

**Swami Ramanand Teerth Marathwada University, Dyanteerth, Nanded**

Teaching and Examination Scheme for  
**Final Year UG program in Computer Science & Engineering**  
 (w.e.f. Academic Year 2011-12)

**Semester - VII**

Sr. No.	SUBJECT	TEACHING SCHEME (Hrs / Week)		EXAMINATION SCHEME				
		Lect.	Pract.	Paper	T/W	Test	Pract & Oral	Total Marks
1	Software Engineering	4	----	80	--	20	---	100
2	Data Mining and Data Warehousing	4	----	80	--	20	---	100
3	Web Technologies	4	----	80	--	20	---	100
4	Grid and Cloud Computing	4	----	80	--	20	---	100
5	Elective I	4	----	80	---	20	----	100
6	Software Engineering Lab	--	2	---	25	--	25	50
7	Programming Lab-III	--	2	---	25	--	25	50
8	Web Technologies Lab	2	4	--	25	--	25	50
9	Project I		4	--	50	--	50	100
	<b>Total</b>	<b>22</b>	<b>12</b>	<b>400</b>	<b>125</b>	<b>100</b>	<b>125</b>	<b>750</b>
	<b>Total of Part I</b>	<b>34 Hrs</b>		<b>750</b>				

<b>Elective I</b>
IT Project Management
Digital Signal Processing
Information Retrieval
Human Computer Interaction
Soft Computing

### Semester - VIII

Sr No.	SUBJECT	TEACHING SCHEME Hours / week		EXAMINATION SCHEME				
		Lect	Pract	Paper	T/W	Test	Pract & Oral	Total Marks
1	Mobile Computing	4	--	80	---	20	---	100
2	Advanced Computer Architecture	4	---	80	--	20		100
3	Cryptography and Network Security	4	---	80	---	20	---	100
4	Elective II	4	2	80	25	20	25	150
5	Open Source Technology Lab	2	2	--	25	--	50	75
7	Programming Lab-IV	--	2	--	25	--	50	75
8	Project-II	--	4	--	50	--	100	150
	<b>Total</b>	<b>22</b>	<b>10</b>	<b>320</b>	<b>125</b>	<b>80</b>	<b>225</b>	<b>750</b>
	<b>Total of Part II</b>	<b>32 Hrs</b>		<b>750</b>				
	<b>Grand Total</b>			<b>1500</b>				

<b>Elective II</b>
Software Testing and Quality Assurance [STQA]
Digital Image Processing
Machine Learning
Distributed Computing
Business Intelligence

**Final Year U.G. Program in Computer Science & Engineering (2011-12)**  
**SEMESTER – VII**

<b>Software Engineering</b>
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<b>Teaching Scheme</b>	<b>L: 4</b>		
<b>Evaluation Scheme</b>	<b>Theory</b>	<b>Test</b>	<b>Minimum Passing Marks</b>
	80 Marks	20 Marks	40%

**Course Objectives**

- To learn the concepts of Software Engineering.
- To understand Software Development Life Cycle.
- To know design & testing principles of software project development.
- To learn and understand the project management and analysis principles of software project development.

**Course Contents**

**Unit I: Introduction to Software Engineering** **(Hrs 07)**

Nature of Software, Software Process, Software Engineering Practice, software Myths, Generic Process model, Process Models: Waterfall Model, Incremental Models, Evolutionary Models, Concurrent, Specialized Process Models, Personal and Team Process Models, Agile Process Models: Agile process, extreme programming.

**Unit II: Requirements Engineering** **(Hrs 06)**

Requirements Engineering, Initiating the process, Eliciting Requirements, Building the Requirements Model, Negotiating, Validating requirements, Requirements Analysis, Scenario-Based Analysis, Requirements Modeling strategies, Flow-Oriented Modeling, Class based modeling, SRS.

**Unit III: Design Engineering** **(Hrs 07)**

Design Process, Design Concepts, The Design Model: Data Design, Architectural, interface Design Elements. Architectural Design: Software Architecture, Architectural Styles, Architectural Design, User Interface Design: Rules, User Interface Analysis and Design, Applying Interface Design Steps, Issues, and Web App Interface Design Principles.

**Unit IV: Testing** **(Hrs 06)**

**Testing Strategies:** A Strategic approach to Software Testing, Strategic Issues, Testing Strategy for Conventional Software and Object-Oriented Software, Testing strategies for Web App, Validation Testing, System Testing, Validation and Verification, Debugging.

**Testing Tactics:** Testing Fundamentals, White Box Testing: Basis Path Testing, Control Structure Testing, Black Box Testing.

**Unit V: Project Management Concepts****(Hrs 07)**

Management Spectrum, people, product, process, project, critical practices, Process and project Metrics: Metrics in process and project domains, software measurement metrics for software quality, Estimation for software project: project planning process, software scope and feasibility, resources, Decomposition Techniques, Empirical Estimation Models, Estimation Empirical, Estimation for Object Oriented project ,Specialized Estimation techniques, Make by decision.

**Unit VI: Project Planning****(Hrs 07)**

Risk Management: Reactive versus proactive Software Risk, Risk Identification, risk projection, risk refinement, risk mitigation, monitoring & management, The RMMM plan. Project Scheduling: Task set for Software project, defining a task network, scheduling, earned value analysis, Product Metrics: A framework for product metrics, Software Quality: Software Quality Factors, Software configuration management: software configuration management, the SCM repository, SCM process.

**Text Books:**

1. Pressman R., "Software Engineering, A Practitioners Approach", 7<sup>th</sup> Edition, Tata McGraw Hill Publication, 2010, (ISBN: 978-007-126782-3)

**Reference Books:**

1. Sommerville "Software Engineering" 8<sup>th</sup> Ed, Pearson Edu., 2006, (ISBN-10:321313798)
2. Pankaj Jalote "An Integrated Approach to Software Engineering", 3<sup>rd</sup> Edition, Springer, 2005 (ISBN: 038720881X)
3. Mall R., "Fundamentals of Software Engineering", 2<sup>nd</sup> Edition, Prentice Hall India, 2004, (ISBN: 9788120338197)
4. Vliet H., "Software Engineering Principles and Practices", 2<sup>nd</sup> Edition, John Wiley & Sons, 2000, (ISBN-10: 0471975087)

**Final Year U.G. Program in Computer Science & Engineering (2011-12)****Data Mining and Data Warehousing**

<b>Teaching Scheme</b>	<b>L: 4</b>		
<b>Evaluation Scheme</b>	<b>Theory</b>	<b>Test</b>	<b>Minimum Passing Marks</b>
	80 Marks	20 Marks	40%

**Course Objectives**

1. To understand the process of data mining and the key steps involved well enough to lead/manage a real-life data mining project.
2. Know the basics of data warehousing and how it facilitates data mining.
3. To understand fundamental issues in statistical data analysis that cut across all procedures, such as generalization to other data, basic tradeoffs, and validity of models. To deliver an overview of web data mining and other significant mining techniques

## **Course Contents**

### **Unit I (Hrs 7)**

Data warehousing fundamentals: Definition and problems in DSS, Definition of Data warehouse (by Bill Inmon), Use of Data warehouse. DSS vs Data warehouse. Difference between OLTP and Data Warehouse, Data cube and OLAP, Concept hierarchies: total and partial, Set-grouping hierarchies.

### **Unit II (Hrs 6)**

OLAP operations: drill-down, Roll-up and extreme Roll-up, slice-dice and pivot. Difference between OLAP and OLTP operations, Star-net model, Models of Data warehouse: Enterprise Warehouse, Data Mart, and Virtual Warehouse.

### **Unit III (Hrs 7)**

Data warehouse general architecture: Issues in building data warehouse, Data warehouse design views, 3-tier data warehouse architecture, ROLAP, MOLAP and HOLAP, Data warehouse schemas: Fact table, Dimension table, Star, Snowflake, Fact constellation, Their comparison, Warehousing internal storage: Dimensional modeling and normalized approach, Meta data, Data staging.

### **Unit IV (Hrs 6)**

Introduction to Data mining: Data mining primitives, Techniques: Clustering, Classification, Association rules, Linear and multiple regression, Feature selection, Introduction to Mining text databases and multimedia databases.

### **Unit V (Hrs 7)**

Classification: Decision tree classifier, Neural network classification, KNN classifier, Fuzzy set approach, Fuzzy-neuro classifier, Classifier accuracy.

### **Unit VI (Hrs 7)**

Clustering: k-means clustering, Outlier analysis, Performance evaluation, Fuzzy neuro-clustering. Interesting item set mining: Item set association, A priori algorithm.

### **Text Books:**

1. Jiawei Han and Micheline Kamber “ Data mining : concepts and techniques”, Kaufman,2001. ISBN: 978-1-55860-901-3
2. Kimball, “Data warehouse life cycle toolkit”, John Wiley,1998,ISBN : 978-0-471-25547-5

### **Reference Books:**

1. T. Mitchell., “Machine Learning”, McGraw-Hill, 1997. ISBN 0070428077
2. Hand, Smyth, Mannila, “Principles of Data mining”, MIT press, ISBN: 026208290x
3. Abraham Silberschatz, Henry F. Korth, S. Sudarshan, “Database Systems Concepts”, 5th Edition, McGraw-Hill,2005. ISBN: 9780073523323

4. Gagendra Sharma , “Data mining, Data warehousing and OLAP”, S.K. Kataria and Sons, First edition, 2007-08. ISBN 13: 9788189757472

**Final Year U.G. Program in Computer Science & Engineering (2011-12)**

<b>Web Technologies</b>
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<b>Teaching Scheme</b>	<b>L: 4</b>		
<b>Evaluation Scheme</b>	<b>Theory</b>	<b>Test</b>	<b>Minimum Passing Marks</b>
	80 Marks	20 Marks	40%

**Course Objectives:**

- Designing and Developing Thread-safe Servlets and managing the sessions in web applications.
- Understanding the Java Server Pages (JSP) Technology Model, authenticating the web clients and interacting with databases with Servlets and JSPs.
- To study the critical elements of XML.
- Learning the concepts of tag libraries, custom tags and JSTL.
- Dealing with state-of-the-art Struts/Model View Controller Architecture.

**Course Contents**

**Unit I: Java Servlets** **(Hrs 6)**  
 Servlet-architecture, Servlet and HTTPServlet interface, Servlet deployment, Request processing, Response generation, Servlet configuration, ServletContext.

**Unit II: Developing Web Applications Using Servlets** **(Hrs 7)**  
 Handling sessions using HttpSession, Using cookies and using hidden form fields, Servlet service management, Using filters, and Integrating web applications with database.

**Unit III: Fundamentals of Java Server Pages** **(Hrs 6)**  
 JSP basics, JSP translation and compilation directives, JSP scripting elements, Java abstraction of JSP, Standard Java objects from JSP, Standard Java action from JSP.

**Unit IV: Developing Java Server Pages:** **(Hrs 7)**  
 JSP configuration and deployment, Custom Java actions and custom tags from JSP, JSTL, Session management in JSP, MVC architecture.

**Unit V: An XML Primer** **(Hrs 7)**  
 History of XML, Benefits of XML, Components of XML, Parsing XML: parsing methodologies, SAX API, The Java API for XML parsing (JAXP), Alternative parsers, Invocation of Web services using JAX-WS (Java API for XML Web Services).

**Unit VI: AJAX and Introduction to Struts****(Hrs 7)**

Introduction to AJAX, HTML & CSS, The XMLHttpRequest and XMLHttpRequest object, Web application development using AJAX, Introduction to struts, Action form and action classes, Struts architecture.

**Text Books:**

1. Paul J. Perrone, Venkata S. R. Krishna and R. Chaganti, "Building Java Enterprise System with J2EE", SAMS Publication, 2000, ISBN-13: 978-0-672-31795-8.
2. Bruce W. Perry, "Java Servlet and JSP Cookbook", by O'Reilly Publications, 2005, ISBN-81-7366-822-1.
3. Ann Navamro, Chuck White, Linda Barman, "Mastering XML", BPB publications, 2000, ISBN-81-76-56-191-6.
4. Rebecca Riordan, "Head First Ajax", 2010, by O'Reilly Publication, ISBN-9780596515782.

**Reference Books :**

1. Daconta and Saganich, "XML Development with Java 2", Sams Techmedia Publications, ISBN-13: 9788176355018.
2. Marty Hall, Larry Brown, Yaakov Chaikin, "Core Servlets and Java Server Pages", Pearson Education, 2008, Volume-2, ISBN-978-81-317-2054-7.
3. Tom Negrino and Dori Smith's, "Javascript and Ajax", Seventh Edition, Pearson Education, 2011, ISBN-978-81-317-3486-5.
4. Chuck Cavaness, "Programming Jakarta Struts", O'Reilly Media Publishers, 2004, ISBN:978-0-596-00328-9.

**Final Year U.G. Program in Computer Science & Engineering (2011-12)****Grid and Cloud Computing**

<b>Teaching Scheme</b>	<b>L : 4</b>		
<b>Evaluation Scheme</b>	<b>Theory</b>	<b>Test</b>	<b>Minimum Passing Marks</b>
	80 Marks	20 Marks	40%

**Course Objectives**

1. To understand the concept of grid and cloud computing.
2. To know the various applications of grid and cloud computing.

**Course Contents****Unit I: Introduction****(Hrs 10)**

The Grid - Past, Present, Future, A New Infrastructure for 21st Century Science- The Evolution of the Grid - Grids and Grid Technologies, Programming models - A Look at a Grid Enabled Server and Parallelization Techniques – Grid applications

**Unit II: Anatomy of the Grid** (Hrs 09)

The concept of virtual organizations–Grid architecture–Grid architecture and relationship to other Distributed Technologies–computational and data Grids, Semantic grids, Open grid services architecture, Open grid services infrastructure.

**Unit III: Cloud Computing Introduction** (Hrs 07)

Cloud Computing Introduction, From collaboration to cloud, Working of cloud computing, Pros and cons, Benefits, Developing cloud computing services, Cloud service development, Discovering cloud services

**Unit IV: Cloud Computing for Everyone** (Hrs 07)

Centralizing email communications, Cloud computing for community, Collaborating on schedules, Collaborating on group projects and events, Cloud computing for corporation, Mapping schedules, Managing projects, Presenting

**Unit V: Using Cloud Services** (Hrs 07)

Collaborating on calendars, Schedules and task management, Exploring on line scheduling and planning, Collaborating on event management, Collaborating on contact management, Collaborating on project management, Collaborating on word processing, Spreadsheets, and Databases.

**Unit VI: Outside the Cloud** (Hrs 05)

Evaluating web mail services, Evaluating instant messaging, Evaluating web conference tools, Creating groups on social networks, Evaluating on line Groupware, Collaborating via blogs and wikis.

**Text Books:**

1. Fran Bernm, Geoffrey Fox, Anthony Hey J.G., “Grid Computing: Making the Global Infrastructure a Reality”, Wiley, USA, 2003.
2. Joshy Joseph, Craig Fallenstein, “Grid Computing”, Pearson Education, New Delhi, ISBN-978-81-317-0885-9.
3. Michael Miller, “ Cloud Computing”, Pearson Education, New Delhi, ISBN-978-81-317-2533-7.

**Reference Books:**

1. Ian Foster, Carl Kesselman, “The Grid2: Blueprint for a New Computing Infrastructure” Morgan Kaufman, New Delhi, 2004.
2. Ahmar Abbas, “Grid Computing: Practical Guide to Technology and Applications”, Delmar Thomson Learning, USA, 2004.
3. Gautam Shroff, “ Enterprise Cloud Computing-Technology, Architecture, Applications” Cambridge University Press, ISBN-9781107648890.
4. Roger Jennings, “Cloud Computing with the Windows Azure Platform”, Wiley.
5. Moyer, ‘ Building Applications in Cloud: Concepts, Patterns and Projects’ Pearson Edu.



## Final Year UG program in Computer Science & Engineering (2011-12)

### Elective I: IT Project Management

<b>Teaching Scheme</b>	<b>L : 4</b>		
<b>Evaluation Scheme</b>	<b>Theory</b>	<b>Test</b>	<b>Minimum Passing Marks</b>
	80 Marks	20 Marks	40%

#### Course Objectives:

- At the end of the course, the student should get familiarize with the characteristics of a project, project management principles, risk in environment and the management challenges for effective project management.
- To understand and use the project management principles across all phases of a project. They will be able to demonstrate competency in the management of a project plan, especially in monitor and controlling a project schedule and budget, tracking project progress.
- To understand how to work as team member and as individual without affecting the quality of project.

#### Course Contents

##### **Unit I: An overview of IT Project Management (Hrs 08)**

Introduction, The state of IT project management, Context of project management, Need of project management, Project goals, Project life cycle and IT development, Extreme project management, PMBOK. Conceptualizing and Initializing the IT Project: An information technology project methodology (ITPM), Project feasibility, Request for proposal (RFP), The business case, Project selection and approval, Project contracting, IT governance and the project office.

##### **Unit II: The Human Side of Project Management (Hrs 07)**

Introduction, Organization and project planning, The project team, The project environment, Developing the Project Charter and Project Plan: Introduction, Project management process, Project integration management, The project charter, Project planning framework, The contents of a project plan, The planning process, The Work Breakdown Structure (WBS), The linear responsibility chart, Multidisciplinary teams

##### **Unit III: The Scope Management Plan (Hrs 08)**

Introduction, Scope planning, Project scope definition, Project scope verification, Scope change control, The Project's Schedule, Budget and Risk Management: Introduction, Developing the project schedule, Project management software tools, Methods of budgeting, Developing the project budget, Improving cost estimates, Finalizing the project schedule and budget. IT project risk management planning process, Identifying IT project risks, Risk analysis and assessment, Risk strategies, Risk monitoring and control, Risk responses and evaluation.

**Unit IV: Allocating Resources to the Project (Hrs 08)**

Resource loading, Resource leveling, Allocating scarce resources to projects and several projects, Goldratt's critical chain. The Project Communication Plan: Introduction, Monitoring and controlling the project, The project communications plan, Project metric, Project control, Designing the control system, The plan-monitor-control cycle, Data collection and reporting, Reporting performance and progress, Information distribution.

**Unit V: Managing Change, Resistance and Conflicts (Hrs 05)**

Introduction, The nature of change, The change management plan, Dealing with resistance and conflicts. Managing Project Procurement and Outsourcing: Introduction, Project procurement management, Outsourcing.

**Unit VI: Project Leadership and Ethics (Hrs 04)**

Introduction, Project leadership, Ethics in projects, Multicultural projects. The Implementation Plan and Project Closure: Introduction, Project implementation, Administrative closure, Project evaluation, Project audit.

**Text Books:**

1. Jack T. Marchewka "Information Technology Project Management", 3<sup>rd</sup> Edition, Wiley India, 2009.
2. Pankaj Jalote, "Software Project Management in Practice", Pearson Education, ISBN-978-81-7758-857-6.

**Reference Books:**

1. S. J. Mantel, J. R. Meredith, "Project Management" 1<sup>st</sup> edition, Wiley India, 2009.
2. John M. Nicholas, "Project Management for Business and Technology", 2nd Edition, Pearson Education.
3. Joel Henry, "Software Project Management, A Real-world Guide to Success", Pearson Education, 2008.
4. Hughes and Cornell, "Software Project Management", 3rd edition, Tata McGraw Hill.
5. Joseph Phillips, "IT Project Management", Second edition, Tata McGraw Hill.
6. Robert K. Wyzocki and Rudd McGary, "Effective Project Management", 3rd edition, Wiley

**Final Year U.G. Program in Computer Science & Engineering (2011-12)**

**Elective I: Digital Signal Processing**

<b>Teaching Scheme</b>	<b>L : 4</b>		
<b>Evaluation Scheme</b>	<b>Theory</b>	<b>Test</b>	<b>Minimum Passing Marks</b>
	80 Marks	20 Marks	40%

**Course Objectives**

1. To study concepts of signal processing in detail.

2. To study the operations performed on discrete signals and to provide details of the fundamentals of digital signal processing.

**Unit I: Introduction to Discrete Time Systems (Hrs 05)**

Time linear system, Sequences, Arbitrary sequences, Linear time invariant system, Causality, Stability. Difference equation, Relation between continuous and discrete system. Classifications of sequence, Recursive and non-recursive system.

**Unit II: Mathematical Operations on Discrete Sequences (Hrs 05)**

Convolution, Graphical and analytical techniques, Overlap and add methods, Matrix method, Some examples and solutions of LTI systems.

**Unit III: Z – Transform (Hrs 05)**

Definition, Relation between Z transform and Fourier transform of a sequence properties of Z transform, Mapping between S-plane and Z-plane. Unit circle, Convergence and ROC, Inverse Z-transform.

**Unit IV: Discrete Fourier Transform (Hrs 10)**

Discrete Fourier Transform: Definition, Inverse discrete Fourier Transform (IDFT) Twiddle factor, Linear transformation, Basic properties, Circular convolution, Multiplication of DFT. Computation of DFT. Fast Fourier Transform (FFT), FFT algorithm. Decimation-in-time and Decimation-in-frequency algorithm.

**Unit V: IIR Filters (Hrs 8)**

Design of IIR (Infinite Impulse Response) filters from analog filters, Bilinear transformation, Butterworth, Chebyshev, Optimisation method of IIR filters. Principle of digital filter realization, Structures of all-zero filters.

**Unit VI: FIR Filters (Hrs 07)**

Design of FIR (Finite impulse response) filters, Linear phase, Windows-rectangular, Bartlett, Hanning, Hamming and Blackman.

**Text Books:**

1. Proakis, John G., Manolakis, Dimitris G. “Digital Signal Processing, Principles, Algorithms and Applications – 4/E”, Prentice Hall of India, ISBN - 0131873741.
2. E. Ifaechor “Digital Signal Processing: A Practical Approach, 2/E”, Prentice Hall, ISBN - 0201596199.
3. Johnny R. Johnson “Introduction to Digital Signal Processing”, Tata McGraw Hill (India), ISBN - 9788120307605.

**Reference Books:**

1. S. K. Mitra, “Digital Signal Processing – A Computer Based Approach – 3/E”, Tata McGraw Hill, ISBN - 0072865466.
2. S. Salivahan, “Digital Signal Processing”, Tata McGraw Hill, ISBN - 9780070669246.
3. V. K. Ingle, John G. Proakis, “Digital Signal Processing using MATLAB”, Vikas Publishing House Pvt. Ltd., ISBN - 9812402152.

## Final Year U.G. Program in Computer Science & Engineering (2011-12)

### Elective I: Information Retrieval

<b>Teaching Scheme</b>	<b>L : 4</b>		
<b>Evaluation Scheme</b>	<b>Theory</b>	<b>Test</b>	<b>Minimum Passing Marks</b>
	80 Marks	20 Marks	40%

#### Course Objectives

1. To understand the basics of information storage and retrieval techniques.
2. To understand different modeling and indexing techniques
3. To know about text and multimedia retrieval searching and matching techniques

#### Course Contents

##### Unit I Introduction (Hrs 06)

Introduction to information retrieval, Basic concepts, The retrieval process, Modeling, A taxonomy of IR models, Classic information retrieval, Set theoretic model, Algebraic model, Probabilistic model, structured text retrieval models, Models for browsing.

##### Unit II Retrieval Performance Evaluation (Hrs 07)

Retrieval performance evaluation, Query languages, keyword based querying, Pattern matching, Structural queries, Query processing and operation: Keyword based querying, pattern matching, structural queries, user relevance feedback, automatic local and global analysis.

##### Unit III Text and Multimedia Formats (Hrs 07)

Text and multimedia formats, Information theory, Modeling natural language, Similarity models, Markup languages, Text operations, Document preprocessing and clustering, Text compression.

##### Unit V Indexing and Searching (Hrs 06)

Indexing and searching, Inverted files, Suffix trees and suffix arrays, Signature files, Boolean queries, Sequential searching, Pattern matching. Multimedia IR: Models and languages, Data modeling, Query languages.

##### Unit V Multimedia IR (Hrs 07)

Indexing and searching, Spatial access methods, A generic multimedia indexing approach, One dimensional time series, Two dimensional color images, Image features and distance function, Automatic feature extraction, Image and video retrieval.

##### Unit VI Searching the Web (Hrs 07)

Searching the web, Characterizing the web, Search engines, Browsing, Finding the needle in the haystack, Searching using hyperlinks, Digital libraries, Architectural issues, Document models, representations, and access.

**Text Books:**

1. Richardo Baeza-Yates, Berthier ribeiro-Neto, "Modern information retrieval", Pearson Education, First edition, ISBN 81-297-0274-6
2. Robert R Korfhage, 'Information storage and retrieval', Willey India, ISBN 81-265-0770-5

**Reference Books:**

1. Gerald Kowalski, Mark T. Maybury, "Information Storage and Retrieval System – Theory and Implementation," Second Edition, Kluwer academic publisher ISBN-0-7923-7924-1
2. Charlres T. Medow, Donald H. Craft, 'Text information retrieval system' Emerald group publishing, 3<sup>rd</sup> edition, ISBN:0-12-369412-4
3. Oge Marques, Borko Furht, 'Content based image and video retrieval ' Kluwer Academic Publishers ISBN:1-4020-7004-7

**Final Year U.G. Program in Computer Science & Engineering (2011-12)****Elective I: Human Computer Interaction****Teaching Scheme L : 4**

<b>Evaluation Scheme</b>	<b>Theory</b>	<b>Test</b>	<b>Minimum Passing Marks</b>
	80 Marks	20 Marks	40%

**Course Objectives**

- To provide the future user interface designer with concepts and strategies for making design decisions.
- To expose the future user interface designer to tools, techniques, and ideas for interface design.
- To stress the importance of good user interface design

**Course Contents****Unit I****(8 Hrs)**

The human – Introduction, Input-output channels, Human memory, Thinking, Emotion, Individual differences, Psychology and the design of interactive system.

The computer – Introduction, Text entry devices, Positioning, Pointing and drawing, Display devices for virtual reality and 3D animation, Physical controls, Sensors and special devices, Paper: printing and scanning, Memory and processing and networks

**Unit II****(5 Hrs)**

The interaction – models of interaction, Framework and HCI, Ergonomics, Interaction style, Elements of the WIMP interface, Interactivity, Context of the interaction, Experience, engagement and fun.

Paradigms – paradigm for interaction.

Interaction design basics – what is design, Process of design, User focus and scenarios, Navigation design, Screen design layouts, Interaction and prototyping.

**Unit III****(8 Hrs)**

HCI in the software process – software life cycle, Usability engineering, Interactive design and prototyping design rationale.

Design rules - principles to support usability, Standards and guidelines, Golden rules and heuristics, HCI patterns.

**Unit IV****(8 Hrs)**

Implementation support – elements of windowing systems, Programming the application, Using toolkit, User interface systems.

Evaluation techniques – What is evaluation?, Guidelines, Evaluation through expert analysis and user participation, Selecting evaluation method.

**Unit V****(5 Hrs)**

Universal design – universal design principles, Multi-modal interaction, Designing for diversity

User support – requirement and approaches of user support, Adaptive help systems, Designing user support systems.

**Unit VI****(6 Hrs)**

Cognitive model – Goal and task hierarchies, Linguistic model challenge of display based systems, Physical and device models, and Cognitive architectures.

**Text Books :**

1. “Human – computer Interaction”, Alan Dix, Janet Finlay, Gregory D. Abowd, Rusell Beale, 3<sup>rd</sup> Edition, Pearson Education Limited, 2011, ISBN 978-81-317-1703-5.
2. “User Interface Design”, Soren Lausen, Pearson Education Limited 2005, ISBN 0-321-18143-3.

**References:**

1. “Interaction Design”, Prece, Rogers, Sharps, Wiley Dreamtech,
2. The Essential Guide to User Interface Design, 3<sup>rd</sup> edition (2007) Wiley, Wilbert O. Galitz, ISBN: 978 -0-470-05342-3.
3. Designing the user interface. 3<sup>rd</sup> Edition Ben Shneidermann , Pearson Education Asia.

## Final Year U.G. Program in Computer Science & Engineering (2011-12)

### Elective I: Soft Computing

<b>Teaching Scheme</b>	<b>L : 4</b>		
<b>Evaluation Scheme</b>	<b>Theory</b>	<b>Test</b>	<b>Minimum Passing Marks</b>
	80 Marks	20 Marks	40%

#### Course Objectives

1. Covers basic concepts of artificial neural networks, fuzzy logic systems and their applications.
2. Focusing on the algorithm formulation and application of the techniques for real life problems.

#### Course Contents

##### Unit I (Hrs 08)

Introduction: Biological neurons, McCulloch and pitts models of neuron, Types of activation function, Network architecture, Knowledge representation, Learning Process: Error correction learning, Supervised learning, Unsupervised learning, Learning rules.

##### Unit II (Hrs 05)

Single layer Perception: Perceptron converges theorem, Method of steepest Descent – least mean square algorithm.

##### Unit III (Hrs 06)

Multi layer Perceptron: Derivation of the Backpropagation algorithm, Learning factors.

##### Unit IV (Hrs 10)

Radial Basis and Recurrent Neural Networks: RBF networks structure, Theorem and the reparability of patterns, RBF Learning Strategies, K means and LMS Algorithms, Comparison of RBF and MLP Networks, Hope Field Networks, Energy Functions, Spurious States, Error performance.

##### Unit V (Hrs 05)

Simulated Annealing: The Boltzmann Machine, Boltzmann Learning rule, Bidirectional associative memory.

##### Unit VI (Hrs 06)

Fuzzy Logic : Fuzzy sets, properties, Operations on Fuzzy sets, Fuzzy relations, Operation some Fuzzy Relations, The Extension Principle, Fuzzy measures, Membership Functions, Fuzzification and deFuzzification methods, Fuzzy Controllers.

#### Text Books :

1. Simin Haykin, “Neural Network a – Comprehensive Foundation”, Pearson Education, ISBN 0138958637

2. Zurda J.M., “ Introduction to Artificial Neural Systems”, Jaico Publishers, ISBN – 13:9788172246501
3. Timothy J. Ross, “ Fuzzy Logic With Engineering Applications”, McGraw Hill.

**Reference Books :**

1. Yegnanarayana B., “Artificial Neural Network”, PHI
2. Drinkov D., Helloendoorn H. and Reinfrank M., “ Fuzzy Systems Desings Principle”, IEEE Press.

**Final Year U.G. Program in Computer Science & Engineering (2011-12)**

<b>Software Engineering Lab</b>
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<b>Teaching Scheme</b>	<b>P: 2</b>		
<b>Evaluation Scheme</b>	<b>Term Work</b>	<b>Pract</b>	<b>Minimum Passing Marks</b>
	25 Marks	25 Marks	40%

**Term Work:**

- Instructor will frame experiments based on the suggested experiments using MS-project/Rational Rose as given below. Instructors are expected to incorporate variations in the lists.
- Student will submit the Term Work in the form of a journal that will include implementation of each part with at least one target system. Each experiment will consist of proper documentation and printout of the output.
- Practical Examination will consist of performance and Viva-voce Examination on the term work.

The assessment will be based on the following:

1. Performance in the practical examination.
2. Record of programs submitted by the candidate.
3. Setting goals higher than expected from problem statement.
4. Innovation & creativity.
5. Team building skills.
6. Technical writing skills.

**Suggested List of Assignments:**

**PART A**

- A) Draw following UML diagrams for a target system such as Library management system, Railway Reservation system, student registration for a course, Airline reservation system, payroll management system etc.
  1. Use Case Diagram
  2. Class Diagram



3. Sequence Diagram
4. Collaboration Diagram
5. Activity Diagram
6. Object Diagram
7. Component Diagram
8. Deployment Diagram

B) Draw Data Flow Diagram for a target system such as Library management system, Railway Reservation system, student registration for a course, Airline reservation system, payroll management system etc.

C) Draw E-R Diagram for a target system such as Library management system, Railway Reservation system, Student registration for a course, Airline reservation system, Payroll management system etc.

## **PART B**

Group of two students should take a case study and perform the software development life cycle (SDLC) phases on it. The record or journal should consist of proper documentation for each phase carried out. Students can take their PROJECT PART-I as a case study or any other case study approved by the instructor.

### **Final Year U.G. Program in Computer Science & Engineering (2011-12)**

<b>Programming Lab III</b>
----------------------------

<b>Teaching Scheme</b>	<b>P: 2</b>		
<b>Evaluation Scheme</b>	<b>Term Work</b>	<b>Pract</b>	<b>Minimum Passing Marks</b>
	25 Marks	25 Marks	40%

#### **Term Work:**

- Instructor should frame experiments based on the below given suggested list of experiments using C/C++/JAVA. Instructors are expected to incorporate variations in the lists.
- The Term Work will include at least 6-8 programming assignment or a mini-project in Data mining and data warehousing and at least 2-3 programming assignment from Grid computing and 4-5 programming assignments from cloud computing or a mini-project covering the features of grid and cloud computing. Each assignment will consists of pseudo-algorithm, program listing with proper documentation and printout of the output.
- Practical Examination will consist of performance and Viva-voce Examination on the term work.

The assessment will be based on the following:

1. Performance in the practical examination.
2. Record of programs submitted by the candidate.
3. Setting goals higher than expected from problem statement.
4. Innovation & creativity.
5. Team building skills.
6. Technical writing skills.

### **Suggested List of Assignments:**

Term work shall consist of at least 6-8 programming assignments of Data mining and data warehousing or a mini-project and at least 2-3 programming assignments of Grid computing and at least 4-5 programming assignments of Cloud computing from the list given below or a mini-project using Grid and cloud computing concepts.

### **Suggested List of Programming Assignments of Data mining and Data warehousing**

1. Implementation of OLAP queries
2. Implementation of cube operator in OLAP queries in data warehousing.
3. Implement decision tree of data mining problem
4. Implement a priori algorithm in data mining
5. Implement view modification and materialization in data warehousing.
6. Design and build a Data Warehouse using bottom up approach titled 'Citizen Information System'
7. Load data from heterogeneous sources including text files into a pre-defined warehouse schema.
8. Develop an application to implement OLAP, roll-up, drill-down, slice, and dice operations.
9. Students can learn to use WEKA open source data mining tool and run data mining algorithms on datasets.
10. Program for Classification – Decision tree, Naïve Bayes using languages like JAVA
11. Program for Clustering – K-means using languages like JAVA/C/C++.
12. Program for Association Mining using languages like JAVA/C/C++.
13. Web mining
14. DM projects: any one of Balanced Scorecard, Fraud detection, Market Segmentation etc.
15. Using any commercial DM tool like SQLServer 2008, Oracle BI, SPSS, Clementine, and XLMiner, etc.

### **Suggested List of Programming Assignments of Grid Computing**

1. Study Globus GT4 or GT3 Toolkit.
2. Build a web portal with MyProxy and a portal engine. Integrate with a few of web and grid services provided by the GT4 or GT3 teams.
3. Build a small application using the latest Web Services and Grid protocols.
4. Globus Toolkit version 4 provides a hosting environment for grid services. Build your own grid service and deploy it inside the Globus GT3 or GT4 Toolkit container.

(For example, a stock quote service that notifies a client watchdog, that will buy more stock based on the rate of change in the share prices, but only if the client still has enough funds in the back. When the amount exceeds a threshold, have the higher-level service notify the person by e-mail. )

### **Suggested List of Programming Assignments of Cloud Computing**

1. Configuration of Private cloud using open source technology.
2. Working with Amazon Elastic compute cloud (EC2)/ Goggles APP engine/ Microsoft Azure/Virtual Workspaces/ OpenNebula/ Reservoir.
3. Development of DMZ for the college.
4. Creating RIA web Site.
5. Working with SOA and REST based Web Services.
6. Collaboration on calendars, schedules, and task management.
7. Collaboration on event management.
8. Collaboration on contact management.
9. Collaboration on project management.
10. Collaboration on word processing.
11. Collaboration on spreadsheets.
12. Collaboration on databases.
13. Collaboration on presentation.
14. Collaboration on file sharing and any other on line content.
15. Collaboration via web communication tools.

### **Final Year U.G. Program in Computer Science & Engineering (2011-12)**

**Web Technologies Lab**

<b>Teaching Scheme</b>	<b>L: 2</b>	<b>P: 4</b>	
<b>Evaluation Scheme</b>	<b>Term Work</b>	<b>Pract</b>	<b>Minimum Passing Marks</b>
	25 Marks	25 Marks	40%

#### **Course Objectives:**

- To Study .Net and event-driven language framework like C# .Net.
- Creating real time GUI applications using C#.net.
- Study of object-oriented programming design and methods through creation and use of classes in C#.Net applications.
- Developing applications to access database using ADO.net
- Understanding the CLR and .Net Framework.

## **Course Contents:**

### **Unit I: Introduction to C#**

**(Hrs 4)**

Introducing C#, Understanding .NET, Overview of C#, Literals, Variables, Data Types, Operators, Expressions, Branching, Looping, Methods, Arrays, Strings, Structures, Enumerations.

### **Unit II: Object Oriented Aspects of C#**

**(Hrs 4)**

Classes, Objects, Inheritance, Polymorphism, Interfaces, Operator Overloading, Delegates, Events, Errors and Exceptions.

### **Unit III: Application Development on .NET**

**(Hrs 4)**

Building Windows Applications, Accessing Data with ADO.NET.

### **Unit IV: Web Based Application Development on .NET**

**(Hrs 4)**

Programming Web Applications with Web Forms, Programming Web Services.

### **Unit V: The CLR and the .NET Framework**

**(Hrs 2)**

Assemblies, Versioning, Attributes, Reflection, Viewing MetaData, Type Discovery, Reflecting on a Type, Marshaling, Remoting.

### **Unit VI: The CLR and the .NET Framework**

**(Hrs 2)**

Understanding Server Object Types, Specifying a Server with an Interface, Building a Server, Building the Client, Using SingleCall, Threads.

## **Text Books:**

1. E. Balagurusamy, "Programming in C#", Tata McGraw-Hill, 2002, ISBN- 13-9780070473393.
2. J. Liberty, "Programming C#", 3<sup>rd</sup> ed., O'Reilly, 2003, ISBN-0596004893.

## **References Books:**

3. Herbert Schildt, "The Complete Reference: C# 4.0", Tata McGraw-Hill, 2010, ISBN-9780071606301.
4. Andrew Troelsen, "Pro C# 2010 and the .NET Platform", 5<sup>th</sup> ed., Apress Publications, 2010, ISBN-13: 978-1893115590.
5. S. Thamarai Selvi, R. Murugesan, "A Textbook on C#", Pearson Education, 2004, ISBN-10-8178085968.
6. Jonn Skeet, "C# in Depth", 2<sup>nd</sup> ed., Manning Publications, 2010, ISBN-13: 978-1935182474

## **Term Work:**

- Instructor will frame assignments based on the suggested assignments as given below. Instructors are expected to incorporate variations in list.
- Students will submit Term Work in the form of a journal that will include at least 16 assignments/programs or a mini-project based on above syllabus.

- Each programming assignment will consists of pseudo-algorithm, program listing with proper documentation and printout of the output.
- Practical Examination will consist of Performance and Viva-voice Examination based on the term work.

**The assessment will be based on the following –**

1. Performance in the practical examination
2. Record of programs submitted by the candidate.
3. Setting goals higher than expected from problem statement.
4. Innovation & Creativity.
5. Team building skills
6. Technical writing skills

**List of suggested assignments:**

**Part-I**

1. Create a simple Time Table program in C#.net.
2. Create a C#.net application for adding images.
3. Create a C# application for adding nodes to a tree view.
4. Adding a Web Browser to a Windows Form in C# .NET.
5. Create a C#. Net application for manipulating files.
6. Implement the feature of Drawing Polygons in C# .NET.
7. Create an application to send Email in C#.
8. Create a SQL Server Express database and Connect to it.
9. Create a .Net application for Getting the values on the another form.
10. Working with datasets and data adapters in C# .NET
11. Working with Date and Time in C#.net

**Part-II**

These Practicals should be carried out using Open Source IDE for Java such as Netbeans, Eclipse. These tools are available for free download at

1. [www.netbeans.org](http://www.netbeans.org)
2. [www.eclipse.org](http://www.eclipse.org)
3. [www.sun.com](http://www.sun.com)

1. Servlet program to add information in the database from an HTML form(Fields: - Name, Acc.No, Amount, City, Password)
2. Servlet program to update database on some transactions.
3. Create a web application for session management.
4. Servlet or JSP program for user validation Login, Acc. No., Password, etc.
5. JSP to assign a new session id for a fresh user. The same page on being requested by a user (who already has a session) should abandon the session and display relevant message.
6. Design of a web site using JSP technology.
7. Java Program for parsing XML file (convert XML objects to Java objects)
8. XML/XSL script to show particular HTML file.
9. Convert Database to XML file.

10. Program to use HTTP Request and XML HTTP Response AJAX Object.

**Final Year U.G. Program in Computer Science & Engineering (2011-12)**

**Project I**

<b>Teaching Scheme</b>	<b>P : 4</b>		
<b>Evaluation Scheme</b>	<b>Term Work</b>	<b>Pract</b>	<b>Minimum Passing Marks</b>
	50 Marks	50 Marks	40%

**Guidelines for Students:**

1. Two different projects can be done in Semester I and Semester II **OR** a single project can be continued in two semesters depending on scope of the project and approval from the Head of Department.
2. Project work must be carried out by the group of **at least two** students and **maximum three** who will jointly work and implement the project. **The work must be original.**
3. To proceed with the project work it is very important to select a right topic. Project can be undertaken on any subject addressing Computer Science and Engineering / any subject taught through semester I to Semester VIII. Research and development projects on problems of practical and theoretical interest should be encouraged.
4. Project shall be any one of the following:  
Creation of software, hardware or middleware related to CSE Technologies  
or  
Fabrication of devices preferably those devices energized from converging technologies  
or  
Creation of experimental setup and experimentation based on technological literature in the public domain
5. Students should submit the Project Topic along with Project Abstract and Team Members for the approval. Project Topic Must be approved by HOD and Project Coordinator.
6. The project work can be undertaken in a research institute or organization / company / any business establishment after taking prior approval of HOD.
7. Before Implementation students must submit the project documentation in the form of SRS (i.e. System Specification Requirements) that includes:
  - System Details
  - Data Model (If Back End is used) /ER Diagrams /DFD and UML diagrams.
  - Module Description
  - Module allocation to every team member
8. Even though project is a Group Activity, still it needs contribution of every team member as an individual; hence each member must implement at least 2 modules of project.
9. Project Report format for Project-I will be decided by Project Coordinator and same should be followed by the students.
10. Student must submit Project report before 2 weeks of examination date.

11. If a project is found to be Purchased/Downloaded/Copied, it will be rejected at any stage and the team will be disqualified.
12. Students can continue with same Project Topic for Eighth Semester with the prior approval of HOD. HOD will approve the same depending upon the scope of the project.
13. If a one semester project is undertaken then :
  - (a) **For Project I** : The group should complete the Project-I in Semester VII only and prepare a project report in **Spiral Bound** which contains following details:- Abstract, Project overview, Problem Statement, Requirement Analysis, Project design, Implementation Details, Technologies used, Results, Conclusion and References.
  - (b) **For Project II** : The group will submit the name of the New Project with a synopsis of the proposed work of not more than 03 to 08 pages. The group will submit a final **Hardbound** project report at the end of **VIII semester** as per specified format.
14. If a two semester project is undertaken then :
 

**For Project I** : The group will submit the name of the project with a synopsis of the proposed work of not more than 03 to 08 pages. The group should complete detail system analysis and design, data flow design, data structure layout, file design, Procurement of Hardware and/or software requirements, and partial implementation of the project in Semester VII. The group should prepare a **SpiralBound** project report containing the work carried out in Semester VII and Implementation Plan for Semester VIII at the end of the Semester VII as a part of the term work submission.

**For Project II** : The group will continue to work on the project selected during the Semester VII and submit a final **Hardbound** project report at the end of Semester VIII containing Complete Implementation of the Project with results, conclusion and future work as per specified format.

### **Term Work Project I**

- (i) Student has to submit weekly progress report to the internal guide and where as internal guide has to keep track on the progress of the project and also has to maintain attendance report. This progress report can be used for awarding term work marks.
- (ii) In case of industry projects, visit by internal guide will be preferred.
- (iii) Make sure that external project guides are at least BE graduates.
- (iv) The term work assessment will be done jointly by teachers, appointed by Head of Department.
- (v) Distribution of marks for term work shall be as follows:
  - Project Report 15 Marks
  - Term End Presentation (Internal) 10 Marks
  - Lab Attendance 5 Marks
  - Progressive Demos 20 Marks

### **Practical Examination (External)- Project I**

Project Practical Examination should be conducted by two examiners appointed by the University. Students have to give Oral, Demonstration, and Seminar (PowerPoint Presentation) on the Projects developed by them.

**Final Year U.G. Program in Computer Science & Engineering (2011-12)**

**SEMESTER-VIII**

**Mobile Computing**

<b>Teaching Scheme</b>	<b>L: 4</b>		
<b>Evaluation Scheme</b>	<b>Theory</b>	<b>Test</b>	<b>Minimum Passing Marks</b>
	80 Marks	20 Marks	40%

**Course Objectives**

1. To understand characteristics of local and wide area wireless technologies such IEEE 802.11, Bluetooth, 802.11 and GSM.
2. To understand network and transport protocols for wireless networks, including mobile IP and variants of TCP
3. To know the basics of WAP and WML

**Course Contents**

**Unit I Introduction to Mobile Communication (Hrs 08)**

Need and Applications of wireless communication, Wireless Data Technologies, Market for mobile communication, Frequencies for radio transmission, Mobile and wireless devices, Mobile OS- PalmOs, Win CE, Android and Symbian.

**Unit II Wireless Communication Fundamentals (Hrs 07)**

Multiplexing – Space division, Frequency division, Time division and code division. Spread Spectrum-DSSS and FHSS, Cellular systems, Motivation for a specialized MAC: Hidden and Exposed terminals, Near and Far terminals, SDMA, FDMA, TDMA, CSMA - collision avoidance – polling, CDMA, Comparison of S/T/F/CDMA.

**Unit III Telecommunication Systems (Hrs 08)**

GSM: Mobile services, System architecture, Radio interface, Protocols, Localization And Calling, Handover, Security, New data services; DECT: System architecture, Protocol architecture; TETRA, UMTS and IMT-2000: UMTS Basic architecture, UTRA FDD mode, UTRA TDD mode.

**Unit IV Wireless LAN (Hrs 07)**

Infrared vs. Radio transmission, Infrastructure and Ad hoc Networks, IEEE 802.11: System architecture, Protocol architecture, Physical layer, Medium access control layer, MAC management, Future developments; Bluetooth: User scenarios, Architecture, Radio Layer, Baseband layer, Link manager protocol, L2CAP, security SDP, Profiles.



**Unit V Mobile Network Layer and Transport Layer (Hrs 05)**

Mobile IP: Goals, Assumptions and requirements, Entities and Terminology, IP packet delivery, Agent advertisement and discovery, Registration, Tunneling and Encapsulation, Optimizations, Reverse tunneling, Ipv6; Dynamic host configuration protocol, Ad hoc networks: Routing. Transport Layer : Traditional TCP: Congestion control, Slow start, Fast retransmit/fast recovery, Implications on mobility; Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/fast recovery, Transmission/time-out freezing, Selective retransmission, Transaction oriented TCP

**Unit VI Trends in Mobile Computing (Hrs 05)**

WAP architecture, Wap Application environment, Wireless markup language, Wimax-Features and applications, 3G Basics, Wimax versus 3G and Wi-Fi, Wireless sensor networks-applications, Design issues and architecture, RFID.

**Text Books**

1. Jochen Schiller, 'Mobile Communications', Pearson Ed. Ltd., Second Edition, ISBN 978-81-317-2426-2.
2. Asoke K. Talukdar and Roopa R Yavagal, 'Mobile Computing–Technology, Applications and Service Creation', Tata McGraw Hill, ISBN 0-07-058807.

**Reference Books:**

1. Kumkum Garg, 'Mobile Computing-Theory and practice', Pearson Ed. Ltd, ISBN 978-81-317-3166-6.
2. Andrews J. G., A. Ghosh, Rias Muhammed, 'Fundamentals of Wimax-Understanding Broadband Wireless Networking', Pearson Ed. Ltd, ISBN 978-81-317-2635-8
3. William Stallings, 'Wireless Communication and Networks', Pearson Ed. Ltd., Second Edition, ISBN 978-81-317-2093-6.
4. Kaveh Pahlavan, Prasanth Krishnamoorthy, "Principles of Wireless Networks", PHI/Pearson Education, 2003.

**Final Year U.G. Program in Computer Science & Engineering (2011-12)**

**Advanced Computer Architecture**

**Teaching Scheme**  
**Evaluation Scheme**

<b>L: 4</b>			
<b>Theory</b>	<b>Test</b>	<b>Minimum Passing Marks</b>	
80 Marks	20 Marks	40%	

**Course Objectives**

1. To provide a comprehensive knowledge of scalable and parallel computer architectures
2. Student should achieve better performance with increasing system resources
3. System resources are scaled by the number of processors used, the memory capacity enlarged, the access latency tolerated, the I/O bandwidth required, the performance level desired.

## Course Contents

### **Unit I Parallel Computer Models**

**(6 Hrs)**

The state of computing, multiprocessors and multicomputers, Multivector and SIMD computers, PRAM and VLSI models, Architectural development tracks.

### **Unit II Program and Network Properties**

**(6 Hrs)**

Conditions of parallelism, Program partitioning and scheduling, Program flow mechanism, System interconnect architectures.

### **Unit III Principles of Scalable Performance**

**(6 Hrs)**

Performance metrics and measures, Parallel processing applications, Speedup performance laws, Scalability analysis, Advanced processor technology, Memory hierarchy technology.

### **Unit IV Pipelining and Superscalar Techniques**

**(6 Hrs)**

Linear pipeline processors, Nonlinear pipeline processors, Instruction pipeline design, Arithmetic pipeline design, Superscalar and superpipeline design

### **Unit V Multivector and SIMD Computers**

**(8 Hrs)**

Vector processing principles, Multivector multiprocessors, Compound vector processing, SIMD computer organizations, The connection machine CM-5

### **Unit VI Scalable, Multithreaded, and Dataflow Architectures**

**(8 Hrs)**

Latency hiding techniques, Principles of multithreading, Fine grain multicomputers, Scalable and multithreaded architectures, Dataflow and hybrid architectures

### **Text Books:**

1. Kai Hwang, 'Advanced Computer Architecture: Parallelism, Scalability, Programmability', McGraw Hill, Inc., 1993. ISBN-10: 0070316228 , ISBN-13: 978-0070316225

### **Reference Book:**

1. Hwang and Briggs 'Computer Architecture and Parallel Processing', McGraw Hill Book Company. ISBN 10: 0070315566, ISBN 13: 9780070315563.

## Final Year U.G. Program in Computer Science & Engineering

### Cryptography & Network Security

<b>Teaching Scheme</b>	<b>L: 4</b>		
<b>Evaluation Scheme</b>	<b>Theory</b>	<b>Test</b>	<b>Minimum Passing Marks</b>
	80 Marks	20 Marks	40%

### Course Objectives

Understanding of:

1. Basic issues, concepts, principles, and mechanisms in information security.
2. Security goals and threats to network
3. Various cryptographic algorithm, infrastructure and applications.
4. Network security and System security applications.

### Course Contents

#### Unit I (Hrs 08)

Security attacks, Services and mechanisms, Classical encryption techniques, Block cipher principles, Data encryption standard (DES), Triple DES, AES, Block cipher modes of operations, Placement of encryption function, Traffic confidentiality, Key distribution, Random number generation.

#### Unit II (Hrs 07)

Public key cryptography, Principles, RSA algorithm, Rabin algorithm, ElGamal algorithm, Key management, Diffie-Hellman key exchange, Elliptic curve cryptography.

#### Unit III (Hrs 08)

Authentication requirements and authentication functions, Message authentication codes, Hash functions, SHA-512, WHIRLPOOL, HMAC, CMAC. Digital signatures, Authentication protocols, Digital signature standard.

#### Unit IV (Hrs 07)

Kerberos, X.509 directory authentication service, Public-key infrastructure. Electronic mail security: Pretty good privacy (PGP), S/MIME.

#### Unit V (Hrs 06)

IP Security: Overview, Architecture, Authentication, Encapsulating security payload, Combining security associations, Key management. Web security: Web security requirements, Secure sockets layer, Transport layer security, and Secure electronic transaction

#### Unit VI (Hrs 06)

System Security: Intruders, Intrusion detection, Password management, Malicious software, Viruses and related threats, Virus countermeasures, Distributed denial of service attacks, Fire walls: Firewall design principles, Trusted systems.

**Text Books:**

1. William Stallings “Cryptography and Network Security: Principles and Practice”, 4<sup>th</sup> Edition, Pearson Education. (ISBN-10: 0131873164)
2. Behrouz A. Forouzan, “Cryptography and Network Security”, Tata McGraw-Hill. 2007, (ISBN-10: 0073327530)

**Reference Books:**

1. Schneier B., “Applied Cryptography”, 2<sup>nd</sup> Edition, Wiley & Sons. 2002, (ISBN-10: 0471117099)
2. Kaufman C., Perlman R. and Speciner M., “Network Security: Private communication in Public World”, 2<sup>nd</sup> Edition, Prentice-Hall, 2002, (ISBN: 0130460192)
3. Bishop, M., “Computer Security: Art and Science”, Pearson. 2003, (ISBN: 0201440997)

**Final Year U.G. Program in Computer Science & Engineering****Elective II: Software Testing & Quality Assurance**

<b>Teaching Scheme</b>	<b>L : 4</b>		
<b>Evaluation Scheme</b>	<b>Theory</b>	<b>Test</b>	<b>Minimum Passing Marks</b>
	80 Marks	20 Marks	40%

**Course Objectives**

- To introduce Software Measurement concepts
- To study Software Testing Process
- To understand Software Testing strategies
- To introduce Software Quality management principles & metrics.

**Course Contents**

**Unit I** **(Hrs 6)**  
 Software quality assurance framework and standards SQA framework: What is quality? Software quality assurance, Components of software quality assurance, Software quality assurance plan: Steps to develop and implement a software quality assurance plan quality standards: ISO 9000 and Companion ISO Standards, CMM, CMMI, PCMM, Malcom Balridge, 3 Sigma, 6 Sigma.

**Unit II** **(Hrs 7)**  
 Software quality assurance metrics and measurement software quality metrics: Product quality metrics, In process quality metrics, Metrics for software maintenance, Example of metric programs “software quality metrics methodology: establish quality requirement, identify software quality metrics, Implement the software quality metrics, Analyze software metrics result, Validate the software quality metrics” Software quality indicators, Fundamentals in measurement theory.

**Unit III** (Hrs 7)  
Software testing strategy and environment establishing testing policy, Structured approach to testing, Test factors, Economics of system development lifecycles (SDLC) testing, Software testing methodology defects hard to find, Verification and Validation, Functional and Structural testing, Work bench concept, Eight considerations in developing testing methodology, Testing tactics checklist

**Unit IV** (Hrs 7)  
Software testing techniques black box, Boundary value, Bottom up, Branch coverage, Cause effect graphing, Crud, Database, Exception, Grey box, Histograms, Inspections, JADs, Pareto analysis, Prototyping, Random testing, Risk based testing, Regression testing, Structured walk throughs, Thread testing, Performance testing, White box testing

**Unit V:** (Hrs 6)  
Software testing tools taxonomy of testing tools, Methodology to evaluate automated testing tools, Loadrunner, Winrunner and Rational testing tool, Java testing tool, Jmetra. JUNIT and Cactus

**Unit VI:** (Hrs 7)  
Testing process, Eleven step testing process: Assess project management development estimate and status, Develop test plan, Requirements phase testing, Design phase testing, Program phase testing, Execute test and Record results, Acceptance test, Report test Results, Testing software installation, Test software changes, Evaluate test effectiveness. Testing specialized systems and Application testing clients/server, Web applications, Testing off the shelf components, Testing security, Testing a data warehouse

**Text Books:**

1. William E. Perry, "Effective method for software testing", 2<sup>nd</sup> edition, Willey Publication 2000 ( ISBN 13:978- 0471354185)
2. Mordechai BenMenachem & Garry S.Marlist "Software Quality", Thomson Learning Publication,1997. (ISBN 1850323267-97-001)

**Reference Books:**

1. Stephen H. Kan, "Metrics & Models in Software Quality Engineering", Addison-Wesley Publication 1995(ISBN-13: 978-0201633399)
2. Ramesh, Bhattiprolu," Software Maintenance", Tata McGraw Hill (ISBN 0-07-048345-0)
3. Desikan, Ramesh, "Software Testing: Principles and Practices", Pearson Education Publication, 2006 (ISBN 81-7758-121-X)
4. Burnstein,"Practical Software Testing", Springer International Edition 2010 (ISBN-13:978-1441928856)

## Term Work

Teaching Scheme Evaluation Scheme	P: 2 Term Work	Pract	Minimum Passing Marks
	25 Marks	25 Marks	40%

### Term Work:

- Instructor will frame experiments based on the suggested experiments using WinRunner Testing Tool. Instructors are expected to incorporate variations in the list.
- Student will submit the Term Work in the form of a journal that will include implementation of each experiment listed below. Each experiment will consist of proper documentation and printout of the output.
- Practical Examination will consist of performance and Viva-voce Examination on the term work.

The assessment will be based on the following:

7. Performance in the practical examination.
8. Record of programs submitted by the candidate.
9. Setting goals higher than expected from problem statement.
10. Innovation & creativity.
11. Team building skills.
12. Technical writing skills.

### Suggested List of Assignments:

1. Study of Testing Tools for program testing and defect detection.
2. Introduction to WinRunner.
3. Recording test in analog and context sensitive mode.
4. Implementation of Synchronizing test.
5. Checking GUI Objects to determine functioning of an application.
6. Implementation of bitmap checkpoint, comparing captured bitmap images pixel by pixel.
7. Using the DataDriver Wizard to create a data-driven test
8. Implementation of how the GUI map enables to continue using your existing test scripts after the user interface changes in the application.
9. Project: Creating Test Report of different formats like defect reporting, test reporting.
10. Developing test cases for a particular task.

## Final Year U.G. Program in Computer Science & Engineering

### Elective II: Digital Image Processing

<b>Teaching Scheme</b>	<b>L : 4</b>		
<b>Evaluation Scheme</b>	<b>Theory</b>	<b>Test</b>	<b>Minimum Passing Marks</b>
	80 Marks	20 Marks	40%

#### Course Objectives:

1. To provide a comprehensive theory of various image processing tasks and the practical experience to simulate them.
2. To gain a hands-on experience about the below topics through extensive simulation assignments.

#### Course Contents

##### **Unit I** **(Hrs 4)**

Digital Image Fundamentals, Human visual system, Sampling and Fourier analysis

##### **Unit II** **(Hrs 8)**

Intensity Transformations and Spatial Filtering, Histogram Processing, Spatial Filtering, Filtering in the Frequency Domain, Preliminary Concepts, Extension to functions of two variables, Image smoothing, Image Sharpening.

##### **Unit III** **(Hrs 8)**

Image Restoration and Reconstruction, Noise Models, Noise Reduction, Inverse Filtering, MMSE (Wiener) Filtering.

##### **Unit IV** **(Hrs 6)**

Image Compression Fundamentals, Basic Compression Methods

##### **Unit V** **(Hrs 8)**

Morphological Image Processing, Erosion, dilation, opening, closing, Basic Morphological Algorithms: hole filling, connected components, thinning, skeletons

##### **Unit VI** **(Hrs 6)**

Image Segmentation, Point, line, edge detection, Thresholding, Region-based segmentation

#### Text Books:

1. Rafael C. Gonzalez and Richard E. Woods, 'Digital Image Processing' 3<sup>rd</sup> edition, Prentice Hall, 2007, ISBN 013168728X, <http://www.imageprocessingplace.com>
2. Rafael C. Gonzalez, Richard E. Woods, and Steven L. Eddins, 'Digital Image Processing Using MATLAB', Prentice-Hall, 2003. ISBN 0130085197

**Reference Books:**

1. Milan Sonka, Vaclav Hlavac, Roger Boyle, Thomson, ‘Image Processing, Analysis and Machine Vision’, 2008, <http://visionbook.felk.cvut.cz/index.html>
2. Computer Vision Research Groups: <http://www-2.cs.cmu.edu/~cil/v-groups.html>

**Term Work:**

<b>Teaching Scheme</b>	<b>P : 2</b>		
<b>Evaluation Scheme</b>	<b>Term Work</b>	<b>Pract</b>	<b>Minimum Passing Marks</b>
	25 Marks	25 Marks	40%

- Instructor will frame experiments based on the suggested experiments using gcc in LINUX/UNIX or MATLAB as given below. Instructors are expected to incorporate variations in list.
- Students will submit Term Work in the form of a journal that will include at least 8-10 experiments from the list given below. Each experiment will consists of pseudo-algorithm, program listing with proper documentation and printout of the output.
- Practical Examination will consist of Performance and Viva-voice Examination based on the term work.

The assessment will be based on the following –

1. Performance in the practical examination
2. Record of programs submitted by the candidate.
3. Setting goals higher than expected from problem statement.
4. Innovation & Creativity.
5. Team building skills
6. Technical writing skills

**Suggested list of assignments:**

1. Write a program to perform intensity (gray-level) transformations.
2. Write a program to perform histogram equalization and histogram specification of an image.
3. Write a program to manually specify the spatial filter and compare the enhancement techniques
4. Write a program to perform filtering in the frequency domain.
5. Write a program to implement Sobel, LoG, and Canney edge detectors.
6. Write a program to compress an image using quantization.
7. Write a program to perform opening and closing operations on a noisy image.
8. Write a program to segment an image using region growing approach.
9. Write a program to segment an image using region splitting and merging approach.
10. Write a program to perform Hough transform for line detection in an image.



## Final Year U.G. Program in Computer Science & Engineering

### Elective II: Machine Learning

<b>Teaching Scheme</b>	<b>L : 4</b>		
<b>Evaluation Scheme</b>	<b>Theory</b>	<b>Test</b>	<b>Minimum Passing Marks</b>
	80 Marks	20 Marks	40%

#### Course Objectives:

- To introduce students to the basic concepts and techniques of Machine Learning.
- To develop skills of using recent machine learning software for solving practical problems.
- To gain experience of doing independent study and research.

#### Course Contents

**Unit I** **(Hrs 8)**  
Introduction, Machine learning problems, Types of learning, Designing a learning system, Inductive learning: Introducing basic concepts by example (learning semantic networks), General setting for induction

**Unit II** **(Hrs 8)**  
Languages for learning: Propositional (attribute-value), Relational, Prolog Hypothesis space: Version space learning

**Unit III** **(Hrs 8)**  
Divide and conquer approaches: Induction of decision trees, OneR, ID3, Covering strategies: Least general generalization approaches

**Unit IV** **(Hrs 8)**  
Searching the generalization/specialization graph, Relational Learning and Inductive Logic Programming, Evaluating hypotheses: Error-based and MDL evaluation

**Unit V** **(Hrs 8)**  
Bayesian learning, Bayesian belief networks, Instance-based learning

**Unit VI** **(Hrs 8)**  
Analytical (Explanation-Based) Learning, Unsupervised learning: clustering

#### Text Book :

1. Machine Learning, Tom Mitchell, McGraw Hill Publishing , 1997, ISBN 0-07-042807-

## Reference Books :

1. N. Cristianini and J. Shawe-Taylor, “ An introduction to support vector machines : and other kernel-based learning methods ”, Cambridge University Press, 2000.
2. Ian H. Witten, Eibe Frank, “Data Mining: Practical Machine Learning Tools and Techniques with Java Implementations. (Describes algorithms and background on the weka system)”
3. R. Duda, P. Hart, and D. Stork, “Pattern Classification (2nd edition)”, John Wiley & Sons, 2001.

## Term Work:

Teaching Scheme Evaluation Scheme	P : 2		Minimum Passing Marks
	Term Work	Pract	
	25 Marks	25 Marks	40%

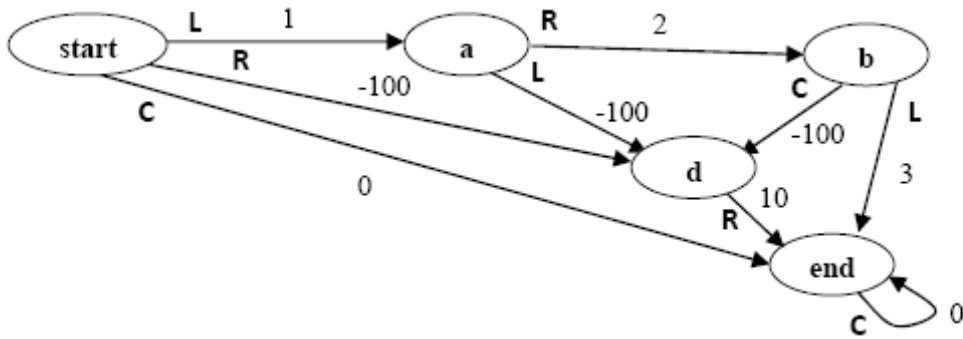
- Instructor will frame experiments based on the above syllabus using gcc in LINUX/UNIX as given below. Instructors are expected to incorporate variations in list.
- Students will submit Term Work in the form of a journal that will include at least 8-10 experiments from the above syllabus. Each experiment will consists of pseudo-algorithm, program listing with proper documentation and printout of the output.
- Practical Examination will consist of Performance and Viva-voice Examination based on the term work.

The assessment will be based on the following –

1. Performance in the practical examination
2. Record of programs submitted by the candidate.
3. Setting goals higher than expected from problem statement.
4. Innovation & Creativity.
5. Team building skills
6. Technical writing skills

## Suggested List of Assignments

Consider the deterministic reinforcement environment drawn below. The numbers on the arcs are the *immediate* rewards. Let the discount rate equal 0.8 and the probability of taking an *exploration* step be 0.02. The **L/R/C** at the beginning of arcs is the name of the action that arc represents (this information is used in Part 4).



Assume you wish to use a *Q table* to represent the Q function. All cells in this table should initially contain 3 (an arbitrary choice). Also assume your RL agent uses 1-step Q-learning. Show the state of your Q table after each of the following "episodes" (to represent the Q table, you can simply draw a copy of the above graph, but instead of attaching immediate rewards to arcs, attach the Q values).

*start* → *a* → *b* → *d* → *end*  
*start* → *a* → *b* → *end*  
*start* → *a* → *d* → *end*

Repeat Part 1, using a fresh Q table (i.e, all cells filled with 3), but this time use SARSA. For SARSA do you need to use  $\alpha$  (a "learning rate" - see Equation 13.10 of Mitchell)? If so, set  $\alpha$  as described in Lecture 24, slides 23-25. Explain your answer.

If you performed RL for a large number of episodes, what policy would Q learning produce? Indicate this policy by copying the above graph and using thick arrows to represent the policy. Briefly explain your answer.

Imagine states are presented using three Boolean-valued features as follows:  
*start* = 001 *a* = 010 *b* = 100 *c* = 110 *end* = 000

Discuss how you can use a perceptron for each action (**L**, **R**, and **C**) to represent the Q function. Draw the perceptrons. Assume all weights (and biases) initially have value 3 and that the output units are not thresholded (i.e., their output is simply the weighted sum of their inputs). Show how you would use SARSA to train these perceptrons for the actions listed in Part 1i using  $\eta = 0.5$ . Following this first episode, what do these perceptrons estimate as the Q values for the initial state's three possible actions?

## Final Year U.G. Program in Computer Science & Engineering

### Elective II: Distributed Computing

<b>Teaching Scheme</b>	<b>L : 4</b>	<b>P : 2</b>	
<b>Evaluation Scheme</b>	<b>Theory</b>	<b>Test</b>	<b>Minimum Passing Marks</b>
	80 Marks	20 Marks	40%

#### Course Objectives

1. To understand the basic concepts of distributed environment and the key steps involved well enough to lead/manage a real-life Distributed Computing project.
2. Know the basics of Distributed Computing

#### Course Contents

##### Unit I (Hrs 6)

Characterization of Distributed Systems: Introduction, Examples of distributed Systems, Resource sharing and the Web Challenges. System Models: Architectural models, Fundamental Models

##### Unit II (Hrs 7)

Theoretical Foundation for Distributed System: Limitation of Distributed system, Absence of global clock, Shared memory, Logical clocks, Lamport's & vectors logical clocks, Causal ordering of messages, Global state, Termination detection.

##### Unit III (Hrs 7)

Distributed Deadlock Detection: system model, Resource Vs communication deadlocks, Deadlock prevention, Avoidance, Detection & resolution, Centralized dead lock detection, Distributed dead lock detection, Path pushing algorithms, Edge chasing algorithms.

##### Unit IV (Hrs 7)

Distributed Objects and Remote Invocation: Communication between distributed objects, Remote procedure call, Events and notifications, Java RMI case study. Distributed File Systems: File service architecture, Sun Network File System, The Andrew File System, Recent advances.

##### Unit V (Hrs 6)

Transactions and Concurrency Control: Transactions, Nested transactions, Locks, Optimistic Concurrency control, Timestamp ordering, Comparison of methods for concurrency control.

##### Unit VI (Hrs 7)

Distributed Transactions: Flat and nested distributed transactions, Atomic Commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery. Replication: System model and group communication, Fault tolerant services, Highly available services, Transactions with replicated data.

**Text Books:**

1. Singhal & Shivaratri, "Advanced Concept in Operating Systems", McGraw Hill Publication, 1996, ISBN 0-7803-1119-1
2. Coulouris, Dollimore, Kindberg, "Distributed System: Concepts and Design", Pearson Education, 2011, ISBN : 978-81-317-1840-7

**References Books:**

1. P.K.Sinha, "Distributed Operating System" Addison Wesley, 2003, ISBN 6321117891
2. Tanenbaum & Steen, "Distributed System" PHI, 2002, ISBN 0-13-148521-0

**Term Work:**

Teaching Scheme Evaluation Scheme	P: 2 Term Work	Pract	Minimum Passing Marks
	25 Marks	25 Marks	40%

- Instructor will frame experiments based on the suggested experiments using C/C++/JAVA as given below. Instructors are expected to incorporate variations in the lists.
- Student will submit the Term Work in the form of a journal that will include at least 8-10 experiments from the list given below. Each experiment will consists of pseudo-algorithm, program listing with proper documentation and printout of the output.
- Practical Examination will consists of performance and Viva-voce Examination on the term work.

The assessment will be based on the following:

1. Performance in the practical examination.
2. Record of programs submitted by the candidate.
3. Setting goals higher than expected from problem statement.
4. Innovation & creativity.
5. Team building skills.
6. Technical writing skills.

**Suggested List of Assignments:**

Term work shall consist of at least 10 experiments covering all topics. Term work should consist of at least 6 programming assignments and one mini project and two assignments covering the topics of the syllabus. One written test is also to be conducted.

1. Implement the concept of RPC.
2. Implement the concept of RMI.
3. Implement concurrent echo client-server application
4. Implement concurrent day-time client-server application.
5. Configure following options on server socket and tests them: SO\_KEEPALIVE, SO\_LINGER, SO\_SNDBUF, SO\_RCVBUF, TCP\_NODELAY
6. Incrementing a counter in shared memory.

7. Create CORBA based server-client application.
8. Design XML Schema and XML instance document.
9. Implement a fully functional distributed file server.
10. Implement Basic File Server.
11. Implement path pushing algorithms.
12. Implement edge chasing algorithms.
13. Implement time stamping in distributed environment.

### Final Year U.G. Program in Computer Science & Engineering

<b>Elective II: Business Intelligence</b>
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<b>Teaching Scheme</b>	<b>L : 4</b>		
<b>Evaluation Scheme</b>	<b>Theory</b>	<b>Test</b>	<b>Minimum Passing Marks</b>
	80 Marks	20 Marks	40%

#### Course Objectives

1. To understand the process of decision support and the key steps involved well enough to lead/manage a real-life Decision support & business intelligence system project
2. Know the basics of decision support and how it facilitates business intelligence

#### Course Contents

##### **Unit I** **(Hrs 06)**

Decision support systems and Business intelligence, Computerized decision support – Decision making systems, Modeling, and Support

##### **Unit II** **(Hrs 04)**

Decision support systems concepts, Methodologies and technologies, Modeling and analysis

##### **Unit III** **(Hrs 10)**

Business intelligence, Special introductory section: The essentials of business intelligence, Data warehousing, Business analytics and Data visualization, Data, Text, and Web mining, Neural networks for data mining

##### **Unit IV** **(Hrs 10)**

Business performance management, Collaborative computing-supported technologies and Group support systems, Knowledge management, Intelligent systems- Artificial intelligence and Expert systems.

##### **Unit V** **(Hrs 05)**

Advanced intelligent systems, Intelligent systems over the Internet, Implementing decision support systems.

## Unit VI

(Hrs 05)

Systems development and acquisition, Integration, Impacts, and the future of management support systems.

### Text Books:

1. Efraim Turban, Jay E Aronson, Ting-Peng Liang, and Ramesh Sharda, 'Decision Support and Business Intelligence Systems', 8<sup>th</sup> Edition, PHI, 2006. ISBN: 0-13-198660-0

### Reference Books:

1. Cindi Howson, 'Successful Business Intelligence: Secrets to Making BI a Killer App', 1st edition, McGraw-Hill Osborne Media, 2007, ISBN 0071498516

### Term Work

Teaching Scheme	P : 2		Minimum Passing Marks
Evaluation Scheme	Term Work	Pract	
	25 Marks	25 Marks	40%

- Instructor will frame experiments based on the suggested experiments using gcc in LINUX/UNIX as given below. Instructors are expected to incorporate variations in list.
- Students will submit Term Work in the form of a journal that will include at least 8-10 experiments from the list given below. Each experiment will consist of pseudo-algorithm, program listing with proper documentation and printout of the output.
- Practical Examination will consist of Performance and Viva-voice Examination based on the term work.

The assessment will be based on the following –

1. Performance in the practical examination
2. Record of programs submitted by the candidate.
3. Setting goals higher than expected from problem statement.
4. Innovation & Creativity.
5. Team building skills
6. Technical writing skills

### Suggested List of Assignments

1. Implement Decision Support System.
2. Design a data warehouse for banking application & implement the concept of business intelligence.
3. Implement the concept of web mining.
4. Write a program that helps user perform routine tasks: Software agents, wizards, demons.
5. Implement E-Commerce Agents.
6. Implement Business Performance Management.
7. Use I8.IBS for analyzing web based sales & marketing data or simulate Intelligent Business Platform (I8.IBS).

8. Use I8.ISP or simulate I8.IBS for Internet-based management of distributed or clustering of servers for Internet Services Providers, for cross platform, cross-location of Internet services.
9. Use I8.BIZ or simulate I8.BIZ for Intranet application server for business internal uses such as business reporting, customer management, sales management, human resource management, knowledge management, security and authentication as well as project management and co-working.
10. Use I8.MOBI or simulate I8.MOBI for Open infrastructure system integrated with 2.5G/3G and API for SMS, mobile data services, mobile transaction, location services, download service, multimedia SMS, mobile payment, etc.

### **Final Year U.G. Program in Computer Science & Engineering**

<b>Open Source Technology Lab</b>
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<b>Teaching Scheme</b>	<b>L:2</b>	<b>P:2</b>	
<b>Evaluation Scheme</b>	<b>Term Work</b>	<b>Pract</b>	<b>Minimum Passing Marks</b>
	25 Marks	50 Marks	40%

**Course Objectives:**

- To understand installation and troubleshooting MySQL, Apache and PHP on Linux/Unix platform.
- To study the web development using Hypertext Preprocessor.
- Understanding the integration of basic SQL commands using PHP.
- To learn Apache web Server and MySQL for project development

**Course Contents**

**Unit I: Getting up and Running (3Hrs)**

- Installation Quickstart Guide
  - Linux/Unix Installation and Troubleshooting
- Installing and configuring MySQL
  - Installing MySQL on Linux and Troubleshooting
- Installing and configuring Apache
  - Installing Apache on Linux/Unix
- Installing and configuring PHP
  - Building PHP on Linux/Unix with Apache
- Php.ini basics

**Unit II: PHP Language Structure (3Hrs)**

- The building Blocks of PHP
- Flow Control Functions in PHP
- Working with Functions
- Working with Arrays



- Working with Objects

**Unit III: Getting Involved with the Code (4Hrs)**

- Working with Strings, Date, and Time
- Working with Forms
- Working with Cookies and User Sessions
- Working with Files and Directories
- Working with Images

**Unit IV: PHP and MySQL Integration (3Hrs)**

- Understanding the Database Design Process
- Learning Basic SQL commands
- Using Transactions and Stored Procedures in MySQL
- Interacting with MySQL using PHP

**Unit V: Basic Project Development (4Hrs)**

- Managing a Simple Mailing List
- Logging and Monitoring Web server Activity.  
Application Localization
- Working with XML

**Unit V: Administration and fine tuning (3Hrs)**

- Apache Performance Tuning and Virtual Hosting
- Setting Up a Secure Web Server
- Optimizing and Tuning MySQL
- Software Upgrades

**Text Books:**

1. Teach Yourself Linux, Apache, PHP, MySQL by Julie C. Meloni, Sams Publications ISBN 13- 978- 0672- 322976 -0

**Reference Books:**

1. James Lee and Brent Ware , “Open Source Web Development with LAMP”, Pearson Edu. ,Inc. ISBN : 978-81-7758-035-8
2. Peterson, “The Complete reference Linux”, Tata McGraw Hill, ISBN: 0071744320 0071744339

**Term Work:**

- Instructor should frame assignments/programs based on the suggested list of assignments as given below. Instructors are expected to incorporate variations in list.
- Students should submit Term Work in the form of a journal that will include at least 10 assignments/programs or a mini-project using above technologies.
- Each programming assignment will consists of pseudo-algorithm, program listing with proper documentation and printout of the output.

- Practical Examination will consist of Performance and Viva-voice Examination based on the term work.

**The assessment will be based on the following –**

1. Performance in the practical examination
2. Record of programs submitted by the candidate.
3. Setting goals higher than expected from problem statement
4. Innovation & Creativity.
5. Team building skills
6. Technical writing skills

**Suggested list of assignments:**

1. Install and configure Linux OS on System
2. Perform different file manipulating operations on files and directories.
3. Install and configure MySQL on Linux platform.
4. Install and configure Apache web server on Linux platform
5. Install and configure PHP on Linux platform
6. Execute basic SQL commands and stored procedures.
7. Create an application for session management.
8. Create a PHP application that reads Text File into String Variable
9. Create Email with File Attachment and Save as .eml
10. Create a PHP application that will Sort Email by Date
11. Create an application Connecting to a SQL Server Express Database
12. Use the XML Documentation Features in web applications

**Final Year U.G. Program in Computer Science & Engineering**

<b>Programming Lab IV</b>
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<b>Teaching Scheme</b>	<b>P: 2</b>		
<b>Evaluation Scheme</b>	<b>Term Work</b>	<b>Pract</b>	<b>Minimum Passing Marks</b>
	25 Marks	50 Marks	40%

**Term Work:**

- Instructor will frame experiments based on the suggested experiments using C/C++/JAVA as given below. Instructors are expected to incorporate variations in the lists.
- Student will submit the Term Work in the form of a journal that will include at least 8-9 programming assignments from Mobile Computing and at least 8-9 programming assignments from Cryptography and Network Security. Each assignment will consist of pseudo-algorithm, program listing with proper documentation and printout of the output.

- Practical Examination will consist of performance and Viva-voce Examination on the term work.

The assessment will be based on the following:

1. Performance in the practical examination.
2. Record of programs submitted by the candidate.
3. Setting goals higher than expected from problem statement.
4. Innovation & creativity.
5. Team building skills.
6. Technical writing skills.

### **Suggested List of Assignments:**

Term work shall consist of at least 8-9 programming assignments of Mobile Computing and at least 8-9 programming assignments of Cryptography and Network Security from the list given below.

### **Suggested List of Programming Assignments of Mobile Computing**

1. Write a simple program for displaying “Hello, World” on your mobile screen using J2ME Wireless Toolkit. Test output in different Emulators provided by J2ME Wireless Toolkit and Transfer it to the mobile.
2. Write a program for sending SMS to your friend by using your mobile phone. Use J2ME Wireless Toolkit to develop your application. Test it in the Emulator provided by Toolkit and Transfer it to your mobile.
3. Develop a simple calculator for your mobile by using J2ME Wireless Toolkit.
4. Design and Program Income Tax and Loan EMI Calculator for Mobile Phones.
5. Write a simple program to take a snapshot by using the Camera in your mobile. Save the snapshot in the image or video format. Use Camera Media API provided J2ME. Test it in Emulator and Transfer it to your mobile.
6. Write a program for Writing and formatting of text in WML.
7. Write a program for Navigation between cards and deck.
8. Write a program for Displaying of Image using WML.
9. Write a program for Table properties of WML.
10. Write a program for acquiring user inputs in WML.
11. Write a program for WML scripts basics.
12. Write a program for If – else structure of WML script.
13. Assignment on latest Open Source Operating Systems for Mobile.
14. Implementation of Mobile Network using Network Simulator NS2/Qualnet or any other simulator for wireless networks
15. Mobile protocol study using omnet++
16. Setup & Configuration of Wireless Access Point (AP)
17. Wireless Network Security : kismet and Netstumbler
18. A site visit can be arranged to Local BSNL or any other wireless service provider to study GSM Base Stations, MSC, etc.

## Suggested List of Programming Assignments of Cryptography and Network Security

1. Write a program to implement substitution techniques such as Caesar cipher and mono-alphabetic cipher.
2. Write a program to implement simplified-DES (S-DES) algorithm.
3. Write a program to implement extended Euclidean algorithm for finding multiplicative inverse modulo m.
4. Write a program to implement RSA algorithm.
5. Write a program to implement Rabin public key algorithm.
6. Write a program to implement ElGamal public key algorithm.
7. Write a program to implement Diffie-Hellman Key exchange algorithm.
8. Write a program using JAVA to demonstrate DES encryption and decryption.
9. Write a program using JAVA to demonstrate AES encryption and decryption.
10. Write a program using JAVA to find message digest using SHA-512.

### Final Year U.G. Program in Computer Science & Engineering (2011-12)

<b>Project II</b>
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<b>Teaching Scheme</b>	<b>P : 4</b>		
<b>Evaluation Scheme</b>	<b>Term Work</b>	<b>Pract</b>	<b>Minimum Passing Marks</b>
	50 Marks	100 Marks	40%

#### Guidelines for Students:

1. A different project can be done in Semester VIII **OR** the same Project of Semester VII can be continued depending on scope of the project and prior approval from the Head of Department.
2. Project work must be carried out by the group of **at least two** students and **maximum three** who will jointly work and implement the project. **The work must be original.**
3. To proceed with the project work it is very important to select a right topic. Project can be undertaken on any subject addressing Computer Science and Engineering / any subject taught through semester I to Semester VIII. Research and development projects on problems of practical and theoretical interest should be encouraged.
4. Project shall be any one of the following:  
Creation of software, hardware or middleware related to CSE Technologies  
or  
Fabrication of devices preferably those devices energized from converging technologies  
or

Creation of experimental setup and experimentation based on technological literature in the public domain

5. Students should submit the Project Topic along with Project Abstract and Team Members for the approval. Project Topic Must be approved by HOD and Project Coordinator.
6. The project work can be undertaken in a research institute or organization / company / any business establishment after taking prior approval of HOD.
7. Before Implementation students must submit the project documentation in the form of SRS (i.e. System Specification Requirements) that includes:
  - System Details
  - Data Model (If Back End is used) /ER Diagrams /DFD and UML diagrams.
  - Module Description
  - Module allocation to every team member
8. Even though project is a Group Activity, still it needs contribution of every team member as an individual; hence each member must implement at least 2 modules of project.
9. **If a project is found to be Purchased/Downloaded/Copied, it will be rejected at any stage and the team will be disqualified.**
10. If a one semester project is undertaken then :
  - (a) **For Project I** : The group should complete the Project I in Semester VII only and prepare a project report in **Spiral Bound** which contains following details:- Abstract, Project overview, Problem Statement, Requirement Analysis, Project design, Implementation Details, Technologies used, Results, Conclusion and References.
  - (b) **For Project II** : The group will submit the name of the New Project with a synopsis of the proposed work of not more than 03 to 08 pages. The group will submit a final **Hardbound** project report at the end of **VIII semester** as per specified format.
11. If a two semester project is undertaken then :

**For Project I** : The group will submit the name of the project with a synopsis of the proposed work of not more than 03 to 08 pages. The group should complete detail system analysis and design, data flow design, data structure layout, file design, Procurement of Hardware and/or software requirements, and partial implementation of the project in Semester VII. The group should prepare a **SpiralBound** project report containing the

work carried out in Semester VII and Implementation Plan for Semester VIII at the end of the Semester VII as a part of the term work submission.

**For Project II :** The group will continue to work on the project selected during the Semester VII and submit a final **Hardbound** project report at the end of Semester VIII containing Complete Implementation of the Project with results, conclusion and future work as per specified format.

12. Project Report Format :

The Final Hardbound Project Report complete in all respect with the following should be prepared by the group at the end of Semester VIII:

- Abstract
- Introduction (Aims and objectives,etc.)
- Literature Surveyed (if any)
- Existing system (if any)
- Problem Description
- System Definition – requirement analysis
- Details of Hardware & Software
- System Design / Methodology (your approach to solve the problem)
- System Implementation– dataflow diagram –algorithms- code documentation.
- Results (outputs)
- Conclusion
- Future Scope
- References

13. Student must submit Project Report before 2 weeks of Examination date.

14. Final Project Submissions:

The group should submit the following-

- (i) The workable project.
- (ii) The Project Report as per above format
- (iii)CD containing: Project documentation, Implementation code, required utilities, Software's and user Manual.

## **Term Work Project II**

- (vi) Student has to submit weekly progress report to the internal guide and where as internal guide has to keep track on the progress of the project and also has to maintain attendance report. This progress report can be used for awarding term work marks.
- (vii) In case of industry projects, visit by internal guide will be preferred.
- (viii) Make sure that external project guides are atleast BE graduates.
- (ix) The term work assessment will be done jointly by teachers, appointed by Head of Department.
- (x) Distribution of marks for term work shall be as follows:
  - Project Report 15 Marks
  - Term End Presentation (Internal) 10 Marks
  - Lab Attendance 5 Marks
  - Progressive Demos 20 Marks

## **Practical Examination (External)- Project II**

Project Practical Examination should be conducted by two examiners appointed by the University. Students have to give Oral, Demonstration, and Seminar (PowerPoint Presentation) on the Projects developed by them.