

**BHARATHIAR UNIVERSITY, COIMBATORE – 641 046**

**M. Sc COMPUTER SCIENCE (CBCS)**

**Department of Computer Science (UD)**

**II year M.Sc Computer Science (2017-18 Batch)**

**SCHEME OF EXAMINATION**

Core/ Elective/ General/ General Supportive	Suggested Code	Sem	Title of the Paper	No. of Credits		Hrs.		Marks			
				T	P	L	P	Int.	Ext.	Total	
Core 11	16CS3C1	III	Wireless Networks	2	2	2	4	25	45	30	100
Core 12	16CS3C2	III	Visual Programming	2	2	2	4	25	45	30	100
Core 13	16CS3C3	III	Software Project Management	4	0	4	0	25	75	-	100
Core 14	16CS3C4	III	Cloud Computing	4	0	4	0	25	75	-	100
Core 15	18CS3C5	III	<b>Big Data Analytics</b>	2	2	2	4	25	45	30	100
Elective-III	16CS3EXX	III	Elective – III	4	0	4	0	25	75	-	100
PDC 3	17CS3PDC1	III	Software Installation	0	1	-	-	25	-	-	25
General	16CS3G1	III	Gap Analysis	0	1	-	-	25	-	-	25
General Supportive	16CSGSXX	III	General Supportive - III	2	0	2	0	12	38	-	50
Project	16CSPRO	IV	Project	9				135	90	-	225
Total				37							925

## WIRELESS NETWORKS

**Subject Code: 16CS3C1**

**Number of Credits: 4**

**Subject Description:** This course will cover the fundamental aspects of wireless networks with emphasis on current and next generation wireless networks.

**Goals:** To introduce the students to state-of-the-art wireless network protocols and architectures.

**Objective:** On successful completion of the course the student will be able to:

- Explain the fundamental of cellular communication and channel allocation.
- Explain the constraints and performance of wireless personal area networks, sensor and adhoc networks

### **Unit -I:**

Wireless Networks: Evolution of wireless networks – Challenges - Transmission fundamentals: Analog and digital data transmission - Transmission media - Modulation techniques for wireless systems - Multiple access for wireless systems - Performance increasing techniques for wireless networks.

### **Unit -II:**

Wireless LAN:Introduction to Wireless LANs – WLAN Equipment, Topologies, Technologies, IEEE 802.11 WLAN – Architecture and Services - Physical Layer - MAC Sub Layer –MAC Management Sub Layer, Other IEEE 802.11 Standards.

### **Unit -III:**

Wireless Personal Area Networks:Introduction – Bluetooth : Architecture - Protocol Stack - Physical Connection – Mac mechanism – Frame format – Connection management -Low Rate and High Rate WPAN , ZigBee Technology IEEE 802.15.4 : Components – Network topologies – PHY – MAC.

### **Unit -IV:**

Ad-hoc Wireless Networks:Introduction- Characteristics of Adhoc Networks - Classifications of MAC Protocols:Conection Based protocols, Reservation Mechanism - Table driven Routing protocols: DSDV, WRP - On Demand routing protocols: DSR,AODV,TORA –Routing Protocol with Efficient Flooding Mechanism: OLSR - Hierarchical routing protocols – CBRP, FSR.

### **Unit -V:**

Wireless Sensor Networks : Introduction - Challenges for wireless sensor networks - Comparison of sensor network with ad-hoc network - Single node architecture : Hardware components - Energy consumption of sensor nodes - Network architecture: Sensor network scenarios - Design principles – Operating systems.

### **REFERENCES:**

1. Nicopolitidis P, Obaidat M S, Papadimitriou G S and Pomportsis A S, “Wireless Networks”, John Wiley and Sons, New York, 2009.
2. Vijay K Garg, Wireless Communication and Networking, Morgan Kaufmann Publishers 2010.
3. Siva Ram Murthy C,Manoj B S, “Ad Hoc Wireless Networks: Architectures and Protocols”, Prentice Hall, 2006.
4. Holger Karl and Andreas Willig, “Protocol and Architecture for Wireless Sensor Networks”, John Willey Publication, 2011.

## VISUAL PROGRAMMING

**Subject Code: 16CS3C2**

**Number of credits: 4**

**Subject Description:** This course presents the introduction to .NET framework, VB.NET, ASP.NET and Web services.

**Goals:** To enable the student to be familiar with visual programming concepts.

**Objectives:** On successful completion of the course the student should have:

- Understood the concepts in VB.NET & ASP.NET.
- Knowledge in developing web services

**Contents:**

### Unit –I

Introduction to .NET – The .NET Framework – Benefits of .NET - Common Language Runtime – Features of CLR - Compilation and MSIL – The .NET Framework libraries – The Visual Studio Integrated Development Environment.

### Unit –II

Introduction to VB.NET – VB.NET fundamentals – Branching and Looping Statements - Classes and Objects – Constructors – Overloading- Inheritance and Polymorphism – Interfaces – Arrays – Strings – Exceptions – Delegates and Events.

### Unit –III

Building Windows Applications – Creating a Windows Applications using window controls - Windows Forms, Text Boxes, Rich Text boxes, Labels, and link labels – Buttons, Check boxes, Radio buttons, Panels and Group Boxes, List Boxes, Checked List boxes, Combo boxes and Picture boxes, Scroll bars – Calendar control, Timer control – Handling Menus – Dialog boxes – Deploying an Application – Graphics.

### Unit- IV

ASP.NET Basics: Features of ASP.NET – ASP.NET page directives - Building Forms with Web server Controls – Validation Server Controls - Rich Web Controls - Custom Controls – Collections and Lists.

### Unit –V

Data Management with ADO.NET - Introducing ADO.NET - ADO.NET features - Using SQL Server with VB.NET – Using SQL Server with ASP.NET – LINQ queries – Building ASP.NET 3.5 Enterprise Applications: Developing ASP.NET Ajax applications – ASP.NET web services.

## REFERENCES:

1. Jesse Liberty, Programming Visual Basic.NET 2003, Second Edition, O Reilly, Shroff Publishers and Distributors Pvt. Ltd.
2. Steven Holzner, Visual Basic.NET Programming Black Book, 2005 Edition, Paraglyph press USA&Dreamtech Press, India.
3. Bill Evjen, JasonBeres, et al. Visual Basic.NET Programming Bible, 2002 Edition, IDG books India (p) Ltd.
4. MridulaParihar et al., ASP.NET Bible,2002 Edition,Hungry Minds Inc, New York, USA.

5. Bill Evjen, Hanselman, Muhammad, Sivakumar& Rader, Professional ASP.NET 2.0, 2006 Edition, Wiley India(p) Ltd.
6. KoGENT Solutions Inc., ASP.NET 3.5 (Covers C# and VB 2008 codes) Black Book, Platinum Edition, Dreamtech press, 2010.

## SOFTWARE PROJECT MANAGEMENT

**Subject Code: 16CS3C3**

**Number of credits: 4**

**Subject Description:** This course presents a deep insight to software project management concepts

**Goals:** Enable the student to be familiar with software project management

**Objectives:** On successful completion of the course the student should have:

- Understood the system software project management, project evaluation effort estimation and risk management.

### Contents

#### Unit - I

Introduction: Software Project Management - Software Project Versus Other Project – Requirement Specification – Information and Control in Organization – Introduction to step wise Project Planning – Select – Identify Scope and Objectives - Identify Project Infrastructure – Analyze Project Characteristics – Products and Activities – Estimate Effort for each Activity – Identify Activity Risks – Allocate Resources - Review / Publicize Plan – Execute Plan and Lower Levels of Planning.

#### Unit - II

Project Evaluation : Introduction – Strategic Assessment – Technical Assessment – Cost Benefit Analysis – Cash Flow Forecasting – Cost Benefit Evaluation Techniques – Risk Evaluation – Selection of an Appropriate Project Approach – Choosing Technologies – Choice of Process Models – Structured Methods – Rapid Application Development – Waterfall Model – V-Process Model – Spiral Model – Software Prototyping – Ways of Categorizing Prototypes – Tools – Incremental Delivery – Selection Process Model.

#### Unit - III

Software Effort Estimation : Introduction – Problems with Over and Under Estimates – Basis for Software Estimating – Software Effort Estimation Technique – Albrecht Function Point Analysis – Function Points – Object Points – Procedural Code Oriented Approach – COCOMO – Activity Planning – Project Schedules - Projects and activities – Sequencing and Scheduling Activities – Network Planning Models – Formulating a Network Planning – Adding Time Dimension – Forward Pass – Backward Pass – Identifying the Critical Path – Activity Float - Shortening Project Duration – Identifying Critical Activities – Precedence Networks.

#### Unit - IV

Risk Management : Introduction – Nature of Risk Management Identification – Analysis – Reducing – Evaluating – Z values – Resource Allocation – Nature of Resources – Requirements – Scheduling – Critical Paths – Counting the Cost – Resource Schedule – Cost Schedule – Scheduling Sequence – Monitoring and Control – Creating the Framework - Collecting the Data – Visualizing the Progress – Cost Monitoring – Prioritizing Monitoring – Change Control.

#### Unit - V

Managing Contracts : Introduction – Types of Contract – Stages in Contract Placement – Terms of Contract – Contract Management – Acceptance – Managing People and Organizing Teams – Organizational Behavior Background – Selecting the Right Person for the Job – Instruction in the Best Methods – Motivation – Decision Making – Leadership – Organizational Structures – Software Quality – Importance – Practical Measures – Product

Versus Process Quality Management – External Standards – Techniques to Help Enhance Software Quality- Case Study on Project Management.

**REFERENCES:**

1. Bob Hughes and Mike Cotterell, “Software Project Management ,McGraw Hill, Second Edition.
2. Walker Royce, “Software Project Management , Addition Wesley.
3. DerrellInce, H. Sharp and M. Woodman, “Introduction to Software Project Management and Quality Assurance , Tata McGraw Hill, 1995.

## CLOUD COMPUTING

**Subject Code: 16CS3C4**

**Number of Credits : 4**

**Subject Description:** This course presents the Introduction to cloud computing, Cloud Computing Technology, Virtualization, Migrating into cloud and data security in cloud.

**Goals:** To enable the student to be familiar with the usage of cloud services, implement the virtualization, data storage in the cloud and its security techniques.

**Objectives:** On successful completion of the course the student should have understood the different concepts of cloud computing and its services, to store and retrieve the data from cloud and can provide the security to the data in cloud.

### Unit - I

Introduction: Cloud Computing Basics: Cloud Computing Overview - Applications of cloud computing - Intranets and the cloud – First movers in the cloud - Benefits - limitations of cloud computing – Security Concerns – Cloud Computing Services – Salesforce.com.

### Unit - II

Cloud Computing Technology: Hardware and Infrastructure – Clients – Security – Network – Services - Cloud Storage – Standards – Cloud Computing at work: Software as a Service – Software Plus Services – Developing Applications.

### Unit - III

Virtual Machines and Virtualization: Introduction - Understanding Virtualization - History of Virtualization – Leveraging Blade Servers – Server Virtualization – Desktop Virtualization – Virtual Networks – Data Storage Virtualization. Data Storage in Cloud: Evolution of Network Storage – Cloud based data Storage – Advantages and disadvantages of Cloud based data storage- Cloud based Backup systems - File Systems – Cloud based Block Storage.

### Unit - IV

Migrating into a Cloud: Introduction – Broad approaches of Migrating into cloud – The Seven Step Models of Migrating into a Cloud. Mobile Cloud Computing: Evolution of Mobile Computing – Mobile Cloud EcoSystem – Mobile Players.

### Unit - V

Data security in cloud: Introduction – Current state of data security – Homo sapiens and Digital Information – Cloud Computing and Data security Risk – Cloud Computing and Identity – The Cloud, Digital Identity and Data Security- Content Level Security- Pros and Cons.

### REFERENCES:

1. Anthony T. Velte, Toby J. Velte, Robert Elsenpeter, “ Cloud Computing: A Practical Approach”, McGraw Hill.
2. Kris Jamsa, “ Cloud Computing” Jones and Barlett Student Edition 2014.
3. RajkumarByya, James Broberg, AndrzejGoscinski, “ Cloud Computing Principles and Paradigms”, Wiley & sons

## BIG DATA ANALYTICS

**Subject Code:18CS3C5**

**No. of Credits: 4**

**Subject Description:** The course provides grounding in basic and advanced methods to big data technology and tools, including MapReduce and Hadoop and its ecosystem.

**Goals:** To enable the student to learn big data technologies such as Hadoop, Hive, MongoDB and visual analytics.

**Objectives:** On successful completion of the course the student should

- Able to apply Hadoop ecosystem components.
- Able to participate data science and big data analytics projects

### Contents

**Unit I: Big data Introduction:** What is big data – why big data – convergence of key trends - unstructured data – industry examples of big data – Web analytics - big data and marketing – fraud and big data - risk and big data – credit risk management – big data and algorithmic trading - big data and healthcare – big data in medicine – advertising and big data – big data technologies - cloud and big data – mobile business intelligence – crowd sourcing analytics.

**Unit II: Hadoop:** History of Hadoop - The Hadoop Distributed File System – components of hadoop - Analyzing the Data with Hadoop - Design of HDFS - How MapReduce Works – Anatomy of a Map Reduce – Map Reduce types and formats – Map Reduce features.

**Unit III: Cassandra and Hive:** Introduction to Cassandra – Drawbacks of Relational Database - Cassandra data model – Cassandra examples. Hive – data types and file formats – HiveQL data definition – HiveQL data manipulation – HiveQL queries.

**Unit IV: Pig and MongoDB:** Pig Introduction – Pig Grunt – Pig data model – Pig Latin. Introduction to NoSQL – document based database - MongoDB Introduction - Data Model - Working with data - Replication and Sharding - Development

**Unit V: Graph Databases:** Graph databases – Introduction - Neo4J - Key concept and characteristics - Modeling data for neo4j - Importing data into neo4j - visualizations - neo4j - Cypher Query Language – data visualization - creating visual analytics with RapidMiner.

### Reference books:

- Tom White, “Hadoop: The Definitive Guide”, Fourth Edition, O’Reilly Publishers, June 2012.
- The Definitive Guide to MongoDB, Second Edition, O’Reilly Media publishers, February 2013.
- Rik Van Bruggen, “Learning Neo4j”, Second Edition, PacktPublishers, August 2014.
- Dirk deRoos, Paul Zikopoulos, Bruce Brown, Roman B. Melnyk,RafaelCoss, “Hadoop For Dummies”, John Wiley and sons publishers, 2014.
- GauravVaish, “Getting Started with NoSQL” , First Edition, PacktPublishers, 2013.
- Pramod J. Sadalage, Martin Fowler, “NoSQL Distilled: A Brief Guide to the EmergingWorld of Polyglot Persistence” Addison Wesley publishers, 2013.
- Andreas Francois Vermeulen ,Ankurgupta, Cindy Gross, David Kjerrumgaard and Scott Shaw, Practical Hive: A Guide to Hadoop’s Data Warehouse System, Apress Media publishers, 2016.



- Eric Lubow and Russell Baradberry, Practical Cassandra: A Developer's Approach, Addison Wesley publishers, 2014.
- RapidMiner Studio Manual.

**Elective Papers**

<b>Sem.</b>	<b>Suggested Code</b>	<b>Title of the Paper</b>	<b>No. of Credits</b>
<b>III</b>	16CS3E01	Virtual Reality	4
	16CS3E02	Machine Learning Techniques	4
	16CS3E03	Human Computer Interaction	4
	16CS3E04	Data Compression	4
	16CS3E05	Genetic Algorithms	4
	16CS3E06	Neural Networks and Fuzzy Systems	4
	16CS3E07	Speech Processing	4
	16CS3E08	E-Commerce	4
	16CS3E09	Distributed Systems	4
	16CS3E10	Open Source Technologies	4

## VIRTUAL REALITY

**Subject Code: 16CS3E01**

**Number of credits: 4**

**Subject Description:** This course presents an idea on Computer graphics, Generic VR Systems, Physical Simulation, VR Hardware.

**Goals:** To enable the student to familiar with to computer graphics, 3D Computer graphics, and simulation.

**Objectives:** On successful completion of the course the student should have: • Understood virtual reality in detail.

Contents:

### **Unit – I**

Virtual Reality and Virtual Environments: Introduction – Computer Graphics – Real-time computer Graphics – Flight Simulation – Virtual Environment – Benefits of Virtual Reality – Historical Development of VR: Scientific Landmarks.

### **Unit - II**

3D Computer Graphics: Virtual world Space – Positioning the Virtual Observer – The Perspective Projection – Human Vision – Stereo Perspective Projection – 3D Clipping – Color Theory – Simple 3D Modeling – illumination, reflection Models- Shading Algorithms – Radiosity – Hidden surface removal – realism- stereographic Images Geometric Modeling: 3D Space Curves – 3D boundary representation – other modeling strategies – Geometrical Transformations: Frames of reference – Modeling – Instances – Picking, Flying, scaling – Collision detection.

### **Unit - III**

Generic VR System: Virtual Environment – computer Environment – VR technology – Models of Interaction – VR Systems – Animating the Virtual Environment: The Dynamics of numbers – animation of objects – Shape and object i n between – Free-form deformation – Particle Systems

### **Unit - IV**

Physical Simulation: Objects Falling in a gravitational field – Rotating wheels – Elastic Collisions – Projectiles – Simple Pendulums – Springs – Flight dynamics of an aircraft. Human Factors: The eye – the ear – The Somatic senses – Equilibrium.

### **Unit - V**

VR Hardware: Sensor Hardware – Head-Coupled display s – Acoustic Hardware – Integrated VR Systems – VR Software: Modeling Virtual World – Physical Simulation – VR Tool Kids – VR Applications: Engineering – Entertainment – Science – training – The Future: Virtual Environments – Modes of Interaction.

## **REFERENCES:**

1. John Vince, "Virtual Reality Systems", Pearson Education Asia, 2001

## **MACHINE LEARNING TECHNIQUES**

**Subject Code: 16CS3E02**

**Number of credits: 4**

**Subject Description:** This course presents the foundations of learning, linear models, distance based models, tree and rule based model and reinforcement learning.

**Goals:** To enable the student to learn techniques in machine learning.

**Objectives:**

On successful completion of the course the student should have:

- Understood the techniques in machine learning and apply machine learning techniques to any domain of interest.

**Contents:**

**Unit - I**

FOUNDATIONS OF LEARNING : Components of learning – learning models – geometric models – probabilistic models – logic models – grouping and grading – learning versus design – types of learning – supervised – unsupervised – reinforcement – theory of learning – feasibility of learning – error and noise – training versus testing – theory of generalization – generalization bound – bias and variance – learning curve

**Unit - II**

LINEAR MODELS : Linear classification – univariate linear regression – multivariate linear regression – regularized regression – Logistic regression – perceptrons – multilayer neural networks – learning neural networks structures – support vector machines – soft margin SVM – generalization and over fitting – regularization – validation

**Unit - III**

DISTANCE-BASED MODELS : Nearest neighbor models – K-means – clustering around medoids – silhouettes – hierarchical clustering – k- d trees – locality sensitive hashing – non - parametric regression – ensemble learning – bagging and random forests – boosting – meta learning

**Unit -IV**

TREE AND RULE MODELS : Decision trees – learning decision trees – ranking and probability estimation trees –Regression trees – clustering trees – learning ordered rule lists – learning unordered rule lists – descriptive rule learning – association rule mining – first -order rule learning

**Unit - V**

REINFORCEMENT LEARNING :Passive reinforcement learning – direct utility estimation – adaptive dynamic programming – temporal - difference learning – active reinforcement learning – exploration – learning an action utility function – Generalization in reinforcement learning – policy search – applications in game playing – applications in robot control

**REFERENCES:**

1. Y. S. Abu - Mostafa, M. Magdon-Ismail, and H.-T. Lin, “Learning from Data”, AMLBook Publishers, 2012.

2. P. Flach, “Machine Learning: The art and science of algorithms that make sense of data”, Cambridge University Press, 2012.
3. K. P. Murphy, “Machine Learning: A probabilistic perspective”, MIT Press, 2012.
4. C. M. Bishop, “Pattern Recognition and Machine Learning”, Springer, 2007.
5. D. Barber, “Bayesian Reasoning and Machine Learning”, Cambridge University Press,2012.

## HUMAN COMPUTER INTERACTION

**Subject Code: 16CS3E03**

**Number of credits: 4**

**Subject Description:** This course presents the design process of HCI, Cognitive models, interaction styles and design issues in HCI.

**Goals:** To enable the student to learn concepts in Human computer interaction.

**Objectives:**

On successful completion of the course the student should have:

- Understood the design processes and issues in HCI
- Able to discover models which can be used for designing systems.

**Contents:**

**Unit - I**

Introduction, The human, The computer, The interaction, Paradigms, Usability of Interactive Systems, Guidelines, Principles, and Theories.

**Unit - II**

Design Process - Interaction design basics, HCI in the software process, Design rules, Implementation support, Evaluation techniques, Universal design, User support.

**Unit - III**

Cognitive models, Socio-organizational issues and stakeholder requirements, Communication and collaboration models, Task analysis, Dialogue notations and design, Models of the system, Modelling rich interaction

**Unit - IV**

Interaction Styles- Direct Manipulation and Virtual Environments, Menu Selection, Form Filling and Dialog Boxes, Command and Natural Languages, Interaction Devices, Collaboration and Social Media Participation

**Unit - V**

Design Issues- Quality of Service, Balancing Function and Fashion, User Documentation and Online Help, Information Search, Information Visualization , Information Search and visualization - Introduction, Search in Textual Documents and Database Querying, Multimedia Document Searches. Hypertext, Multimedia and the world wide web, Introduction, Understanding hypertext, Web technology and issues, Static web content, dynamic web content.

**REFERENCES:**

1. Human Computer Interaction, Alan Dix, Janet Finlay, Gregory Abowd and Russel Beale, Prentice Hall Publication
2. Designing the User Interface, Ben Shneiderman, 4<sup>th</sup> Edition, Pearson Education, 2008, ISBN 81-7808-262-4
3. Human Computer Interaction, Dan R. Olsen, Cengage Learning, India Edition, ISBN No.978-81-315-1137-4

4. The Essential Guide to User Interface Design, Second Edition, An Introduction to GUI Design Principles and Techniques, Wilbert O. Galitz, Wiley India (P) Ltd., ISBN : 81-265-0280-0
5. The Essential of Interaction Design, Alan Copper, Robert Reimann, David Cronin, Wiley India (P) Ltd., ISBN : 978-81-265-1305-5

## DATA COMPRESSION

**Subject Code: 16CS3E04**

**Number of credits: 4**

**Subject Description:** This course presents a brief introduction to compression schemes and modulation

**Goals:** To enable the student to familiar with Information and Coding and Compression of Still Images.

**Objectives:**

On successful completion of the course the student should have:

- Understood data compression concepts and principles

**Contents:**

**Unit - I**

Information and Coding: Information and Entropy – Noiseless and Memoryless Coding Shannon – Fano Coding: Shannon Coding–Shannon-Fano Coding.

**Unit - II**

Huffman Coding – Arithmetic Coding - Dictionary Techniques - Sampling and Quantization

**Unit - III**

Predictive Coding: Delta Modulation – Differential Pulse Code Modulation. Transform Coding: Defining a Transform – Interpretation of Transforms – Karhunen-Loeve Transform – Hadamard Transform – Discrete Wavelet Transform. Subband Coding: Down sampling and Up sampling – Bit Allocation

**Unit - IV**

JPEG – The Baseline System – Progressive DCT-based Mode of Operation – Hierarchical Mode of Operation – Sequential Losses Mode of Operation. Video Image Compression: MPEG – MPEG-1, MPEG-2, MPEG-4 and MPEG-7

**Unit - V**

Fourier analysis: Fourier series – The Fourier Transform – The Discrete Fourier Transform - The Sampling Theorem. Wavelets: Wavelet Transforms – Multiresolution Analysis

**REFERENCES:**

1. Adam Drozdek, “Elements of Data Compression ,Vikas Publishing House, 2002.
2. Mark Nelson, Jean-Loup Gailly, “The Data Compression Book , BPB Publication, Second Edition, 1996.

## GENETIC ALGORITHMS

**Subject Code: 16CS3E05**

**Number of credits: 4**

**Subject Description:** This course presents an introduction to genetic algorithms and its applications

**Goals:** To enable the student to familiar with the concepts of genetic algorithms

**Objectives:**

On successful completion of the course the student should have:

- Understood the concepts and applications of genetic algorithms

**Contents:**

**Unit - I**

Introduction: Genetic algorithms (GA) – Traditional optimization and search methods – GA Vs Traditional methods – Simple GA- schemata – learning the Lingo- GA mathematical foundation: Schema processing – Two armed and K – armed bandit problem – building block hypothesis – minimal deceptive problem. Data structure – GA operations – mapping objective functions to fitness values. Fitness scaling – coding – multi parameter representation Discretization – constrains.

**Unit - II**

Applications of GA: The Rise of GA – Bagley and Adaptive Game playing program, Tosenberg and Biological cell simulation – pattern recognition – metalevel GAs – Hollstien and Function optimization – Real genes – Box and Evolutionary operations – Evolutionary optimization techniques, programming. Function optimization – improvements in basic techniques – Current applications – Pipeline system s – Structural optimization – medical registration

**Unit - III**

Dominance – Diploidy and Abeyance and reordering operators- other micro operators: Segregation, Translocation and multiple chromosome structure – Duplication and Deletion. Sexual determination and Differentiation – Niche an d speciation. Multi objective optimization – Knowledge based techniques – GA and Parallel Processors.

**Unit - IV**

Genetic based Machine: Classifier system – Rule and Message system – The Bucket Brigade GA – Implementation issues.

**Unit - V**

Genetic Based Machine Learning (GBML) – Development of CS-1-Smith s Poker Player – LS – 1 Performance – GBML efforts – ANIMAT classifier system pipeline operation classifier system.

**REFERENCES:**

1. D.E. Goldberg, “Genetic Algorithms, Optimization, and Machine Learning”, Addison Wesley 2000.

## NEURAL NETWORKS AND FUZZY SYSTEMS

**Subject Code: 16CS3E06**

**Number of credits: 4**

**Subject Description:** This course presents the fundamentals of neural networks and fuzzy systems

**Goals:** To enable the student to familiar with to Fuzzy Set Theory, Fuzzy Systems Adaptive Resonance Theory and Back Propagation Networks

**Objectives:**

On successful completion of the course the student should have:

- Understood concepts and principles of fuzzy and neural networks.

**Contents:**

### Unit - I

Fundamentals of Neural Networks : basic Concepts of Neural Networks – Human Brain – Model of an Artificial Neuron – Neural Network Architectures – Characteristics of Neural Networks – Learning Methods – Taxonomy of Neural Network Architectures – History of Neural Network Research – Easy Neural Network Architectures – Some Application Domains.

### Unit - II

Back Propagation Networks : Architecture of a Back Propagation Network – Back Propagation Learning – Illustration – Applications – Effects of Tuning Parameters of the Back Propagation Neural Network – Selection of Various Parameters in BPN – Variations of Standard Back Propagation Algorithm.

### Unit - III

Adaptive Resonance Theory: Introduction – ART1 – AR T2 – Applications.

### Unit - IV

Fuzzy Set Theory: Fuzzy versus Crisp – Crisp Sets – Fuzzy Sets – Crisp Relations – Fuzzy Relations.

### Unit - V

Fuzzy Systems: Crisp Logic – Predicate Logic – Fuzzy Logic – Fuzzy Rule Based System – Defuzzification Methods.

## REFERENCES:

1. S. Rajasekaran, G. A. VijayalakshmiPai, “Neural Networks, Fuzzy Logic and Genetic Algorithms Synthesis and Applications, Prentice Hall of India, 2003.
2. James A. Freeman, David M. Skapura, “Neural Networks – Algorithms, Applications and Programming Techniques, Pearson Education.
3. Fredric M. Ham, Ivica Kostunica, “Principles of Neuro Computing for Science of Engineering , Tata McGraw Hill.
4. Simon Haykin, “Neural Networks – A Comprehensive Foundation , Prentice Hall of India.



## SPEECH PROCESSING

**Subject Code: 16CS3E07**

**Number of credits: 4**

**Subject Description:**This course presents an idea on fundamentals of speech recognition, pattern comparison techniques and processing

**Goals:**To enable the student to familiar with to overview of signals and systems, Fundamentals of speech recognition, Pattern-comparison techniques.

**Objectives:**

On successful completion of the course the student should have:

- Understood concepts and principles in speech recognition.

**Contents:**

**Unit - I**

Overview of signals and systems – Review of One dimensional and two dimensional signal processing and discrete Fourier transforms and digital filters- domain models for speech processing.

**Unit - II**

Fundamentals of speech recognition.The speech signal – production, perception and Acoustic-Phonetic characterization. Signal processing and analysis methods of speech recognition. Bank-of-filters-front-end processor-linear predictive coding model for speech recognition-vector quantization-auditory based spectral analysis models.

**Unit - III**

Pattern-comparison techniques. Speech recognition system analysis and implementation issues: Application of source-coding techniques-template training methods-performance analysis and recognition enhancements.

**Unit - IV**

Homomorphic speech processing-Speech Recognition algorithm: Pattern Recognition based and knowledge based – Discrete utterance and continuous speech recognition systems-Principles of speaker recognition-projects.

**Unit - V**

Speech recognition based on connected word models-Large vocabulary continuous speech recognition – Task oriented applications of automatic speech recognition.

**REFERENCES:**

1. Rabiner& Schaffer, “Digital processing of speech signals”, Prentice Hall. 1980.
2. Lawrence Rabiner, ”Fundamentals of speech recognition”, Prentice Hall.
3. Samuel D.Stearns and Ruth A.David “Signal Processing algorithms”, Prentice Hall, 1988.
4. D.Shanghessuy, “Speech Communication”, Prentice Hal 1,1987

## **E-COMMERCE**

**Subject Code: 16CS3E08**

**Number of credits: 4**

**Subject Description:**This course presents an idea on fundamentals of E-Commerce.

**Goals:**To enable the student to familiar with network infrastructure, Information Publishing Technology, Search Engines and Directory Services.

**Objectives:**

On successful completion of the course the student should have: Understood concepts and principles in E-Commerce

**Contents:**

**Unit - I**

Introduction to E-Commerce: Benefits-Impacts-Classification and Application of E-Commerce-Business Model-Architectural Frame Work

**Unit - II**

Network Infrastructure: Local Area Network-Ethernet-Wide Area Network-Internet-TCP/IP Reference Model-Domain Name System-Internet Industry structure-Information Distribution and Messaging: FTP Application-Electronic Mail-World Wide Web Server-HTTP-Web Server Implementations

**Unit - III**

Information Publishing Technology: Information publishing-Web Browsers-HTML-CGI-Multimedia Content - Other Multimedia Objects-VRML- Securing the Business on Internet-Why Information on Internet is vulnerable?-Security Policy-Procedures and Practices-Site Security-Protecting the Network-Firewalls-Securing the Web Service

**Unit - IV**

Securing Network Transaction-Electronic Payment Systems: Introduction –Online Payment Systems-Pre-paid Electronic Payment System- Post-paid Electronic Payment System-Requirement Metrics of a Payment System

**Unit - V**

Search Engines and Directory Services: Information Directories –Search Engines –Internet Adverting- Agents in Electronic Commerce: Needs and Types of Agents-Agent Technologies-Agents Standards and Protocols-Agents Applications-Case Study.

**REFERENCES:**

1. Bharat Bhasker, “Electronic Commerce Framework, Technologies and Applications”, Tata McGraw Hill Publication, 2003.

## **DISTRIBUTED SYSTEMS**

**Subject Code: 16CS3E09**

**Number of credits: 4**

**Subject Description:**This course presents an Introduction to Distributed Systems, Client/Server Network Model and Distributed Databases

**Goals:**To enable the student to familiar with distributed systems and client server computing

**Objectives:**

On successful completion of the course the student should have:

- Understood Distributed Systems in detail

**Contents:**

**Unit - I**

Distributed Systems: Fully distributed processing systems – Networks and Interconnection structures – Designing a Distributed Processing System.

**Unit - II**

Distributed Systems: Pros and Cons of Distributed processing – Distributed databases – the challenge of distributed data – loading factors – managing the distributed resources – division of responsibilities.

**Unit - III**

Design Considerations: Communications line loading – Line loading Calculations – Partitioning and allocation – Data flow systems – dimension analysis – network database design considerations – ration analysis – database decision trees – synchronization of network databases.

**Unit - IV**

Client/Server Network Model: Concept – file server – printer server – an e-mail server.

**Unit - V**

Distributed Databases: An overview – Distributed Databases – Principles of Distributed Databases – levels of transparency – Distributed Database Design – The R\* Project Technique Problems of Heterogeneous Distributed Databases.

**REFERENCES:**

1. John A. Sharp, "An Introduction to Distributed and Parallel Processing", Blackwell Scientific Publications, 1987.
2. UylessD.Black, "Data Communications & Distributed Networks".
3. Joel M.Crichlow, "Introduction to Distributed & Parallel Computing".
4. StefansCeri, GinseppePelagatti, "Distributed Databases Principles and Systems, McGraw Hill Book Co., New York, 1985.

## OPEN SOURCE TECHNOLOGIES

**Subject Code: 16CS3E10**

**Number of credits: 4**

**Subject Description:** This course presents the principles of Open Source, platform and various technologies and their integration.

**Goals:** To enable the student to learn and use the available Open Source Software Technologies.

**Objectives:**

On successful completion of the course, the student should have

- Understood the principles of open source technologies and the usage of Linux, Apache, PHP and MySQL

### Unit I

**Introduction:** Open Source, Free Software, Free Software vs. Open Source software, Public Domain Software, History : BSD, The Free Software Foundation and the GNU Project, Philosophy: Software Freedom, Open Source Development Model, Licenses and Patents, Economics of FOSS - Zero Marginal Cost, Income-generation opportunities, Problems with traditional commercial software, Internationalization.

### Unit II

**Open Source Platform and Technologies:** The Open Source Platform–Operating Systems, Windowing Systems and Desktops, GIMP, Technologies Underlying Open source Development.

### Unit III

**Linux Application:** Accessing and Running Applications–Multimedia in Linux : Listening to Audio, Playing video, Using Digital Camera, Recording music / video CDs. Publishing: Open office, Working with Graphics, Printing Documents, Displaying documents with Ghost script and Acrobat, Using Scanners driven by SANE.

### Unit IV

**PHP:** Installing and Configuring PHP, Building Blocks of PHP, Flow control functions in PHP, Working with functions, arrays, objects and forms.

### Unit V

**PHP and MySQL Integration:** Understanding the Database Design Process, Learning Basic SQL commands, Using Transactions and Stored Procedures in MySQL, Interacting with MySQL using PHP.

### REFERENCES:

1. Christopher Negus, Red Hat Linux Bible, Wiley Publishing, ISBN: 0-7645-4333-4.
2. Fadi P. Deek, James A. M. McHugh, Open Source Technology and Policy, Cambridge University Press, 2008.
3. Julie C Melonie, PHP, MySQL and Apache, Pearson Education, ISBN: 81-297-0443-9.
4. [http://en.wikibooks.org/wiki/Open\\_Source](http://en.wikibooks.org/wiki/Open_Source).

**Supportive Papers**

Suggested Code	Sem.	Title of the Paper	Hrs	Credits	Marks
18CSS01	I/II/III	Windows and MS Word	2	2	50
18CSS02		Internet and HTML Programming	2	2	50
18CSS03		Relational Database Management System	2	2	50
18CSS04		Object Oriented Programming	2	2	50
18CSS05		Software Engineering	2	2	50
18CSS06		Multimedia Systems	2	2	50

## **WINDOWS AND MS WORD**

**Number of Credits: 2**

### **UNIT I**

Getting started –about OS – types of OS – mouse handling – pull down menu selection.

### **UNIT II**

Window resizing – File manager operation – control panel operation – opening and closing files

### **UNIT III**

Editing – cut, paste – copy to clipboard – creating icon – Creating group items.

### **UNIT IV**

Introduction to common office tools and techniques – sharing information within MS Office – word basics – formatting text documents – working with header, footer and footnotes.

### **UNIT V**

Tabs – tables and sorting – graphics – templates writer tools – macros – keyboard shortcuts – means – custom toolbars.

### **REFERENCES BOOKS**

1. Microsoft Office“ 2000 by woody Leonhard
2. Using Microsoft Office“ 97 by Rick Winter and Patty Winter.

## **INTERNET AND HTML PROGRAMMING**

**Number of Credits: 2**

### **UNIT I**

Internet Basics – Origin of Internet – ARPANET – Protocol – Packet switching theory – TCP/IP address (classification), Domain name system (Concept of DNS Server) – Router.

### **UNIT II**

Routing Algorithm (just introduction) – Direct & Dial up Networking – MODEM ISP (VSNL) Services (shell & TCP/IP ACC) Up load, down load Protocols (ZMODEM, KERMIT etc)

### **UNIT III**

Email – Newsgroup – FTP – Gopher – Origin of WWW – Origin of HTML – URL –Browsers (Text & Graphics) – HTTP - Search Engines (Purpose & Facilities, Yahoo, Alta Vista Web crawler etc.

### **UNIT IV**

Archie – Veronica – Telnet – Chat – What is meant by Website Homepage. Etc.

### **UNIT V**

HTML Programming HTML – Basic Tags – Various versions of HTML – HTML forms – HTML frames – Browser (IE, Netscape communicator, Lynx (Text) Browser dependent – HTML tags.

### **REFERENCE BOOKS:**

1. Using Microsoft Office ,, 97 by Rick Winter and Patty Winter.
2. Advanced Internet for Dummies by Hohn Levine and Margaret Levine.
3. Asian Publishers Internet Concepts, problems and Solutions by Singh.

## **RELATIONAL DATABASE MANAGEMENT SYSTEMS**

**Number of Credits: 2**

### **UNIT I**

Introduction – purpose of database system data models – database languages –  
Transaction management – Storage management – DBA – database users – system  
structure

### **UNIT II**

E-R model – Hierarchical model – Network Model.

### **UNIT III**

Structure of Relational databases – Relational Commercial Languages SQL – Integrity  
Constraints.

### **UNIT IV**

Normalization – Indexing and Hashing

### **UNIT V**

Query Processing – Concurrency Control – Security

### **TEXT BOOKS:**

1. Abraham Silberchatz, Henry K.Forth, Sudharshan, “Database system Concepts” – (3<sup>rd</sup> edition) McGraw Hill.
2. Elisa Bettino, “Object Oriented Databases”, Addison Wesley.

### **REFERENCE**

1. Navethe/Elmasri,” Fundamentals of Database Systems”, Addition Wesley, 1994



## **OBJECT ORIENTED PROGRAMMING**

**Number of Credits: 2**

### **UNIT I**

Drawback of structured programming – object oriented language characteristics and fundamentals – programming basics.

### **UNIT II**

Loops, decisions – structures and functions – object and classes.

### **UNIT III**

Overloading – Inheritance – Polymorphism

### **UNIT IV**

Files – Streams – Templates

### **UNIT V**

Exception handling – String handling

### **TEXT BOOKS**

1. Strongstrup, “The C++ Programming Languages”, (3<sup>rd</sup> edition) AW

### **REFERENCE**

1. Robert Lafore, “Object Oriented Programming in Turbo C++,” Galgotha publications Ltd 1996

## **SOFTWARE ENGINEERING**

**Number of Credits: 2**

### **UNIT I**

Introductions: Evolving role of software – Software characteristics, components and its applications – Generic view of software engineering – Software process models.

### **UNIT II**

Systems Analysis: Requirements analysis – Analysis principles – Prototyping Software requirement specification – Data modeling, functional modeling and behavioral modeling.

### **UNIT III**

Design concepts: Design and software quality, Design concepts: Abstraction, refinement, modularity, and software architecture control hierarchy structural partitioning and information hiding, Effective modular design: functional independence, cohesion and coupling – design documentation.

### **UNIT IV**

Design Methods: Data design – Architectural design process: transform mapping and transaction mapping – interface design – procedural design. Design for Real – Time Systems: System considerations  
– Real time systems – analysis and simulation of real time systems.

### **UNIT V**

Software Testing Methods: Software testing fundamentals. White box testing: basis path testing and control structure testing – black box testing – testing for specialized environments. Software Testing Strategies: A strategic approach to software testing – unit testing – Integration testing – Validation testing  
– System Testing.

### **TEXT BOOK:**

1. R.S.Pressman "Software Engineering", (5<sup>th</sup> edition) Tata McGraw Hill, 1997.

## **MULTIMEDIA SYSTEMS**

**Number of Credits: 2**

### **UNIT I**

Multimedia in use and technology Introducing Multimedia – Multimedia definition need, benefits and problems – system components – Multimedia platforms – development tools – types – cross platform compatibility – commercial tools – standards.

### **UNIT II**

Media type Non temporal – text image, graphics, Temporal – analog, digital audio/video, music animation, other media types – Extended Images, digital ink, speech audio.

### **UNIT III**

Digital video and Image compression – Evaluating an compression system – Redundancy and visibility

### **UNIT IV**

Video compression Techniques – Image Compression Standards – JPEG, MPEG, DVI

### **UNIT V**

Applications – Media in real world – Multimedia and single user – Multimedia on networks – Training and education.

### **TEXT BOOKS:**

1. Judith Jeffcott, MULTIMEDIA IN PRACTICE Technology and Application chapters: 1,2,3,12,13 printice Hall, 1995
2. Simon J Bibbs&DionysionC.Tsichrikzis. MULTIMEDIA PROGRAMMING chapters : 2,3,4,5, Addison Wesley, 1994
3. MULTIMEDIA SYSTEMS – John F.Koegel Buford, Addison Wesley 1994