### UNIT- II (Tools of Multimedia)

(Credit-1.5)

Tools of Multimedia: Paint and Draw Applications, Graphic effects and techniques, Image File Format, Anti-aliasing, Morphing, Multimedia Authoring tools, professional development tools.

1. Procedure to display the background given (filename: tulip.jpg) through your name. **(0.2 Credit)**
2. Procedure to display the background given (filename: garden.jpg) through your name using mask. **(0.2 Credit)**
3. Procedure to create an animation with the following features. WELCOME (Letters should appear one by one .The fill color of the text should change to a different colour after the display of the full word.) **(0.2 Credit)**
4. Procedure to simulate a ball hitting another ball. **(0.2 Credit)**
5. Procedure to design a visiting card containing at least one graphic and text information. **(0.2 Credit)**
6. Procedure to take a photographic image. Give a title for the image. Put the border. Write your names. Write the name of institution and place. **(0.2 Credit)**

### UNIT- III (Animation)

(Credit-1)

Animation: Introduction and Principles of Animations, Power of Motion, Animation Techniques, Animation File Format, Making animation for Rolling Ball, making animation for a Bouncing Ball, Animation for the web, GIF, Plugins and Players, Animation tools for World Wide Web.

1. Procedure to prepare a cover page for the book in your subject area. Plan your own design **(0.2 Credit)**



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2. Procedure to extract the flower only from given photographic image and organize it on a background. Selecting your own background for organization. **(0.2 Credit)**
3. Procedure to change a circle into a square using flash. **(0.2 Credit)**
4. Procedure to display the background given (FILENAME: GARDEN.JPG) through your name using mask **(0.2 Credit)**

### Textbook:

1. Ze-Nian Li and Mark S. Drew, “ Fundamentals of Multimedia”, PHI, New Delhi
2. Multimedia: Making It Work (4th Edition) – by Tay Vaughan, Tata Mcgraw Hills.

### Reference Books:

1. Buford, “Multimedia Systems”, Addison Wesley.
2. Tay Vaughan, “Multimedia, Making IT Work”, Tata McGraw Hill
3. Sleinreitz, “Multimedia System”, Addison Wesley.
4. Ze-Nian Li and Mark S.Drew, “Fundamentals of Multimedia”, Pearson Education
5. Prabhat K Andleigh, KiranThakrar, “Multimedia systems design”, PHI Learning Private Limited, Delhi India.
6. Elsom Cook – “Principles of Interactive Multimedia” ,Tata McGraw Hill.



## IV – SEMESTER

### Course: Cryptography & Network Security

**Course Outcomes:** Cryptography is an indispensable tool for protecting information in computer systems. In this course you will learn the inner workings of cryptographic systems and how to correctly use them in real-world applications.

#### Unit-I (Conventional and Modern Encryption)

(Credit-2)

Model of network security – Security attacks, goals of security- prevention, detection and recovery., services and attacks – OSI security architecture – Classical encryption techniques – SDES – Block cipher Principles- DES – Strength of DES - Block cipher design principles – Block cipher mode of operation – Evaluation criteria for AES – RC5 - Differential and linear crypto analysis – Placement of encryption function – traffic confidentiality

#### Unit-II (Public Key Encryption & Authentication)

(Credit-2)

Number Theory – Prime number – Modular arithmetic – Euclid's algorithm - Fermet's and Euler's theorem – Primality – Chinese remainder theorem – Discrete logarithm – Public key cryptography and RSA – Key distribution – Key management – Diffie Hellman key exchange – Elliptic curve cryptography.

Authentication requirement – Authentication function – MAC – Hash function – Security of hash function and MAC – MD5 – SHA - HMAC – Digital signature and authentication protocols – DSS

#### Unit-III ( System Security) (2-0-0)

##### Theory

(Credit-2)

Authentication applications – Kerberos – X.509 Authentication services - E-mail security – IP security - Web security  
Intruder – Intrusion detection system – Virus and related threats – Countermeasures – Firewalls design principles – Trusted systems – Practical implementation of cryptography and security

#### Recommended Text Books:

1. William Stallings, “*Cryptography & Network Security*”, Pearson Education, 4th Edition 2006.

#### Reference Books:

1. D.R. Stinson, *Cryptography - Theory and practice*, CRC Press.
2. A.J. Menezes, P.C. van Oorschot and S.A. Vanstone, *Applied Cryptography*, CRC Press.
3. B Schneier, *Applied Cryptography*, Wiley. ISBN 0-471-11709-9
4. C. Kaufman, R. Perlman, *Network Security*, Prentice Hall.
5. RICK LEHTINEN, G.T. GANGEMI, SR., "Computer Security Basics, Second Edition", O'Reilly Pubs, June 2006
6. STEPHEN NORTHCUTT, KAREN KENT, LENNY ZELTSER, "Inside Network Perimeter Security", Sams Pubs 2005



# JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

## Course: Computer Graphics

**Course Outcomes:** Computer graphics is responsible for displaying art and image data effectively and meaningfully to the consumer. It is also used for processing image data received from the physical world, such as photo and video content.

### Unit I (Application areas of Computer Graphics)

(Credit-1.5)

Introduction, Application areas of Computer Graphics, overview of graphics systems, video-display devices, and raster-scan systems, random scan systems, graphics monitors and workstations and input devices Output primitives: Points and lines, line drawing algorithms, mid-point circle and ellipse algorithms. Filled area primitives: Scan line polygon fill algorithm, boundary fill and flood-fill algorithms

Program for Line Drawing Algorithm.

Program for mid point circle Algorithm.

Program for ellipse Algorithm.

Program for Boundary Fill Algorithm.

Program for Flood Fill Algorithm.

### Unit II (2-D geometrical transforms)

(Credit-1.5)

2-D geometrical transforms: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms 2-D viewing: The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland –Hodgeman polygon clipping algorithm

Program for 2D translation.

Program for 2D scaling.

Program for 2D rotation.

Description of line clipping.

Program for Cohen-Sutherland line Clipping.

Program for window to viewport transformation.

### Unit III (3-D object representation)

(Credit-1.5)

3-D object representation: Polygon surfaces, spline representation, Bezier curve and B-Spline curves, Bezier and B-Spline surfaces, polygon-rendering methods. 3-D Geometric transformations; 3-D viewing: Viewing pipeline, viewing coordinates, parallel & perspective projections, Visible surface detection methods: Classification, back-face detection, depth buffer, A-buffer, scan-line, depth sorting, BSP-tree methods, area sub-division

Program for 3D Translation.

Program for scaling of a triangle.

Program, for translation of a circle.

Practice of 2D and 3D rotation, scaling and translations and visible surface detection algorithms (A-buffer, Depth buffer)



## Recommended Text Books:

1. "Computer Graphics C version", Donald Hearn and M. Pauline Baker, Pearson Education

## Reference Books:

1. "Computer Graphics Second edition", Zhigandxiang, Roy Plastock, Schaum's outlines, Tata Mc-Graw hill edition.
2. "Computer Graphics Principles & practice", Second edition in C, Foley, VanDam, Feiner and Hughes, Pearson Education.
3. Procedural elements for Computer Graphics, David F Rogers, Tata McGraw hill, 2nd edition.

## Course: Advanced Web Technologies

**Course Outcomes:** The aim of this course is to teach the students the concepts, technologies and techniques for creating large-scale distributed software system using service oriented computing and cloud applications.

### UNIT I (Installation and configuration of MySQL and Concepts of PHP) (Credit-1.5)

Installing and Configuring: Current Versions of MySQL and PHP, Installing MySQL and PHP on Windows, php.ini. Basics, The Basics of PHP scripts. The Building blocks of PHP: Variables, Data Types, Operators and Expressions, Constants. Flow Control Functions in PHP: Switching Flow, Loops, Code Blocks and Browser Output. Working with Functions: Returning the values from User-Defined Functions, Variable Scope, Saving state between Function calls with the static statement, more about arguments. Working with Arrays: Creating Arrays, Some Array-Related Functions.

1. Exercise based on PHP Variables, String, Operators
2. Exercise based on PHP If...Else, Switch,
3. Exercise based on PHP Arrays
4. Exercise based on PHP Looping
5. Exercise based on several PHP Functions,

### UNIT II (Objects and Forms)(Credit-1.5)

Working with Objects: Creating Objects, Object Instance Working with Strings, Dates and Time: Formatting strings with PHP, Investigating Strings with PHP, Manipulating Strings with PHP, Using Date and Time Functions in PHP. Working with Forms: Creating Forms, Accessing Form Input with User defined Arrays, Combining HTML and PHP code on a single Page, Using Hidden Fields to save state, Redirecting the user, Sending Mail on Form Submission, Working with File Uploads.

1. Exercise based on Forms,
2. Exercise based on \$\_GET,
3. Exercise based on \$\_POST
4. Exercise based on PHP Date, Include function,
5. Exercise based on state management through Cookies,
6. Exercise based on Sessions



## UNIT III (MySQL)

(Credit-1)

Learning the MySQL Data types, Learning the Table Creation Syntax, Using Insert Command, Using SELECT Command, Using WHERE in your Queries, Selecting from Multiple Tables, Using the UPDATE command to modify records, Using the DELETE Command, Frequently used string functions in MySQL, Using Date and Time Functions in MySQL. Interacting with MySQL using PHP: MySQL Versus MySQLi Functions, Connecting to MySQL with PHP, Working with MySQL Data. Planning and Creating Database Tables, Creating Menu, Creating Record Addition Mechanism, Viewing Records, Creating the Record Deletion Mechanism, Adding Sub-entities to a Record.

1. Exercise based on PHP Database:
  - i. MySQL Connect,
  - ii. MySQL Create,
  - iii. MySQL Insert,
  - iv. MySQL Select, Where, Order By,
  - v. MySQL Update,
  - vi. MySQL Delete
  
2. Small web based application which demonstrate the Client-Server based transaction.

### Recommended Books:

1. Sams Teach Yourself PHP in 24 Hours, Third Edition
2. Wrox, Beginning PHP, Apache, MySQL Web Development
3. Wrox, Beginning PHP

### Suggested Readings:

1. Programming PHP, By RasmusLerdorf, Kevin Tatroe, O'Reilly
2. PHP Developer's Cookbook, By Sterling Hughes, Publisher: Sams Publishing
1. PHP 5 For Dummies, by Janet Valade, Wiley Publishing, Inc.



# JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

## Course: Cloud Computing

**Course Outcomes:** Private or public, the goal of cloud computing is to provide easy, scalable access to computing resources and IT services. Cloud infrastructure involves the hardware and software components required for proper implementation of a cloud computing model.

### UNIT I (Introduction to Cloud Computing, Virtualization)

(Credit-1.5)

What is cloud? Services provided by cloud are categorized :Software As a Service(SaaS) ,Infrastructure As a Service(IaaS) ,Platform As a Service(PaaS) ,Desktop As a Service (DaaS) and VDI etc. How Cloud Computing Works, Advantages & Disadvantages, and Applications for Businesses Cloud Service Providers. Brief overview of major Cloud Service providers – Amazon AWS, Google App Engine, Microsoft, VMware. How Companies are using Cloud Computing Cloud Computing Risks and Issues Virtualization concepts, Objectives, Types of Virtualization & its benefits, Introduction to Various Virtualization OS (Hypervisor), HA/DR using Virtualization Live Migration of VMs, SAN backend concepts, S/W defined Networking (OpenFlow/OpenVSwitch), S/W Defined Datacenter, S/W Defined Storages. Virtualization for Enterprise

- VMware
- Xen
- KVM with oVirt
- Hyper-V

### UNIT II (Private, Public & Hybrid Clouds, Setting up your own Cloud)

(Credit-1.5)

What is Private, Public & Hybrid Clouds, and Advantages & Disadvantages On Premises and Off Premises Cloud services, installing a Cloud service using • Eucalyptus • Open Nebula • Open Stack Amazon Web Services Microsoft Azure Google App Engine VMware air.

#### Setting up your own Cloud

How to build private cloud using open source tools Understanding various cloud plugins, Setting up your own cloud environment Auto provisioning Custom images Integrating tools like Nagios Integration of Public and Private Cloud.

### UNIT III (Cloud Security)

(Credit-1.5)

• Infrastructure Security • Network level security, Host level security, Application level security • Data security and Storage • Data privacy and security Issues, Jurisdictional issues raised by Data location • Identity & Access Management • Access Control • Trust, Reputation, Risk • Authentication in cloud computing, Client access in cloud, Cloud contracting Model, Commercial and business consideration.

Security in Clouds: Cloud security challenges – Software as a Service Security

#### Project Work

- Designing of sample cloud services.
- Case Study of sample cloud services

#### Recommended Text Books:

1. **Cloud Computing: Web Based Applications** That Change The Way You Work And Collaborating Online,  
By Michael Miller

#### Suggested Readings:

1. Barrie Sosinsky, **Cloud Computing Bible**
2. Robin Bloor, Marcia Kaufman, and Fern Halper, **Cloud Computing for Dummies**



# JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

## Course: Organizational Behaviour

**Course Outcomes:** The course aims to provide an understanding of basic concepts, theories and techniques in the field of human behaviour at the individual, group and organizational levels in the changing global scenario. The course must be taught using case study method.

### UNIT I

(Credit-2)

- Introduction: Concept and nature of Organizational behaviour; Contributing disciplines to the field of O.B.;
- O.B. Models; Need to understand human behaviour; Challenges and opportunities.
- Individual & Interpersonal Behaviour: Biographical Characteristics; Ability; Values;
- Attitudes- Formation, Theories, Organization Related Attitude, Relationship between Attitude and Behavior;
- Personality – Determinants and Traits; Emotions;

### UNIT II

(Credit-2)

- Learning-Theories and Reinforcement Schedules, Perception –Process and Errors.
- Interpersonal Behaviour: Johari Window; Transactional Analysis – Ego States, Types of Transactions, Life Positions, Applications of T.A.
- Group Behaviour & Team Development: Concept of Group and Group Dynamics; Types of Groups;
- Formal and Informal Groups; Stages of Group Development, Theories of Group Formation; Group Norms, Group Cohesiveness;

### UNIT III

(Credit-2)

- Group Think and Group Shift. Group Decision Making; Inter Group Behavior;
- Concept of Team Vs. Group; Types of Teams; Building and Managing Effective Teams.
- Organization Culture and Conflict Management: Organizational Culture- Concept, Functions,
- Socialization; Creating and sustaining culture; Managing Conflict – Sources, Types, Process and Resolution of Conflict;
- Managing Change; Resistance to Change, Planned Change. Managing Across Cultures; Empowerment and Participation.

### Recommended Text Book

- Robbins, S.P. and Sanghi, S., (2009), Organizational Behaviour; 13th edition, Pearson Education.
- Singh, Kavita, (2010), Organizational Behaviour: Text and Cases, 1st edition, Pearson Education.

### Suggested Readings:

- Luthans, Fred, (2008), Organizational Behavior, 11th Edition, McGraw Hill Education.
- Mcshane, Steven, Von, Glinow and Sharma, Radha, (2008), Organisational Behaviour, 4th Edition, McGraw Hill Education.
- Kinicki, Angelo and Kreitner, Robert, ((2005)), Organisational Behaviour, 2nd Edition, McGraw Hill Education.

### Recommendation:

- One Existing case Analysis learning & one Current case Analysis on groups behaviour



## V – SEMESTER

### Course: Advance Database Management System

**Course Objective:** To provide a strong foundation in advanced database concepts from an industry perspective. To covers advanced data modeling concepts like OOD Modeling and ORD Modeling.

To learn query processing and transaction management concepts for object-relational database and distributed database.

#### UNIT I (Introduction to Data Base Systems)

(Credit-1.5)

Introduction: Database & Database Users. Characteristics of the Database, Approach advantages of using DBMS. Data Models, Schemas & Instances. DBMS Architecture & Data Independence. System Architecture for DBMS and Data Dictionary, Database Users Data Base languages & Interfaces. Data Modeling using the Entity-Relationship Model -Entity types, Entity Sets, Attributes and Keys, Relationship, Relationship Types, Weak Entity Types, Structural Constraints, Enhanced ER Model- Specialization Generalization.

1. Exercise based on Database creation & related queries.
2. Alteration of an existing database
3. Deletion of existing tables from a particular database.
4. Implementation of query language with insertion, Selection & Updating of database tables

#### UNIT II (Relational Model and Normalization)

(Credit-1.5)

Relational Data Model Concepts and Constraints. Relational Algebra - select, project, set theoretic, join operations. Overview of Relational Calculus. SQL – A Relational Database Language. Data Definition commands, View and Queries, transaction commands, Specifying Constraints & Indexes in SQL. Relational Data Base Design: Function Dependencies & Normalization for Relational Databases. Informal design guidelines for relation schemas, Functional Dependencies. Normal forms based on primary keys (1NF, 2NF, 3NF & BCNF). Lossless join & Dependency preserving decomposition. Multi-valued dependencies, join dependencies (4NF & 5NF), Denormalization.

1. Execution of several query statements that includes following operations:
  - a) Deletion of a record Basic data retrieval
2. Execution of several query statements that includes Condition specification
3. Execution of several query statements that includes following operations:
  - Arithmetic Operators
  - Aggregate Operators
4. Retrieval of records through multiple tables

#### UNIT III (Concurrency Control, Transaction and Security)

(Credit-1)

Security & Integrity: Basic concept; ACID properties; transaction state; implementation of atomicity and durability; concurrent executions; basic idea of serializability; view and conflict serializability Recovery



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Techniques Failure Classification , Storage Structure, Recovery and Atomicity Log Based Recovery, Shadow Paging ,stable storage implementation, data access; recovery and atomicity - log based recovery, deferred database modification, immediate database modification, checkpoints.

1. Join operation on multiple tables.
2. Set manipulation on records through following operations:
  - any, in, all,
  - contains. not contains, exists,
  - not exists, union, minus, intersect.

### **Recommended Text Books:**

1. Elmsari and Navathe, "Fundamental of Database System", AddisonWesley. New York.
2. H.Korth& A. Silberschatz, "DATABASE SYSTEM CONCEPTS", TMH.

### **Reference Books:**

1. Date. CJ, "An Introduction to Database System", Narosa Publishing House. New Delhi.
2. Desai, B, "An Introduction to Database Concepts", Galgotia Publications. New Delhi.



## Course : Artificial Intelligence & Applications

**Course Objective:** AI is an introductory course in Artificial Intelligence. The goal is to acquire knowledge on intelligent systems and agents, formalization of knowledge, reasoning with and without uncertainty, machine learning and applications at a basic level.

### UNIT I (Introduction to Artificial Intelligence)

(Credit-2)

Introduction to Artificial Intelligence- What is AI? ,Early work in AI, AI and related fields, AI problems and Techniques, Problems, Problem Spaces and Search-Defining AI problems as a State Space, Search: example, Production Systems, Search and Control Strategies, Problem Characteristics

Issues in Design of Search Programs, Additional Problems, Heuristic Search Techniques-Generate-and-test, Hill Climbing, Best First Search, Problem Reduction, Constraint Satisfaction, Mean-Ends Analysis

### UNIT II (Knowledge Representation )

(Credit-2)

Knowledge Representation-Representations and Mappings, Approaches to Knowledge,

Representation, Knowledge representation method, Propositional Logic, Predicate logic, Representing Simple facts in Logic, Representing Instances and Isa, relationships, Computable Functions and Predicates, Resolution, □ Forward and backward chaining, Slot – and – Filler Structures

### UNIT III (Game Playing )

(Credit-2)

Game Playing- Minimax Search Procedures, Adding alpha-beta cutoffs, Planning, An example Domain: The Blocks world, Component of a planning system, Goal state planning, Nonlinear planning

Hierarchical Planning, Natural Language Processing- Introduction, Syntactic Processing, Semantic analysis, Discourse and Pragmatic Processing, Learning, What is learning, Rote Learning, Learning by taking advice, Learning in problem solving, Learning from examples, Explanation based learning

### Recommended Text Books:

1. Elaine Rich and Kevin Knight: Artificial Intelligence – Tata McGraw Hill.
2. Dan W.Patterson, Introduction to Artificial Intelligence and Expert Systems – Prentice Hal of India.

### Reference Books:

1. Nils J. Nilsson: Principles of Artificial Intelligence – Narosa Publication house.
2. Artificial Intelligence : A Modern Approach, Stuart Russell, Peter Norving, Pearson Education 2nd Edition.
3. Artificial Intelligence, Winston, Patrick, Henry, Pearson Education.
4. Artificial Intelligence by Gopal Krishna, Janakiraman.



## Course : Network programming

**Course Objective:** make use of various solutions to perform inter-process communications. demonstrate advanced knowledge of networking. understand the key protocols which support the Internet. have a detailed knowledge of the TCP/UDP Sockets. describe major technologies and protocols used in network communications.

### UNIT I (Basics of TCP Sockets)

(Credit-1.5)

ELEMENTARY TCP SOCKETS Introduction to Socket Programming – Overview of TCP/IP Protocols – Introduction to Sockets – Socket address Structures – Byte ordering functions – address conversion functions – Elementary TCP Sockets – socket, connect, bind, listen, accept, read, write, close functions – Iterative Server – Concurrent Server.

### UNIT II (TCP Echo Server-Client)

(Credit-1.5)

APPLICATION DEVELOPMENT TCP Echo Server – TCP Echo Client – Posix Signal handling – Server with multiple clients – boundary conditions: Server process Crashes, Server host Crashes, Server Crashes and reboots, Server Shutdown – I/O multiplexing – I/O Models – select function – shutdown function – TCP echo Server (with multiplexing) – poll function – TCP echo Client (with Multiplexing)

### UNIT III (TCP Echo Server-Client)

(Credit-1)

SOCKET OPTIONS, ELEMENTARY UDP SOCKETS Socket options – getsockopt and setsockopt functions – generic socket options – IP socket options – ICMP socket options – TCP socket options – Elementary UDP sockets – UDP echo Server – UDP echo Client – Multiplexing TCP and UDP sockets – threaded servers – thread creation and termination – TCP echo server using threads – ping program – trace route program.

### Recommended text BOOKS

1. W. Richard Stevens, "UNIX NETWORK PROGRAMMING Vol-I" Second Edition, PHI / Pearson Education, 1998.
2. William Stallings, "SNMP, SNMPv2, SNMPv3 and RMON 1 and 2", Third Edition, Addison Wesley, 1999.

### REFERENCE BOOKS

1. D.E. Comer, "Internetworking with TCP/IP Vol- III", (BSD Sockets Version), second Edition, PHI, 2003.



## Course :Microprocessor

**Course Outcomes:** To provide solid foundation on the fundamentals of microprocessors and applications, interfacing the external devices to the processor according to the user requirements thus, enabling to create novel products and solutions for real time problems.

### UNIT-I

(Credit-1.5)

The 8085 Microprocessor: Block diagram, pins & their description, demultiplexing of buses, control signals & flags. Introduction to 8085 based microcomputer system. Instruction & Timings: Instruction classification, instruction formats, addressing modes, Instruction timings and status, Interrupts

1. Study the hardware, functions, memory structure and operation of 8085 microprocessor kit. (0.8 Practical)
2. Program to perform integer division: (i) 8-bit by 8-bit (ii) 16-bit by 8-bit. (0.4 Practical)
3. Transfer of a block of data in memory to another place in memory in the direct and reverse order. (0.4 Practical)

### UNIT-II

(Credit-1.5)

Programming & Programming Techniques of the 8085: 8085 instruction set, data transfer instructions, arithmetic, logic & branch operations. Rotate & compare. Instructions related to stack operations. Looping, counting and indexing, counters & time delays. Subroutines, Interfacing Concepts & Peripherals: Basic interfacing concepts. Memory mapped and peripheral mapped I/O. Description, programming & interfacing of 8155, 8255, 8279 with 8085. Description of simple systems using above chips. Description, programming and interfacing of 8253 and 8259A with 8085 microprocessor.

1. Searching a number in an array and finding its parity.
2. Sorting of array in: (i) Ascending (ii) Descending order.
3. Program to perform following conversion: (i) BCD to ASCII (ii) BCD to Hexadecimal
4. Program to multiply two 8-bit numbers.

### UNIT-III

(Credit-1)

Direct memory Access: Basic concepts of DMA techniques. Description, Programming and interfacing of DMA controller 8257. A/D and D/A converters, Serial I/O & Bus stands: Interfacing of AD558, AD7522, ADC0801, 0808 with 8085. Basic concepts in serial I/O, Software controlled serial I/O. RS232C and standard parallel port of PC.

1. Program to generate and sum 15 Fibonacci numbers.
2. Program for rolling display of message "INDIAN".
3. To insert a number at correct place in a sorted array.

### Recommended Text Books

1. P. Mathur Introduction to Microprocessors

### References Books:

1. Gaonkar- Microprocessors
2. V. Hall- Microprocessor & Interfacing



# JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

## Course : WEB INTELLIGENCE, HADOOP AND BIG DATA ANALYSIS

**Course Outcomes:** Get a deeper knowledge of various Big Data frameworks. Exposure to the fundamentals of business intelligence and big data analytics. Understand basic concepts in Big Data analytics and parallel data processing. To gain an understanding of how managers use business analytics to formulate and solve business problems and to support managerial decision making.

### UNIT I – INTRODUCTION TO INTELLIGENT WEB and LISTEN AND LOAD (Credit-1.5)

Inside the search engine - Examples of intelligent web applications - Basic elements of intelligent applications - Machine learning, data mining – Searching, Reading, indexing, and searching. Streams, Information and Language, - Statistics of Text - Analyzing Sentiment and Intent – Load - Databases and their Evolution, Big data Technology and Trends.

S.No.	Name of Practical
1	A practical approach for how SEM works
2	Configure and deploy a single instance topology

### UNIT II – Clustering and generic Methods (Credit-1.5)

Data structures in Java: Linked List, Stacks, Queues, Sets, Maps; Generics: Generic classes and Type parameters, Implementing Generic Types, Generic Methods, Wrapper Classes, Concept of Serialization An overview of clustering algorithms - Clustering issues in very large datasets - The need for classification .

S.No.	Name of Practical
1	Implement the following Data structures in Java a)Linked Lists b) Stacks
2	Implement the following Data structures in Java a)Queues b) Set c) Map
3	Increase data capacity of the cluster
4	Increase data availability of the cluster
5	Write a program on collections in java
6	Write a program by using generic methods



# JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

## UNIT III – Introduction of HADOOP (Credit-1)

Working with Big Data: Google File System, Hadoop Distributed File System (HDFS) – Building blocks of Hadoop (NameNode, DataNode, Secondary NameNode, JobTracker, TaskTracker), Introducing and Configuring Hadoop cluster (Local, Pseudo-distributed mode, Fully Distributed mode), Configuring XML files.

S.No.	Name of Practical
1	Perform setting up and Installing HADOOP in its three operating modes: <ul style="list-style-type: none"><li>• Standalone</li><li>• Pseudo distributed</li><li>• Fully distributed.</li></ul>
2	Use web based tools to monitor your HADOOP setup.
3	Implement the following file management tasks in HADOOP <ul style="list-style-type: none"><li>• Adding files and directories</li><li>• Retrieving files</li><li>• Deleting files</li></ul>

### Recommended text Books:

1. Gautam Shroff, "Intelligent Web - Search, Smart Algorithms, and Big Data", Oxford University Press, 2013.
2. Haralambos Marmanis, Dmitry Babenko, "Algorithms of the Intelligent Web", Manning publications, 2009.
3. Christopher D. Manning, Prabhakar Raghavan, Hinrich Schütze, "An Introduction to Information Retrieval", Cambridge University Press, 2009.
4. Mark Gardener, "Beginning R - The Statistical Programming Language", John Wiley & Sons, Inc., 2012.
5. Big Java 4th Edition, Cay Horstmann, Wiley John Wiley & Sons, INC
6. Hadoop: The Definitive Guide by Tom White, 3rd Edition, O'Reilly; Hadoop in Action by Chuck Lam, MANNING Publ.



## VI – SEMESTER

### Course : Introduction to Data Science

**Course Outcomes:** The goal of data science is to construct the means for extracting business-focused insights from data. This requires an understanding of how value and information flows in a business, and the ability to use that understanding to identify business opportunities.

#### UNIT- I (Introduction of Data Science & R Programming)

(Credit-2)(Credit-1)

Introduction: What is Data Science? Big Data and Data Science hype, Statistical Inference, Statistical modeling, probability distributions, fitting a model, Intro to R, Exploratory Data Analysis and the Data Science Process, Basic tools (plots, graphs and summary statistics) of EDA, The Data Science Process - Case Study, Real Direct (online real estate firm).

#### UNIT- II (Basic Machine Learning Algorithms & Applications)

(Credit-1.5)

Linear Regression, k-Nearest Neighbors (k-NN), k-means, Filtering Spam, Linear Regression and k-NN for filtering spam, Naive Bayes, Data Wrangling, Feature Generation, Feature Selection algorithms.

#### UNIT- III Mining Social-Network Graphs & Data Visualization)

(Credit-1.5)

Social networks as graphs, clustering of graphs, direct discovery of communities in graphs, Partitioning of graphs, Neighborhood properties in graphs, Data Visualization, Basic principles, ideas and tools for data visualization, Examples of inspiring (industry) projects, Data Science and Ethical Issues.

#### TEXT BOOKS:

1. Arun K Pujari "Data Mining Techniques".
2. Jiawei Han and Micheline Kamber, "Data Mining Concepts and Techniques".
3. Dan W. Patterson, "Introduction to AI and ES", Pearson Education, 2007
4. Cathy O'Neil and Rachel Schutt. Doing Data Science, Straight Talk From The Frontline. O'Reilly. 2014.

#### REFERENCE BOOKS:

1. Jure Leskovek, Anand Rajaraman and Jeffrey Ullman. Mining of Massive Datasets.v2.1, Cambridge University Press. 2014. (free online)
2. Kevin P. Murphy. Machine Learning: A Probabilistic Perspective. ISBN 0262018020. 2013.
3. Foster Provost and Tom Fawcett. Data Science for Business: What You Need to Know about Data Mining and Data-analytic Thinking. ISBN 1449361323. 2013.
4. Trevor Hastie, Robert Tibshirani and Jerome Friedman. Elements of Statistical Learning, Second Edition. ISBN 0387952845. 2009. (free online)
5. Avrim Blum, John Hopcroft and Ravindran Kannan. Foundations of Data Science.



## Course: NEURAL NETWORKS

**Course Outcomes:** This course introduces the basic models, learning algorithms, and some applications of neural networks. After this course, we should be able to know how to use neural networks for solving different problems related to pattern recognition, function approximation, data visualization, and so on.

### UNIT- I (Neuro Computing and Neuroscience)

(Credit-1)

Historical notes, human Brain, neuron Mode I, Knowledge representation, AI and NN. Learning process: Supervised and unsupervised learning, Error correction learning, competitive learning, adaptation, statistical nature of the learning process. Scaling, normalization, Transformation (FT/FFT), principal component analysis, regression, co-variance matrix, eigen values & eigen vectors.

### UNIT- II (Data processing)

(Credit-1.5)

Basic Models of Artificial neurons, activation Functions, aggregation function, single neuron computation, multilayer perceptron, least mean square algorithm, gradient descent rule, nonlinearly separable problems and bench mark problems in NN. Multilayered network architecture, back propagation algorithm, heuristics for making BP-algorithm performs better. Accelerated learning BP (like recursive least square, quick prop, RPROP algorithm), approximation properties of RBF networks and comparison with multilayer perceptron.

### UNIT- III (Recurrent Networks) (Credit-1.5)

Recurrent network and temporal feed-forward network, implementation with BP, self organizing map and SOM algorithm, properties of feature map and computer simulation. Principal component and Independent component analysis, application to image and signal processing. Complex valued NN and complex valued BP, analyticity of activation function, application in 2D information processing.

### TEXT BOOK:

1. Dan W. Patterson, "Introduction to AI and ES", Pearson Education, 2007
2. E. Rich and K. Knight, Artificial Intelligence, Tata McGraw Hill, New Delhi 1992.

### REFERENCE BOOKS:

1. J.A. Anderson, An Introduction to Neural Networks, MIT
2. Hagen Demuth Beale, Neural Network Design, Cengage Learning
3. Laurene V. Fausett, "Fundamentals of Neural Networks : Architectures, Algorithms and Applications", Pearson India
4. Kosko, Neural Network and Fuzzy Sets, PHI
5. Hagan, Neural Network Design w/CD, Cengage Learning