SOLAPUR UNIVERSITY, SOLAPUR

TYMCA (UNDER ENGG.) YEAR 2015-16

Solapur University, Solapur								
New syllabus of Third year MCA (Under faculty of Engg.) w. e. f. 2015-16								
Semester	**Paper Name**	**L**	**T**	**P**	**TH**	**TW**	**POE**	**Total**
V	Mobile communication	3			100			**100**
	Data warehousing and Data Mining	4		2	100	25		**125**
	Information Security	4			100	a		**100**
	Advanced Internet Technology	4		2	100	25		**125**
	Elective - II	4			100			**100**
	Lab-V (ASP.NET using C#	2		4		50	50	**100**
	Project			2		50	50	**100**
	Total	**21**		**10**	**500**	**150**	**100**	**750**

Semester	**Paper Name**	**L**	**T**	**P**	**TH**	**TW**	**POE**	**Total**
VI	**Software Project Development**					**150**	**100**	**250**
	Grand Total							**4000**

Elective-II:

1. Artificial Technology
2. Information Retrieval System
3. Fuzzy Logic and Artificial Neural Network
4. Cloud Computing
5. Linux Operating System

5.1 Mobile Communication

Lecture: 3 hr / week
Total Lectures: 40 **Theory: 100 Marks**

Section I

Unit 1 : Introduction **(3)**
Applications, A short history of wireless communications, A market for mobile communications, Some open research topics, A simplified reference model

Unit 2 : Introduction to wireless communication: **(5)**
Wireless data technologies, Frequencies for radio signals, antennas and signal propagation, need and types of multiplexing techniques, modulation types, use of spread spectrum, cellular systems.

Unit 3 : Medium Access Control **(6)**
Need for MAC algorithm, medium access methods and comparison of these methods

Unit 4 : Digital mobile Phone Systems: **(6)**
GSM , DECT, TETRA, UMTS and IMT 2000, comparison with GSM.

Section II

Unit 5 : Wireless LAN **(6)**
Introduction, Infrastructure and ad-hoc networks, IEEE 802.11: system and protocol architecture, physical layer, HIPERLAN, Blue tooth.

Unit 6 : Mobile network layer **(6)**
mobile IP, Dynamic host configuration protocol, Mobile ad-hoc networks.

Unit 7 : Wireless Application Protocol **(8)**
WAP architecture, Wireless datagram protocol, transport layer security.

Text Books
1. Mobile Communications – Jachen Schiller (Addison- Wesley)
2. Mobile Computing – Asoke K Talukder, Roopa R Yavgal, (TMH Publishing)
3. Mobile Computing - Raj Pandya

Reference Books
1. Mobile Computing: Technology, Applications and Service creation – Asoke K Talukder, Roopa R Yavagal, Tata McGraw Hill 2005

5.2 Data Warehousing and Data Mining

Lecture: 4hrs/ week **Total Lectures: 40** **Practical: 2hrs/ week**
Theory : 100 Marks **Term Work : 25 marks**

Objective: To study the methodology of data warehousing and data mining to derive business rules for decision support systems.

Section – I

1. DATA WAREHOUSING **(5)**

What is data warehouse?, Need of data warehouse, Data Warehouse Architecture, Data warehousing Components, Mapping the Data Warehouse to a Multiprocessor Architecture.

2. Trends in Data Warehousing **(8)**

Continuous growth of data, Significant trends, Multiple data types, Data visualization, Parallel processing, Query tools, Browser tools

3. Online Analytical Processing(OLAP) **(7)**

Online Analytical Processing (OLAP) , Need, Categories of OLAP tools, OLTP vs OLAP, Catalogs, Cognos Impromptu, Picklist prompts

Section – II

4. DATA MINING **(8)**

Introduction , KDD vs Data Mining, DBMS vs DM, Issues and Challenges, Application, Trends Affecting Data Mining

5. WEB Mining **(5)**

Introduction, Web Mining, Web Content Mining , Web Structure Mining, Web Usage Mining.

6. CLUSTERING **(7)**

Clustering, Outlier, Agglomerative, Divisive clustering, Minimum Spanning Tree, K-Means clustering,Nearest Neighbor method,PAM method, BIRCH,DBSCAN, CURE method.

Note : Practical will consist of minimum 10 assignment based on above syllabus

Textbook :

1. Arun K Pujari, “ Data Mining Techniques”

2. W.H.Inmon, “Building the Data Warehouse”, Wiley Dreamtech, Third Edition.

References:

1. Jiawei Micheline Kamber, “Data Mining Concepts and Techniques”,
Morgan Kauf Mann Publishers.

2. George M. Marakas, “Modern Data Warehousing, Mining and
Visualization”, Pearson Education, 2003.

4. Margaret H. Dunham , “Data Mining”

5.3 Information Security

Lecture: 4 hr / week
Total Lectures: 40 **Theory: 100 Marks**

Objectives:
To understand the basics and to know the Technological aspects of Information Security
To know the legal, ethical and professional issues in Information Security
To become aware of various standards in Information Security

Section-I

1. **Introduction:** **(5)**
   What is Information Security?, Critical Characteristics of Information, NSTISSC Security Model, Components of an Information System, Securing the Components, Balancing information security and access, The Security SDLC.
2. **Security Investigation and analysis:** **(6)**
   Need for Security, Business Needs, Threats, Attacks, Legal, Ethical and Professional issues, Risk Management, Identifying and Assessing Risk, Controlling Risk.
3. **Logical Design:** **(5)**
   Blueprint for Security, Information Security Policy, Standards and Practices, VISA International Security Model
4. **Physical Design:** **(4)**
   Security Technology, IDS, Scanning and Analysis tools, Cryptography, Access Control Devices, Planning for Continuity

Section-II

5. **E-Governance and IT Act 2000:** **(5)**
   Legal recognition of electronic records, Legal recognition of digital signature, Use of electronic records and digital signatures in Government and its agencies
6. **Certifying Authorities:** **(6)**
   Need of Certifying Authority and Power, Appointment, function of Controller, Digital Signature certifications, Generation, Suspension and Revocation

7. **Domain Name Disputes and Trademark Law**: **(4)**

   Concept of Domain Names, New Concepts in Trademark Jurisprudence, Cyber squatting, Reverse Hijacking, Meta tags, Jurisdiction in Trademark Dispute.

8. **Cyber Regulations Appellate Tribunal:**

   Establishment and Composition of Appellate tribunal, Powers of Adjudicating officer to Award Compensation, Powers of Adjudicating officer to Impose Penalty. **(5)**

Text Books:

1. Michael E Whitman and Herbert J Mattord, 'Principles of Information Security", Vikas Publishing House, New Delhi, 2003.
2. Cyber Law in India by Farooq Ahmad, Pioneer Books

References:

1. Micki Krause, Harold F. Tipton, "Handbook of Information Security Management", Vol 1-3 CRC Press LLC, 2004
2. Stuart Mc Clure, Joel Scrambray, george Krutz, "Hacking Exposed ", TMG, 2003
3. Matt Bishop, "Computer Security Art and Science", Pearson/PHI 2002.
4. Nina Godbbole, Information systems security: security management, metrics, frameworks and best practices (WILEY)
5. Information Technology Law and Practice by Vakul Sharma, Universal Law Publishing Co. Pvt. Ltd.
6. The Indian Cyber Law by Suresh T Vishwanathan, Bharat Law house New Delhi.
7. Hand book of Cyber & E-commerce Laws by P.M. Bakshi & R.K.Suri, Bharat Law house New Delhi.
8. Guide to Cyber Laws by Rodney D. Ryder, Wadhwa and Company Nagpur.
9. The Information Technology Act, 2000, Bare Act, Professional Book Publishers, New Delhi.

5.4 Advanced Internet Technology

Lecture: 4hrs/ week **Total Lectures: 40** **Practical: 2hrs/ week**

Theory : 100 Marks **Term Work : 25 marks**

Objective : To provide extension to web development skills, Servlets and PHP is introduced for students to enhance their skills.

Section – I

1. Internet Basics (2)

Overview of Internet, history, web system architecture, Uniform Resource Locator (URL), HTTP protocol basics, HTTP request & response, Cookies Basics

2. E – Commerce (8)

Introduction, E-commerce as business need, types advantages, disadvantages, E-commerce Architecture, Internet Payment Systems, Characteristics 4C payment methods SET protocol for Credit card payment E-Cash, E-commerce security, Need of security, Encryption: Public, Private & Hybrid, Digital signature Authentication

3. Servlets (10)

Introduction, Servlet vs CGI, Servlet API Overview, Servlet Life Cycle, Coding, Writing & running simple servlet, HTTPServlet, ServletConfig, ServletContext,
Writing servlet to handle Get & Post methods, Writing threadsafe servlet.

Section II

4. JSP (4)

Why JSP?, JSP Directives ,Writing simple JSP page, Scripting Elements, Introduction to custom tags

5. PHP (Introduction) (8)

Obtaining, Installing & Configuring PHP, Introduction PHP & web server Architecture, Model Overview of PHP Capabilities, PHP HTML embedding tags & syntax, Simple script examples, PHP & HTTP Environment variables, Variables, constants, data types.

6. PHP (Basic Operations) (8)

Operators, flow control & loops,functions, Include statements, Error handling, Processing HTML form using GET, POST, SESSION, COOKIE variables, Sending Email, Database Operation with PHP

Note : Practical will consist of minimum 10 programs based on above syllabus

Text books:

1. E-Commerce Fundamentals & Application - Wiley publications
2. Java Server Programming Vol – I Wrox Press

Reference Books:

1. Programming the World Wide Web - Robert W. Sebesta
2. Inside Servlets - Dustine R. Callway
3. Developing Java Servlets - James Goodwill
4. Beginning PHP5
5. Complete Ref. PHP

5.5 Elective – II (1) Artificial Intelligence

Lecture: 4 hr / week
Total Lectures: 40 **Theory: 100 Marks**

Section-I

Unit-I: What is artificial intelligence? The AI problem, The underlying assumption, What is an AI technique?, Level of the model, One final word. **(4)**

Unit-II: Problems, problem spaces and search, Defining the problem as state space search, Production system, Production characteristics, Production system characteristics, Issue in the design of the search program, Additional Problems **(5)**

Unit-III: Heuristic Search Techniques, Generate and Test, Hill Climbing, Best First Search, Problem Reduction, Constrain Satisfaction, Mean-Ends Analysis **(6)**

Unit-IV: Knowledge Representation Issues, Representation and mapping, Approaches to knowledge representation, Issues in knowledge representation, The Frame Problem. **(5)**

Section-II

Unit-V: Using Predicate Logic, Representing simple facts in logic, representing instance and ISA relationships, Computable functions and predicates, Resolution Natural Deduction.**(4)**

Unit-VI: Knowledge Representation using Non-monotonic Logic: TMS (Truth Maintenance System), Statistical and probabilistic reasoning, Fuzzy Logic, Knowledge representation Semantic Net, Frames, Script, Conceptual dependency. **(5)**

Unit-VII: Planning, Overview, The Blocks world, Components of planning system, Goal Stack Planning, Nonlinear Planning using Constraint Posting, Hierarchical Planning, Reactive Systems, Natural Language Processing, Syntactic Processing, Semantic Analysis, Discourse and Pragmatic Processing, Statistical Natural Language Processing, **(6)**

Unit-VIII: Expert System: Utilization and functionality, architectures of Expert system, Knowledge representation, Two case studies on expert systems, Game Playing: Minimize search procedure, Alpha-beta cutoffs, Waiting for Quiescence, Secondary Search. **(5)**

Text Books:

1. Elaine Rich, Kerin Knight, "Artificial Intelligence". TMH

References:

3. Dan W. Patterson, " Artificial Intelligence And Expert Systems", PHI

5.5 Elective – II (2) Information Retrieval Systems

Lecture: 4 hr / week
Total Lectures: 40 **Theory: 100 Marks**

Objectives:
The course introduces students with the principles of information retrieval from text, multimedia ad web. During the course students has to undergo different mathematical models and algorithms for the same.

Section-I

1. **Models :** **(6)**
   Information retrieval and data retrieval, Information retrieval process, A Formal Characterization of IR Models, Classic Information Retrieval, Structured Text Retrieval Models, Models For Browsing, Retrieval Performance Evaluation-Recall and Precision
2. **Query Languages:** **(4)**
   Keyword based querying, Pattern Matching, Structural Queries.
3. **Text and Multimedia Languages and Properties :** **(5)**
   Text data & formats, Multimedia Data & formats.
4. **Indexing and Searching :** **(5)**
   Inverted Files and Indices for text search, Boolean Queries, Sequential searching, Pattern Matching, Structural Queries.

Section–II

5. **Multimedia IR - Models and Languages :** **(4)**
   Data Modeling & Query Languages.
6. **Multimedia IR - Indexing and Searching :** **(5)**
   A generic multimedia indexing approaches, One dimensional time series, Two Dimensional color images, Automatic Feature Extraction.
7. **Searching the Web:** **(6)**
   Search Engines ,Browsing, Metasearchers, Searching using Hyperlinks
8. **Digital Libraries :** **(4)**
   Architectural issues of Digital Libraries, Document models, Representation, and Access.

Text Book -

1. Modern Information Retrieval - Ricardo Baeza-Yates and Berthier Ribeiro-Neto- Pearson Education (Low Price Edition)

Reference :

1. www.dcc.ufmg.br/irbook or sunsite.dcc.uchile.cl/irbook
2. http://nlp.stanford.edu/IR-book/information-retrieval-book.html
3. Information Storage and Retrieval- Robert R Korthage, WILEY-INDIA

Course Objectives : This course introduces students with the principles of information retrieval from text, multimedia and web . During the course students has to undergo different mathematical models and algorithms for the same.

5.5 ELECTIVE - II (3) Fuzzy and Artificial Neural Network

Lecture: 4 hr / week
Total Lectures: 40 **Theory: 100 Marks**

Section-I

1. **Classical and fuzzy sets:** **(8)**
   Introduction to classical sets-properties, operations and relations, fuzzy sets- fuzzy relations, cardinalities, membership functions.
2. **Fuzzy Logic System Components:** **(8)**
   Fuzzification, membership value assignment, development of rule base and decision making system, defuzzification to crisp sets, defuzzification methods.
3. **Applications:** **(4)**
   Neural network applications-process identification ,control fault diagnosis. Fuzzy logic applications-fuzzy logic control and fuzzy classification.

Section-I

4. **Introduction to Neural Network:** **(2)**
   Introduction, human and computers, organization of the brain, biological neuron, biological and artificial models, characteristics of ANN, McCulloch-Pitts model, applications of ANN.
5. **Essentials of Artificial Neural networks:** **(6)**
   Artificial neuron model, operations of artificial neuron, types of neuron activation functions, ANN architectures, classification taxonomy of ANN –connectivity, learning strategy (Supervised, Unsupervised, Reinforcement), learning rules.
6. **Feed Forward Neural Network:** **(6)**
   Single layer-Introduction, perceptron model, training algorithms- discrete and continuous perceptron network, Limitations of perceptron model. Multilayer- Generalized delta rule, backpropagation algorithm, Kolmogorov theorem, learning difficulties and improvements.
7. **Associative Memories:** **(6)**

Paradigms of associative memory, hebbian learning ,general concept of associative memory, bidirectional associative memory(BAM) architecture, BAM training algorithm-Storage and recall algorithm, BAM energy function

Text books:

1. S. Rajasekharan and G. A. Vijayalakshmi pai, ”Neural Network,Fuzzy logic, genetic algorithms:synthesis and applications”, PHI publication

2. John yen and reza langan, ”Fuzzy Logic: Intelligence, control and information ”, pearson education

Reference books:

1. Simon haykin,”Neural networks-A comprehensive foundation”, pearson education

2. S.N.Shivanandam,S.Sumathi,S.N.Deepa,” Introduction to neural networks using MATLAB 6.0”, TMH

3. James A Freeman and Davis Skapura,”Neural Networks” pearson education

4. Timothy J.Ross, ”Fuzzy Logic with Engineering applications”, McGraw=Hill Inc

5.5 Elective – II (4) Cloud Computing

Lecture: 4 hr / week
Total Lectures: 40 **Theory: 100 Marks**

SECTION - I

Unit 1: Overview of Cloud Computing (6 Hrs.)

Brief history and evolution - History of Cloud Computing, Evolution of Cloud Computing, Traditional vs. Cloud Computing. Why Cloud Computing, Cloud service models (IaaS, PaaS & SaaS). Cloud deployment models (Public, Private, Hybrid and Community Cloud), Benefits and Challenges of Cloud Computing.

Unit 2: Working with Private Cloud (8 Hrs.)

Basics of virtualization, Virtualization technologies, Server virtualization, Role of virtualization in Cloud Computing.Private Cloud Definition, Characteristics of Private Cloud, Private Cloud deployment models, Private Cloud Vendors, Private Cloud Building blocks namely Physical Layer, Virtualization Layer, Cloud Management Layer, Challenges to private Cloud.

Unit 3: Working with Public Clouds (6 Hrs.)

What is Public Cloud, Why Public Cloud, When to opt for Public Cloud, Public Cloud Service Models, and Public Cloud Players.Infrastructure as a Service Offerings, IaaS Vendors, PaaS offerings, PaaS vendors, Software as a Service.

SECTION - II

Unit 4: Overview of Cloud Security (8 Hrs.)

Explain the security concerns in Traditional IT, Introduce challenges in Cloud Computing in terms of Application Security, Server Security, and Network Security. Security reference model, Abuse and Nefarious Use of Cloud Computing, Insecure Interfaces and APIs, Malicious Insiders, Shared Technology Issues, Data Loss or Leakage,Account or Service Hijacking.

Unit 5: Overview of Multi-Cloud Management Systems (6 Hrs.)

Explain concept of multi -cloud management, Challenges in managing heterogeneous clouds, benefits and advantages of multi-cloud management systems.

Unit 6: Future directions in Cloud Computing (6 Hrs.)

Future technology trends in Cloud Computing with a focus on Cloud service models, deployment models, cloud applications, and cloud security,Current issues in cloud computing leading to future research directions.

Text Book:

1) Cloud Computing: Principles and paradigms By Raj Kumar Buyya, James Broberg, AndrezeiM.Goscinski, 2011 Cloud Computing, By Michael Miller, 2008.
2) Cloud Computing for dummies, By Judith Hurwitz, Robin Bllor, Marcia Kaufman, Fern Halper, 2009.
3) Cloud Computing: A Practical Approach, By Anthony T. Velte, Toby J. Velte, and Robert Elsenpeter, McGraw Hill, 2010.
4) Handbook of Cloud Computing, By BorkoFurht, Armando Escalante (Editors), Springer, 2010.

Reference Book:

1) Cloud Security, A comprehensive Guide to Secure Cloud Computing by Krutz, Ronald L.; Vines, Russell Dean
2) Cloud computing: Implementation, management and security By Rittinghouse, John, W.
3) Mastering Cloud Computing, RajkumarBuyya, Christian Vecchiola, S. ThamaraiSelvi, McGraw Hill, 2013

5.5 Elective – II (5) Linux Operating System

Lecture: 4 hr / week
Total Lectures: 40 **Theory: 100 Marks**

Section-I

1. Introduction to Linux Kernel: Overview of operating system and kernel, Linux versus Classical Unix kernel, The Linux Kernel development Community, The kernel source tree, A beast of a different nature. **(5)**

2. Process Management and scheduling: Process descriptor and the task structure, process creation, The Linux implementation o threads, process termination. Process scheduling policy, The Linux scheduler algorithm, preemption and context switching, schedule related system calls. **(6)**

3. System calls: Syscalls, system call handler, system call implementation, system call context, system calls in conclusion **(4)**

4. Interrupt and Interrupt Handler: Interrupts, interrupt handler, registering an interrupt handler, writing an interrupt handler, interrupt context and interrupt control. **(5)**

Section-II

5. Kernel Synchronization Introduction: Critical regions and race conditions, locking, deadlocks, contention and scalability, atomic operations, spin locks, reader-writer spin locks, semaphores, reader-writer semaphores. Spin locks versus semaphores, BKL **(5)**

6. Timer and Timer Management: Kernel notion of time, the tick rate, jiffies, hardware clocks and timers, the timer interrupt handler, the time of day, timers, delaying execution, out of time. **(4)**

7. Memory Management: Pages, Zones, kmalloc(), vmalloc(), slab layer slab allocator interface, high memory mappings, per-CPU allocation, the new per-cpu interface.Virtual file system: Common files system interface, files system abstraction, VFS objects and data structures, the super block object, the inode object, the dentry object and the file object. **(6)**

8. The block I/O layer and the process address space: Anatomy of block device, buffer and buffer heads, the bio structure, request queues, I/O schedulers. the memory descriptor, memory areas, manipulating areas, page tables, page cache, radix tree, introduction to modules. **(5)**

Text Book:

1. Linux Kernel Development, Second edition, Robert Love, Pearson

Reference Books:

1. Operating system design and implementation – A.S.Tanenbaum, PHI

2. Operating system design – D. Comen, PHI

3. The design of the UNIX operating system – M.J.Bach, PHI

5.6 LAB -V (ASP.Net Using C#)

Tutorial: 2 Hours/Week
Practical: 4 Hours/Week

Practical/Oral: 50 Marks
Term Work: 50 Marks

1. Introduction to ASP.NET

Overview of .NET framework, Visual Studio Integrated Development Environment, features in visual studio IDE: code editor, page inspector, HTML editor, CSS editor.

2. Introduction to C#

C# language features, Working with variables, constants, operators and strings, control statements, exception handling. Defining classes and class members.

3. Visual programming using C#

Programming with button, label, TextBox, RadioButton, CheckBox, Listbox, Combobox, TabControl, PictureBox Controls.

4. Web applications in ASP.NET

Concepts of web application, ASP.NET core services, web forms, web pages. ASP.NET web API, ASP.NET MVC.

5. ASP.NET Standard controls

Introduction to the Control class, System.web.UI.WebControl Class, TextBox, Label, Image, CheckBox, RadioButon, Table, Panel, Calendar, FileUpload controls.

6. Validation and Login Controls

Introduction to basic validation controls, validation techniques, Using Advanced Validation Controls. State Management: Using view state, using session state, using application state, using cookies and URL encoding. Master pages and navigation.

7. Databases

Introduction, using data sources, GridView, FormView, ListView and DataPager controls, Using object data sources.

Note : Practical will consist of minimum 10 assignment based on above syllabus

Text Books:

1. Beginning Visual C# 2010, K. Watson, C. Nagel, J.H. Padderson, J.D> Reid, M. Skinner, Wrox (Wikey) 2010.
2. Beginning ASP.NET 4 in C# and VB, I Spanjaars, Reprint 2011.

References:

3. ASP.NET 4.0 programming, J. Kanjilal, Tata McGraw-Hill
4. Programming ASP.NET, D Esposito, Microsoft press, Reprint 2011.
5. ASP.NET Visual C# NET, Vijay Nicoel, TMH
6. ASP.NET 4.5 DT Editorial Services, DreamTeach press
7. C# 2012 Kogent Learning Solutiojns Inc, DreamTech press
8. Magic of ASP.Net with C$#, Kumar Sanjeev, Shibi Panikkar, Fire Wall Media

5.6 Project

Practical: 2 Hours/Week

Practical/Oral: 50 Marks
Term Work: 50 Marks

Software project based on subjects of the this term

List of practical exercise:

1. Write a console application with C# to accept four integer values from user and calculate their product.
2. Write an console application with C# uses two command line arguments to accept values in string and calculate their sum.
3. Write an application that receives and print student information as below;
   Student Id, Student Name, Course Name, Date of Birth.
4. Write programs with C# using conditional and loop statements
   a) Generate Fibonacci series
   b) Prime number test
   c) Find sum of digits and reverse the number
   d) an array processing
5. Write a object oriented programs with C# for
   a) function overloading
   b) inheritance
   c) Constructor overloading
   d) Interfaces
   e) Exception handling
6. Program using different controls
7. Programs using CSS
8. Programs using ASP.NET Server controls
9. Database programs with ASP.NET and ADO.NET
10. Programs securing web pages.