MCA SYLLABUS

Sr. No.	COURSE CODE	SUBJECT	PERIODS			INTERNAL ASSESMENT	ESE	SUBJECT TOTAL
			L	T	P			
1	MCA-301	Java Technologies	3	1		20	80	100
2	MCA-302	Web Technologies	3	1		20	80	100
3	MCA-303	Computer Graphics	3	1		20	80	100
4	MCA-304	Advanced Database System	3	1		20	80	100
5	MCA-305	Theory of Computation	3	1		20	80	100
Practicals								
1	MCA-351	Mini Project using Java			4	20	80	100
2	MCA-352	Web Design Lab			4	20	80	100
3	MCA-353	Computer Graphics Lab using C/C++			4	20	80	100
4	MCA-354	Advanced DBMS Lab			4	20	80	100
		Total				**180**	**720**	**900**

MCA Year 2 Semester III

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MCA-301
Java Technologies

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Class: III Sem. MCA   **Evaluation**

Branch: MCA
Schedule Per Week
Lectures: 3
Examination Time: Three Hours   Maximum Marks= 100 [Mid-term (20) & End-term (80)]

Content of the Subject

Introduction to Java Enterprise
Introduction to Java Enterprise APIs, JDBC fundamentals, Multitier architecture, Web Applications in JEE. Introduction to RMI, EJB's and JavaFx.

Servlets
Servlets fundamentals, architecture, life cycle of a servlet, initialization, threads, servlets and HTML, retrieving data in servlet, servicing the GET and POST requests, servlet sessions session tracking, cookies. Inter servlet communication and servlet security.

JDBC and Inter servlet
JDBC and Inter servlet communications JDBC, Driver types, JDBC servlet, JDBC connection pooling. Introduction to Java Frameworks-Hibernate and Struts.

JSP
JSP fundamentals, architecture, implicit objects, standard actions, JSP errors. Different packages of JSP and servlets. Java Mail using JSP.

Introduction to Spring
Introduction to Spring Web MVC, The Dispatcher Servlet , A Simple View Page, Adding a View Resolver, Adding a message bundle, Using JDBC with Spring.

Text Books:
1. "Advanced Java 2 Platform HOW TO PROGRAM" by H. M.Deitel, P. J. Deitel, S. E. Santry,   Prentice Hall, 2001
2. "Beginning Java™ EE 6 Platform with GlassFish 3 From Novice to Professional" by Antonio Goncalves – Apress publication, 2009
3. "Beginning Spring" by Mert Caliskan, Kenan Sevindik, Wrox Publication, 2015

References:

1. Perroud, Thierry, Inversini, Reto , "Enterprise Architecture Patterns :Practical Solutions for Recurring IT-Architecture Problems", Springer, 2013

2. Dustine R Callway , "Inside Servlets:Server Side Programming for Java ", Addison-Wesley, 1999

3. Kogent Solutions Inc., "Java 6 Programming Black Book", Dreamtech Press, 2007

4. David Flangan, "Java in a Nutshell", Oreilly Publications, 2005

5. James Gosling, Bill Joy, Guy Steele, Gilad Bracha and Alex Buckley, " TheJava language specification", Oracle Press, 2014

MCA-302
Web Technologies

Class: III Sem. MCA
        Evaluation

Branch: MCA
Schedule Per Week
Lectures: 3
Examination Time: Three Hour   Maximum Marks= 100 [Mid-term (20) & End-term (80)]

Content of the Subject

Introduction to HTML:
The internet: history of the World Wide Web, hardware and software trend, object technology – java script object, scripting for the web-browser portability.
Introduction of HTML: introduction, markup language, editing HTML : common tags, headers, text styles, linking, images, formatting text, horizontal rules and more line breaks, unordered lists, nested and ordered lists, basic HTML tables : intermediate HTML tables and formatting : basic HTML forms, more complex HTML forms, HTML5: Input Types & Attributes, internal linking, creating and using image maps

Java script
Introduction to scripting: introduction- memory concepts- arithmetic- decision making. Java script control structures, Java script functions: introduction – program modules in java script - function definitions, duration of identifiers, scope rules, recursion, java script global functions.
Java script arrays: introduction, array-declaring and allocating arrays, references and reference parameters – passing arrays to functions, multiple subscripted arrays. Java script objects: introduction, math, string, date, boolean and number objects.

Dynamic HTML
CSS: introduction – inline styles, creating style sheets with the style element, conflicting styles, linking external style sheets, positioning elements, backgrounds, element dimensions, text flow and the CSS box model, user style sheets, Filter and Transitions, HTML DOM, Browser BOM
Event model : introduction, event ON CLICK, event ON LOAD – error handling with ON ERROR, tracking the mouse with event, more DHTML events.

Introduction to PHP & web server Architecture Model
Overview of PHP Capabilities, PHP HTML embedding tags & syntax, Simple script examples, PHP & HTTP Environment variables. PHP Language Core-Variables, constants, data types, PHP: operators, flow control & loops, Arrays, string, functions Include & require statements, Simple File & Directory access operations,
Error handling, Processing HTML form using GET, POST, REQUEST, SESSION, COOKIE variables, Sending E-mail, Database Operations with PHP, Connecting to My-SQL (or any other database), Selecting a db, building & Sending Query, retrieving, updating & inserting data, CMS: Wordpress
Note: XAMMP is used for PHP

Text Books:

1. Harvey M. Dietel, Paul Dietel & Tem R. Nieto, ",Internet & World Wide Web How to Program", Pearson, 2011
2. Ivan Bayross. "Web enabled commercial application development using HTML, DHTML, JavaScript, PERL-CGI", BPB Publications, 2010

References:

1. Hofstetter, Fred, "Internet Technology at work", Osborne, 2004
2. Steven Holzner, "PHP: The Complete Reference", McGrawHill, 2008
3. Elizabeth Naramore, Jason Gerner, Jeremy Stolz, and Timothy Boronczyk Beginning PHP, Apache, MySql web development.Wrox Publication, 2009
4. Ivan Bayross, Sharanam Shah, Shroff ,"PHP 5.1 for Professionals", Publishers and Distributers Pvt. Ltd., 2007

Class: III Sem. MCA
        Evaluation

Schedule Per Week
Lectures: 3
Examination Time: Three Hours   Maximum Marks= 100 [Mid-term (20) & End-term (80)]

Content of the Subject

Introduction
Elements of graphics workstation. Video Display Devices. Raster Scan Systems. Random Scan systems. Input devices. Graphics Software Coordinate Representations, Fundamental Problems in Geometry.

Algorithms
Line drawing algorithms- DDA Algorithm. Bresenham's Line Algorithm. Frame buffers. Circle and Eclipse generating algorithms. Midpoint Circle Algorithm. Sean-line polygon fill algorithm. Inside-Outside tests. Sean- Line fill of curved Boundary Areas. Boundary fill Algorithm. Flood fill Algorithm. Character generation. Attributes of lines, curves, filling, characters. etc.

Graphics Primitives
Primitive Operations, The display file interpreter-Normalized Device Coordinates. Display-File structure. Display – file algorithm. Display control and Polygons- polygon representation.

Attributes of output primitives
Line attributes - Line type. Line width. Pen and Brush options. Line Color. Color and gray scale levels. Color-tables. Gray scale. Area- Fill Attributes- Fill styles. Pattern fill. Soft fill. Character Attributes. Text attributes.

Geometric Transformations
Matrices. Scaling Transformations. Sin and Cos Rotation. Homogeneous Co-ordinates and Translation. Co-ordinate Translations. Rotation about an arbitrary point. Inverse Transformations, Transformations Routines.

2-D Viewing
The viewing pipeline. Viewing co-ordinate, Reference Frame. Windows to view ports . co-ordinate transformation 2-D Viewing functions. Clipping operations point clipping. Line clipping. Cohen- Sutherland. Line Clipping. Polygon clipping. Sutherland Hodge man clipping.

3-D concepts

Three dimensional Display Methods Parallel projection. Perspective projection. Visible line and surface identification. Surface rendering. Three Dimensional Object representations. Bezier curves and surfaces. B-Spline curves and surfaces. Visibility, Image and object precision Z- buffer algorithm. Floating horizons.

Computer Animation
Design of Animation Sequences. General Computer Animation Functions-Raster Animations. Key Frame Systems. Morphing Simulating Accelerations. Motion Specifications. Kinematics and Dynamics.

Text Books:
1. Donald Hearn & M. Pauline Baker, "Computer Graphics", Pearson , 2008
2. James D. Foley, Andries van Dam, Steven K. Feiner & John F. Hughes, " Computer Graphics: Principles and Practice", 1997

References:
1. Jeffrey J. McConnell, "Computer Graphics: Theory and Practice", Jones and Bartlett Publishers, 2006
2. John DiMarco, "Computer Graphics and Multimedia Applications, Problems and Solutions", Idea Group Publishing, 2004

MCA-304
Advanced Database System

Class: III Sem. MCA

Evaluation

Branch: MCA
Schedule Per Week
Lectures: 3
Examination Time: Three Hours   Maximum Marks= 100 [Mid-term (20) & End-term (80)]

Content of the Subject

Object Oriented Database Management System
Introduction, Object-Oriented Data Model, Object Oriented Languages, Persistent Programming Languages. Object-Relational Databases: Nested Relations, Complex Types, Inheritance, Reference Types, Querying with Complex Types, Functions and Procedures Storage for Object Databases.

Distributed Databases
Introduction, Advantages, Architecture, Homogeneous & Heterogeneous DDBMS, Distributed Data Storage (Fragmentation & Replication), Distributed Transactions, Commit protocol, Concurrency Control in Distributed Databases, Availability, Distributed Query Processing

Parallel Databases
Introduction,Architecture, I/O Parallelism and Skew, Interquery Parallelism, IntraqueryParallelism, Intraoperation Parallelism (Parallel Sort, Parallel Join), Interoperation Parallelism, Design of Parallel Systems

PL/SQL
PL/SQL basics, blocks, architecture, variables, constants, attributes, character set, PL/SQL control structure, data types, precompiler, conditional and sequential control statements, cursors, exceptions, triggers, procedures and packages.

Introduction to Advanced Database Concepts
Spatial Data Management, Web Based Systems, Multimedia databases, Mobile Database, Deductive Database and Recursive Queries, Information Retrieval and Indexing for Text Search, XML Database, XML Data Model, Xquery, Efficient Evaluation of XML Queries

Text Books:
1. Raghu Ramkrishnan, Johannes Gehrke , "Database Management Systems", McGraw Hill International, 2007
2. Abraham Silberschatz, Henry Korth, S, Sudarshan,, "Database System Concepts", McGraw Hill International, 2005
3. C.J.Date, Longman, "An Introduction to Database System", Pearson Education, 2003

References:
1. Elmasri R and Navathe SB, "Fundamentals of Database Systems", Addison Wesley, 2000.
2. Thomas Connolly, Carolyan Begg,, "Database Systems,: A Practical Approach to Design, Implementation and Management, Addison Wesley, 2014

3. Ceri Pelagatti, "Distributed Database: Principles and System" , Addison Wesley, 1999.
4. Simon AR, "Strategic Database Technology: Management for the year 2000", Morgan Kaufmann, 1995
5. Gray J and Reuter A, "Transaction Processing: Concepts and Techniques", Morgan Kaufmann, 1993.

Theory of Computation

Class: III Sem. MCA   **Evaluation**
Branch: MCA
Schedule Per Week
Lectures: 3
Examination Time: Three Hours   Maximum Marks= 100 [Mid-term (20) & End-term (80)]

Content of the Subject

Review of basic concepts
Graphs, Trees, Strings, Mathematical Induction, finite State Machine, types of languages and Grammars. Overview of Theoretical Computer Science (including computationally intractable problems) , Introduction to System software including various phases / Modules in the design of a typical compiler , Chomsky Classification.

Finite Automata
Finite Automata, Deterministic Finite Automata (DFA), Non-Deterministic Finite Automata (NFA),statement of Kleen's Theorem, Regular Expressions, Equivalence of DFAs, NFAs and Regular Expressions, Closure properties of Regular Language, Non-Regular Languages, Pumping Lemma. Myhill Nerode Theorem, Use of Regular expressions in the Design of scanner (lexical analyzer). Introduction to JFLAP Simulation.

Context Free Languages
Context Free Grammar (CFG), Parse Trees, Push Down Automata (deterministic and nondeterministic) (PDA), Equivalence of CFGs and PDAs, Closure properties of CFLs, Pumping Lemma, Parsing (including LL(1) , SLR and LR(1) Parsing Method).

Turing Machines and Computability Theory
Definition of Turing Machine, Extensions of Turing machines, Non – deterministic Turing machines, Equivalence of various Turing Machine Formalisms, Church – Turing Thesis, Decidability, Halting Problem, Reducibility, Recursion Theorem.

Complexity Theory
Time and Space measures, Hierarchy theorems, Complexity classes P, NP, space complexity , Savich theorem , L, NL, PSPACE complexity , Post correspondence problem, Probabilistic computation.

Text Books:
1. John C. Martin, "Introduction to Languages and the Theory of Computation", McGraw-Hill, 2003
2. Michael Sipser, "Introduction to the Theory of Computation", Cengage Publication, 2003
3. Wayne Goddard, "Introducing the Theory of Computation", Jones & Bartlett India Pvt.Ltd, 2009.

References:

1. Dexter C. Kozen, "Theory of Computation: Classical and Contemporary Approaches", Springer, 2006
2. J. Hopcroft, R. Motwani, and J. Ullman, "Introduction to Automata Theory, Language and Computation", Pearson, 2008.
3. K. L. Mishra and N. Chandrasekharan, "Theory of Computer Science Automata Language Computation", PHI, 2006
4. H. R. Lewis and C. H. Papadimi Triou, "Elements of the Theory of Computation", Pearson, 1997

MCA-351
Mini Project Using Java

Class: III Sem. MCA   **Evaluation**

Branch: MCA

Examination Time: Three Hours   Maximum Marks= 100 [Mid-term (20) & End-term (80)]

Objective: Student should able to develop a small real time industry application using Java.

Guidelines regarding project:

1. Students should work in group. Minimum number of students in one group can be 2. Maximum number of students in one group can be 4.
2. Students will be working under supervision of one teacher.
3. A teacher can have maximum 5 groups to supervise.
4. Students will submit a synopsis of the project.
5. Two copies of the report should be submitted.
6. The reports should be spiral bound along with the soft copy of the project.
7. The reports should be submitted with the following guidelines in the prescribed format.
    - Paper size: A4
    - Font: Times New Roman
    - Chapter Heading: 16pt
    - Sub Heading: 14, Sub-Sub Headings: 12
    - Bold Running Matter: 12 pt
    - All topics should be numbered accordingly.
    - Paragraph Gap: 6 Pt Maximum
    - Line Gap: 1.5
    - Margins: Left 1.5, Right, Top and Bottom 1 inch

Class: III Sem. MCA   **Evaluation**

Branch: MCA

Examination Time: Three Hours   **Maximum Marks:100 [Mid-term (20) & End-term (80)]**

Objectives of the laboratory

- Learn how to design and develop a Website using HTML, CSS , JavaScript & PHP
- Learn how to link pages so that they create a Web site.
- Design and develop a Web site using text, images, links, lists, and tables for navigation and layout.
- Learn how to develop a blog

List of experiments

HTML:

- Basics Elements & Attributes, HTML Formatting tags, Links,
- Images, Tables, Forms Elements
- HTML5 Audio and Video, HTML5 Input Types & Attributes
- CSS Syntax, CSS Attribute Selectors
- CSS properties: Fonts, Background, Colors, Links, Lists,
- CSS Box Model, Display, Opacity, Float, Clear
- CSS Layout, CSS Navigation Bar,
- CSS Rounded Corners, CSS Border Images, CSS Animations

JavaScript:

- Displaying Output, DeclaringVariables, Operators, Arithmetic, Data Types,Assignment,
- JavaScript Functions, Booleans, Comparisons, Conditional ,
- JavaScript Switch, Loops, Break, Type,
- JavaScript Objects, Scope,
- Strings and String Methods
- Numbers and Number Methods, Math, JavaScript Dates: Formats and Methods
- JavaScript Events, JavaScript, JavaScript Forms (API and Validation), Objects,
- JavaScript Functions, JavaScript DOM, JavaScript Validation, Browser BOM

PHP:

- Installing XAMMP
- Variables, Data Types, Constants, Operators, Programming Loops,
- PHP Functions,
- Arrays
- Strings Functons
- PHP Form Handling, Require & Include
- PHP with Mysql
- WordPress Installation

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MCA-353
Computer Graphics Lab Using C/C++

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Class: III Sem. MCA   **Evaluation**
Branch: MCA
Examination Time: Three Hours   Maximum Marks:100 [Mid-term (20) & End-term (80)]

Objectives of the Laboratory

- The objective of this course is to get hands-on experience with graphics programming and implementing the techniques learnt in the theory course.
- Students acquire knowledge about the basic concepts of 2D and 3D graphic functions. They also learn various transformation and clipping techniques.

List of Experiments
1. Implementation of algorithms on line (DDA,Bresenham), circle (Mid-point)
2. Two Dimensional transformations- Translation, Rotation, Scaling, Reflection
3. Composite 2D Transformation
4. 2D Line Clipping- Cohen Sutherland
5. 3D Transformation- Translation, Rotation, Scaling
6. Color Fill Algorithms – Flood Fill, Boundary Fill
7. Drawing 2D & 3D objects
8. Generating images
9. Implementation of programs using following functions. Instructors will instruct students to use different given graphics functions in making graphics programs:
   circle, cleardevice, closegraph, drawpoly, fillpoly, imagesize, line, lineto, linerel, moveto, moverel, outtext, outtextxy, putimage, putpixel, rectangle, sector, setbkcolor, setcolor, setfillstyle, setlinestyle, getarccords, getbkcolor, getcolor, getdrivername, getimage, getmaxcolor, getmaxx, getmaxy, getpixel.

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MCA-354
Advanced DBMS Lab

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Class: III Sem. MCA   **Evaluation**
Branch: MCA
Examination Time: Three Hours   Maximum Marks= 100 [Mid-term (20) & End-term (80)]

Objectives of the laboratory:
Upon successful completion of this lab the student of this lab will be able to:

1. Familiarize with creation of databases with constraints.
2. Understand the Control structures of PL/SQL Programming.
3. To be able to apply advanced concepts of PL/SQL like cursors, procedures and triggers.

List of experiments:

1. SQL data types, Operators, Literals, Constraints
2. Assignment on Queries: Select / From / Where/ Group By/Having Clause/ Order By Clause/ SQL Operators/ Joins/ Built-in Functions
3. PL/SQL Block Structure
4. Conditional Statements
5. Iterations: Simple Loops, For Loop, While Loop, Nested Loops
6. Exception Handling
7. Database Programming with Record Variables
8. Database Programming with Cursors, Cursor-For Loop
9. Procedures & Functions
10. Triggers
11. Packages

Sr. No.	COURSE CODE	SUBJECT	PERIODS			INTERNAL ASSESMENT	ESE	SUBJECT TOTAL
			L	T	P			
MCA Year 2 Semester IV								
1	MCA-401	Software Engineering & UML	3	1		20	80	100
2	MCA-402	.Net Framework and Programming in ASP.Net	3	1		20	80	100
3	MCA-403	Open Source Operating System	3	1		20	80	100
4	MCA-404	Artificial Intelligence	3	1		20	80	100
5	MCA- 405	Elective 1*	3	1		20	80	100
Practicals								
1	MCA-451	Seminar Presentation-I			4	20	80	100
2	MCA-452	. Net Mini Project			4	20	80	100
3	MCA-453	Linux Lab(Shell Script & Security)			4	20	80	100
4	MCA-454	Colloquium (Group Discussion)			4	20	80	100
		Total				**180**	**720**	**900**
		Elective 1*						
	MCA-405A	Data Mining & Data Warehousing						
	MCA-405B	Information Protection & Security						
	MCA-405C	Soft Computing						
	MCA-405D	Mobile Application Development						
	MCA-405E	E-Commerce						

Note: A student can opt for **one** of the five given specializations in semester **IV.** Accordingly corresponding electives will be chosen from the given category for E**lective 2** and El**ective 3** in semester **V.**

Specializations

A: Database Systems [MCA-405A, MCA-504A, MCA-505A]

ELECTIVES	COURSE CODE	SUBJECT
Elective 1	MCA-405A	Data Mining & Data Warehousing
Elective 2	MCA-504A	Big Data Technologies & Analytics
Elective 3	MCA-505A	Database Intensive Computing & Security

B: Security [MCA-405B, MCA-504B, MCA-505B]

ELECTIVES	COURSE CODE	SUBJECT
Elective 1	MCA-405B	Information Protection & Security
Elective 2	MCA-504B	Cyber Security & Quantum Cryptography
Elective 3	MCA-505B	Cryptography

C: Artificial Intelligence[MCA-405C, MCA-504C, MCA-505C]

ELECTIVES	COURSE CODE	SUBJECT
Elective 1	MCA-405C	Soft Computing
Elective 2	MCA-504C	Bio-Informatics
Elective 3	MCA-505C	Artificial Neural Networks

D: Mobile Computing [MCA-405D, MCA-504D, MCA-505D]

ELECTIVES	COURSE CODE	SUBJECT
Elective 1	MCA-405D	Mobile Application Development
Elective 2	MCA-504D	Mobile Operating System
Elective 3	MCA-505D	Embedded Systems

E: e-business Technologies [MCA-405E, MCA-504E, MCA-505E]

ELECTIVES	COURSE CODE	SUBJECT
Elective 1	MCA-405E	E-Commerce
Elective 2	MCA-504E	ERP Systems
Elective 3	MCA-505E	Web Mining

Class: IV Sem. MCA   **Evaluation**
Branch: MCA
Schedule Per Week
Lectures: 3
Examination Time: Three Hours   Maximum Marks: 100 [Mid-term (20) & End-term (80)]

Content of the Subject
Software Engineering Fundamentals: Software Engineering - A layered Technology, The importance of software, software myths, software engineering paradigms, Software Process Models: Linear Sequential Model, Prototyping Model, RAD Model Evolutionary Software Process Models: Incremental Model, Spiral Model Component Assembly Model, Formal Methods, Fourth-Generation Techniques.

Analysis Concepts and Principles: Analysis Concepts and Principles, the Elements of the Analysis Model Data Modifying, Functional Modeling and Information Flow and Behavior Modeling, Mechanics of Structured Analysis, Data Dictionary. Requirement analysis, tasks, analyst, software prototyping, specification principles, representation and the software requirements specification.

Software Project Planning: Software Project Planning, Size Estimation, Cost Estimation, Models, Static, single variable models, Static, Multivariable Models, COCOMO, The Putnam Resource Allocation Model, Risk Identification and Projection: RMMM, Project scheduling and Tracking.
Software Design Process, Design Principles, Design Concepts: Effective Modular Design, Design Heuristics, Design Documentation, Design Methods: Data Design, Architectural Design, Interface Design, Human Computer Interface Design, Procedural Design. Case Study for Design of any Application Project.

Software Testing : S/W Testing Fundamentals, White Box Testing, Black Box Testing, software testing   strategies, verification and Validation, System Testing, Unit testing, Integration testing and Debugging. Software Maintenance Maintainability – maintenance Tasks, Characteristics of a good quality software. Case Study for Testing Techniques

Unified Modeling Language (UML): Unified Modeling Language, Basic structures and modeling classes, common modeling techniques, relationships, common mechanism, class diagrams. Advanced structured modeling, advanced classes and relationships, interfaces, types and roles, instances and object diagram. Basic idea of behavioral modeling. State diagrams, Interaction diagrams, Use case diagrams Object- oriented concepts and principles. Identifying the elements of an object model. Object oriented projects metrics and estimation.

Text Books:
1. Roger S Pressman, Bruce R Maxim, "Software Engineering: A Practitioner's Approach", Kindle Edition, 2014.
2. Ian Sommerville," Software engineering", Addison Wesley Longman, 2014.

References:
1.   James Rumbaugh. MichealBlaha "Object oriented Modeling and Design with

UML", 2004.
2. Ali Behforooz, Hudson, "Software Engineering Fundamentals", Oxford, 2009.
3. Charles Ritcher, " Designing Flexible Object Oriented systems with UML", TechMedia , 2008.
4. Grady Booch, James Rumbaugh, IvarJacobson.," The Unified Modeling Language User Guide", 2004.

MCA-402
.Net Framework and Programming in ASP.Net

Class: IV Sem. MCA   **Evaluation**
Branch: MCA
Schedule Per Week
Lectures: 3
Examination Time: Three Hours   Maximum Marks: 100 [Mid-term (20) & End-term (80)]

Content of the Subject
Introduction to .NET Framework: Introduction, Advantages & Components, CLR, CTS,CLS,MSIL,JIT,GC, BCL(Base Class Library), Compilation of .NET Applications, Features of .NET Framework, C#/VB .Net Basics, Creating Applications using Visual studio IDE and Command Line compiler, About .NET Assemblies- Creating an Assembly, Namespaces

Conceptual Overview of ASP.NET Framework: Client And Server Architecture, Page Life Cycle, All Standard Controls, Validation Controls, Navigation Controls, Rich Web Controls. Creating and Implementing User and Custom Controls, Design website with Master Pages.

ASP.NET Configuration: Session and Application Management, Caching, Security-Authentication and Authorization, Localization and Globalization, Exception Handling, Using AJAX Control toolkit.

Working with Data Controls: Basics of ADO.NET, OLEDB and SQL Managed Data Providers- Data adapters, Dataset, DataReader, ExecuteReader, ExecuteScalar, ExecuteNonQuery, DataTable, DataRow, DataColumn, Crystal Reports

Introduction to Web Services: need of Web Services, role of XML, UDDI, WSDL, HTTP and SOAP Protocol, Web Service Vs WCF (Windows Communication Foundation).

Text Books:
1. Jeffery Ritcher "Applied Microsoft .Net framework programming", MS Press 2002.

References:
1. ImarSpaanjaars," Beginning ASP. NET 4: in C# and VB", Wrox Publication 2010.
2. Thuan L. Thai, Hoang Q. Lam ".Net framework essentials", O'Reilly 2003
3. Juval Lowy "Programming .Net components" O'Reilly.2003

MCA -403
Open Source Operating System

Class: IV Sem. MCA   **Evaluation**
Branch: MCA
Schedule per Week
Lectures: 3
Examination Time: Three Hours   Maximum Marks: 100 [Mid-term (20) & End-term (80)]

Contents of the Subject

Introduction: Introduction to concept of Open source software, Introduction to Linux , Evolution of Linux, Linux vs. UNIX, Different Distributions of Linux, Installing Linux, Linux Architecture, Linux file system (inode, Super block, Mounting and Unmounting), Essential Linux Commands (Internal and External Commands), Kernel, Process Management in Linux, Signal Handling, System call, System call for Files, Processes and Signals.

Shell Programming: Shell Programming – Introduction to Shell, Various Shell of Linux, Shell Commands, I/O Redirection and Piping, Vi and Emacs editor, Shell control statements, Variables, if-then-else, case-switch, While, Until, Find, Shell Meta characters, Shell Scripts, Shell keywords, Tips and Traps, Built in Commands, Handling documents, C language programming, Prototyping, Coding, Compiling, Testing and Debugging, Filters, Advanced filters: sed and awk

Advance Shell Programming: Shell and sub shells, export, Shell Procedures and Reporting, exec.

Linux System Administrations: File listings, Ownership and Access Permissions, File and Directory types, Managing Files, User and its Home Directory, Booting and Shutting down (Boot Loaders, LILO, GRUB, Bootstrapping, init Process, System services)

Text Book:
1. UNIX: Concepts and Applications, Sumitabha Das, McGraw-Hill, 4th Edition, 2008. Reference

References:
1. Practical Guide to Linux Commands, Editors, and Shell Programming, Sobell, Pearson, 2nd Edition, 2010.
2. A Practical Guide to Fedora and Red Hat Enterprise Linux, Sobell, Pearson, 5th Edition, 2010.

MCA -404
Artificial Intelligence

Class: IV Sem. MCA   **Evaluation**
Branch: MCA
Schedule Per Week
Lectures: 3
Examination Time: Three Hours   Maximum Marks: 100 [Mid-term (20) & End-term (80)]

Content of the Subject
Concept of intelligence
An Overview of AI: The AI problems, what is an AI technique; Characteristics and applications of AI, General Problem solving: Production systems; Control strategies; forward and backward chaining, Exhaustive searches: Depth first Breadth first search.

Heuristic Search Techniques: Hill climbing, Branch and Bound technique; Best first search and A* algorithm; AND/OR Graphs; Problem reduction and AO* algorithm; Constraint Satisfaction problems Game Playing Min Max Search procedure; Alpha-Beta cutoff; Additional Refinements.

Knowledge Representation Techniques: First Order Predicate Calculus; Skolemnisation; Resolution Principle and Unification; Inference Mechanisms Horn's Clauses; Semantic Networks; Frame Systems; Scripts; Conceptual Dependency, AI Programming Languages: Introduction to LISP, Syntax and Numeric Function; List manipulation functions; Iteration and Recursion; Property list and Arrays.

Natural Language Processing and Parsing Techniques: Context Free Grammar; Recursive Transition Nets (RTN); Augmented Transition Nets (ATN); Semantic Analysis, Case and Logic Grammars

Probabilistic Reasoning and Uncertainty: Probability theory; Bayes Theorem and Bayesian networks; Certainty Factor.

Expert Systems: Introduction to Expert Systems, Architecture of Expert Systems; Expert System Shells; Knowledge Acquisition; Case Studies; MYCIN, Concept of Learning, Rote Learning; Learning by Induction; explanation based learning.

Text Books:
1.   Elaine Rich and Kevin Knight: Artificial Intelligence, 3rd Edition, Tata McGraw Hill, 2008
2.   Dan W. Patterson, Introduction to Artificial Intelligence and Expert Systems –
        Prentice Hal of India., 1999

References:
   1. Artificial Intelligence: A Modern Approach, Stuart Rusell, Peter Norving, Pearson Education 2nd Edition., 2009
   2. Nils J. Nilsson: Principles of Artificial Intelligence – Narosa Publication house, 2009
   3. Artificial Intelligence, Winston, Patrick, Henry, Pearson Education, 1998

MCA- 405A
Data Mining and Data Warehousing

Class: IV Sem. MCA   **Evaluation**
Branch: MCA
Schedule per Week
Lectures: 3
Examination Time: Three Hours   Maximum Marks: 100 [Mid-term (20) & End-term (80)]

Contents of the Subject

Data Warehousing: Introduction, Definition, Multidimensional data transformation, OLAP operations, Ware house schema, Ware house Server, Other features. Data Mining: Introduction, Definition, KDD vs. DM, DBMS vs. DM, DM Techniques, Issues and Challenges in DM, DM Applications. Association Rules: A Prior Algorithm, Partition, Pincer search, Incremental, Border, FP-tree growth algorithms, Generalized association rule.

Classification: Parametric and non-parametric technology: Bayesian classification, two class and generalized class classification, classification error, Decision boundary, Discriminate functions, Non-parametric methods for classification.

Clustering: Hierarchical and non-hierarchical techniques, K-MEDOID Algorithm, Partitioning, Clara, Clarans. Advanced Hierarchical algorithms

Decision Trees: Decision tree induction, Tree pruning, Extracting classification rules from decision trees, Decision tree construction algorithms, Decision tree construction with presorting.

Techniques for Data mining: Introduction, Learning, Neural Networks, Data mining using neural networks, Genetic algorithms. Web Mining: Web mining, Text mining, Content mining, Web structure mining. Searching Techniques: Optimal, non-optimal, Min-max, α –β pruning.

Text Books:
1. Alex Berson, Stephen J. Smith, Data Warehousing, Data Mining and OLAP, McGrawHill, 2004
2. D. Hand, H. Mannila, and P. Smyth, Principles of Data Mining, MIT Press, 2011
3. Jiawei Han, MichelineKamber, Data Mining: Concepts and Techniques, Harcourt India Pvt., 2011

References:

1.   W. H. Innmon, Building the Data Warehouse, Wiley Computer Publishing, 2005

MCA- 405B
Information Protection and Security

Class: IV Sem. MCA   **Evaluation**
Branch: MCA
Schedule per Week
Lectures: 3
Examination Time: Three Hours   Maximum Marks: 100 [Mid-term (20) & End-term (80)]

Contents of the Subject
Introduction
 Introduction to Cryptography: Introduction To Security: Attacks, Services & Mechanisms, Security, Attacks, Security Services. Conventional Encryption: Classical Techniques, Conventional Encryption Model, and Stenography, Classical Encryption Techniques.

Modern Techniques:
Simplified DES, Block Cipher Principles, DES Standard, DES Strength, Differential & Linear Cryptanalysis, Block Cipher Design Principles, Block Cipher Modes of Operation

Conventional Encryption Algorithms
 Triples DES, Blowfish, International Data Encryption Algorithm, RCS, CAST-128, RC2 Placement & Encryption Function, Key Distribution, Random Number Generation, Placement Of Encryption Function. Public Key Encryption: Public-Key Cryptography: Principles of Public-Key Cryptosystems, RSA Algorithm, Key Management, Fermat's & Euler's Theorem, Primality, The Chinese Remainder Theorem.

Hash Functions
 Message Authentication & Hash Functions: Authentication Requirements, Authentication Functions, Message Authentication Codes, Hash Functions, Birthday Attacks, Security Of Hash Function & MACS, MD5 Message Digest Algorithm, Secure Hash Algorithm (SHA), Digital Signatures: Digital Signatures, Authentication Protocol, Digital Signature Standard (DSS), Proof Of Digital Signature Algorithm.

Network & System Security
 Authentication Applications: Kerberos X.509, Directory Authentication Service, Electronic Mail Security, Pretty Good Privacy (PGP), S / Mime, Security: Architecture, Authentication Header, Encapsulating Security Payloads, Combining Security Associations, Key Management, Web Security: Secure Socket Layer & Transport Layer Security, Secure Electronic Transaction (Set), System Security: Intruders, Viruses, Firewall Design Principles, Trusted Systems.

Text Books:
1.   Kaufman, c., Perlman, R., and Speciner, M., Network Security, Private Communication in a public world, 2nd ed., Prentice Hall, 2002
2.   Stallings, W., Cryptography and Network Security: Principles and Practice, 3rd ed., Prentice Hall PTR, 2002

References:
1.   Pieprzyk Josef and et.al; Fundamentals of Computer Security, Springer-Verlag, 2008.
2.   Trappe & Washington, Introduction to Cryptography, 2nd Ed. Pearson.,2006

3.   Johannes A. Buchmann, "Introduction to cryptography", Springer- Verlag, 2004

Class: IV Sem. MCA   **Evaluation**
Branch: MCA
Schedule per Week
Lectures: 3
Examination Time: Three Hours   Maximum Marks: 100 [Mid-term (20) & End-term (80)]

Contents of the Subject

Overview of Crisp sets and fuzzy sets : Basic concepts of crisp sets and fuzzy sets, Basic types of fuzzy sets, Fuzzy sets verses crisp sets, Representation and extension principle for fuzzy sets, Operations on Fuzzy sets

Fuzzy Relations and Fuzzy Logic: Crisp versus Fuzzy relations, Binary relations on fuzzy sets, Equivalence, compatibility and ordering relations, Morphisms and compositions of relations, Fuzzy relations equations, Fuzzy measures and possibility theory, Classical logic and multivalued logics, Fuzzy propositions and approximate reasoning

Fuzzy systems and neuro fuzzy systems : Relevance of integration between fuzzy sets and neural networks – pros and cons, Fuzzy neurons, Fuzzy neural networks, Neuro fuzzy systems, Fuzzy associative memories
Introduction to Genetic Algorithms : What are genetic algorithms?, Robustness of traditional optimisation and search methods, The Goals of optimisation, How are genetic algorithms different from traditional methods?, A simple genetic algorithm, Genetic algorithms at work – a Simulation by hand, Grist for the Search Mill – Important Similarities, Similarity Templates (Schemata), Learning the Lingo.

Genetic Algorithms Revisited : Mathematical Foundations, Who shall live and who shall die? The fundamental Theorem, Schema processing at work: An example by hand revisited. The two-armed and k-armed bandit problem, How many schemata are processed usefully?, The building block hypothesis, Another perspective: The minimal deceptive problem, Schemata revisited: similarity templates as hyper planes.
Computer Implementation of A Genetic Algorithm : Data Structures, Reproduction, Crossover, and mutation, A Time to reproduce, a time to cross, Get with the main program, How well does it work?, Mapping objective functions to fitness form, Fitness scaling, Codings, A multiparameter, Mapped, Fixed-Point coding, Discretization, Constraints

Introduction To Genetic-Based Machine Learning : Genetics-Based machine learning: whence it came, What is a classifier system?, Rule and message system, Apportionment of credit: The bucket brigade, Genetic algorithm, A simple classifier system in Pascal, Results using the simple classifier system

Text Books:
1. G. Klir and B. Yuan "Fuzzy Sets and Fuzzy Logic: Theory and Applications", Prentice Hall of India, 1997.
2. B. Kosko "Neural Networks and Fuzzy Systems" A Dynamical Systems Approach

to Machine Intelligence", Prentice Hall of India, 1997.

References:

1. David E. Goldberg, "Genetic Algorithms in Search, Optimization and Machine Learning, Addison-Wesley an imprint of Pearson Education Asia .

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MCA- 405D
Mobile Application Development

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Class: IV Sem. MCA   **Evaluation**
Branch: MCA
Schedule per Week
Lectures: 3
Examination Time: Three Hours   Maximum Marks: 100 [Mid-term (20) & End-term (80)]

Contents of the Subject
INTRODUCTION
Introduction to mobile applications – Embedded systems - Market and business drivers for mobile applications – Publishing and delivery of mobile applications – Requirements gathering and validation for mobile applications, Basics of embedded systems design – Embedded OS - Design constraints for mobile applications, both hardware and software related – Architecting mobile applications – User interfaces for mobile applications – touch events and gestures.

ADVANCED DESIGN
 Designing applications with multimedia and web access capabilities Integration with GPS and social media networking applications – Accessing applications hosted in a cloud computing environment – Design patterns for mobile applications – Achieving quality constraints – performance, usability, security, availability and modifiability.

TECHNOLOGY I ANDROID
Establishing the development environment, Android architecture, Android Application structure, Emulator- Android virtual device, UI design, Fragments, Activity, Services, broadcast Receiver, Intents/Filters, Content provider- SQlite Programming , SQlite Open Helper, SQlite Database, Interaction with server side applications.

Advanced ANDROID
 Using Google Maps, GPS and Wi-Fi Integration, Android Notification, Audio manager, Bluetooth ,Camera and Sensor integration, Sending SMS, Phone Calls. Publishing Android Application.

TECHNOLOGY II IOS
Introduction to Objective C, iOS features UI implementation Touch frameworks Data persistence using Core Data and SQLite, Action and Outlets, Delegates, Storyboard, Location aware applications using Core Location and Map Kit , Integrating calendar and address book with social media application Using Wifi iPhone marketplace.

Text Books:
1. Jeff McWherter and Scott Gowell, "Professional Mobile Application Development", Wrox, 2012
   2.   Charlie Collins, Michael Galpin and Matthias Kappler, "Android in Practice", DreamTech, 2012

References:

1. David Mark, Jack Nutting, Jeff LaMarche and Frederic Olsson, "Beginning iOS 6 Development: Exploring the iOS SDK", Apress, 2013.
2. James Dovey and Ash Furrow, "Beginning Objective C", Apress, 2012
3. Paul Deitel ,Harvey Deitel, Abbey Deitel and Michael Morgano "Android for Programmers An App-Driven Approach" ,Pearson, 2013

MCA- 405E
E-Commerce

Class: IV Sem. MCA   **Evaluation**
Branch: MCA
Schedule per Week
Lectures: 3
Examination Time: Three Hours   Maximum Marks: 100 [Mid-term (20) & End-term (80)]

Contents of the Subject
Introduction to e-Commerce
Definition, Activities, Objectives, Components, Functions, Advantages and disadvantages, Scope, Forces driving E-Commerce, Traditional commerce Vs. E-Commerce, E-Commerce opportunities for industries, Growth of E-Commerce, e-Commerce Applications.

E-Commerce Models
Business to consumer, Business to Business, Consumer to Consumer, Government to Citizen, Features and Benefits, Portal Vs. Website.

Other Models
Brokerage Model, Aggregator Model, Info-Mediary Model, Community Model and value chain Model.

Electronic Payment Systems
Introductions, Special features, Types of E-Payment Systems (EFT, E-Cash, E-Cheque, Credit/Debit Card, Smart Card, Digital Tokens and Electronic Purses/ Wallets), Traditional Payments Vs E-Payment Systems, The SET protocol, SET vs. SSL, Payment Gateway, Certificate Issuance, Certificate Trust Chain.

Security Issues in E-Commerce
Security risk of E-Commerce, Types of threats, Security Tools, Cyber Laws, Business Ethics, EDI Architecture, EDI Standards, EDI Application in business.

Applications of E-Commerce
E-Marketing, E-Customer Relationship Management, E-Supply Chain Management, E-Governance, E-Buying, E-Selling, e-Banking, E-Retailing
Creation of An E-Commerce Application and Project Report based on any of the above models/modules

Text Books:
1. Ravi Kalakota, "Electronic Commerce: A Manager's Guide", Addison-Wesley Professional, Edition 2012.
2. Ian Daniel, "E-Commerce get it Right", Neuro Digital Publication, 2011.

References:
1. Dr. K Abirami Devi & Dr. M Alagammai, "E-Commerce Essentials", Margham Publication, 2012.
2. Kenneth C. Loudon, Karol Traver, "E-Commerce 2014", Prentice Hall Publication, 2013.

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MCA – 451
Seminar Presentation-I

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Class: IV Sem. MCA
Evaluation
Branch: MCA
Examination Time: Three Hours   Maximum Marks: 100 [Mid-term (20) & End-term (80)]

Objective: To get in depth knowledge of the upcoming trends in the field of Computer Science. The objective of the seminar is to prepare the student for a systematic and independent study of the state of the art topics in a broad area of his / her specialization.

Term Paper Presentation:
- Research work / Technical Learning must be done individually.
- Final Evaluation will be done by evaluating the electronic Presentation and the printed report
- The semester end assessment of Seminar Presentation shall be on the basis of Presentation/ Seminar Report and Viva Voice.

General Instructions For Preparation Of Seminar Presentation Report

The Report should broadly include the following heads / subheads

1. Introduction
        1.1 Cover Page
        1.2 Title Page
        1.3 Certificate
        1.4 Acknowledgement
        1.5 Table of Contents

2. Research / Technology Description
        2.1 Overview/ Introduction
        2.2 Objective & Scope of the study
        2.3 Description of the Technology

3. Drawbacks and Limitations
4. Proposed Enhancements
5. Conclusion
6. Bibliography

MCA-452
. NET MINI PROJECT

Class: IV Sem. MCA   **Evaluation**
Branch: MCA
Examination Time: Three Hours   Maximum Marks: 100 [Mid-term (20) & End-term (80)]

Objective: Student should be able to develop a small real time industry application using Microsoft Visual Studio 2010 or above.

Guidelines regarding project:

8. Students should work in group. Minimum number of students in one group can be 2. Maximum number of students in one group can be 4.
9. Students will be working under supervision of one teacher.
10. A teacher can have maximum 5 groups to supervise.
11. Students will submit a synopsis of the project.
12. Two copies of the report should be submitted.
13. The reports should be spiral bound along with the soft copy of the project.
14. The reports should be submitted with the following guidelines in the prescribed format.
    - Paper: A4
    - Font: Times New Roman
    - Chapter Heading: 16pt
    - Sub Heading: 14, Sub-Sub Headings: 12
    - Bold Running Matter: 12 pt
    - All topics should be numbered accordingly.
    - Paragraph Gap: 6 Pt Maximum
    - Line Gap: 1.5
    - Margins: Left 1.5, Right, Top and Bottom 1 inch

MCA 453
Linux Lab (Shell Script and Security)

Class: IV Sem. MCA   **Evaluation**
Branch: MCA
Examination Time: Three Hours   Maximum Marks: 100 [Mid-term (20) & End-term (80)]

Objectives of the laboratory:

Upon successful completion of this lab the student of this lab will be able to:
1. Introduce the student to Unix/Linux Shell programming techniques.
2. To describe and understand the LINUX file system.
3. To make students aware about security aspects in Linux.

List of experiments:
1. Basic Commands of Linux.
2. Accessing help options, File names and Wild Card, Types of Files, Directory Hierarchy, Operations.
3. Introduction of vi and Emacs Editor, File Permissions.
4. Shell Programming: Basics of Shell Programming, Meta Characters, Predefined Variables, Shell Variables, Storing and Accessing value of variables, Reading files, Expression, Strings Handling.
5. Conditional Statements: if, if-else, nested conditions, Case Statements.
6. Positional Parameters, argument Validations, Looping Statements: while loop, until, for, Nested Loops, User Defined Functions.
7. Simple Filter Commands: pr, head, tail, cut, paste, sort, uniq, tr, Regular Expressions, grep.
8. Practical Aspects of Security.

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MCA 454
COLLOQUIUM (Group Discussion)

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Class: IV Sem. MCA   **Evaluation**
Branch: MCA
Examination Time: Three Hours   Maximum Marks: 100 [Mid-term (20) & End-term (80)]

Objectives

Upon successful completion of this exercise student will develop skills to
- Exchange ideas in a systematic and structured way.
- Train one to discuss and argue about the topic given.
- Improve thinking, listening and speaking skills.
- Promote confidence level in problem solving, decision making and personality assessment.

Evaluation
In Group discussion performances would be evaluated on the basis of following points:
1. Knowledge about the topic
2. Oral communication skills.
3. Leadership skill – how well candidate is able to discuss among the group i.e. putting points, listening to others & trying to manage the whole discussion
4. Listening & articulating other points
5. Concluding all the points put forward in the group and sharing overall opinion of the group.
6. Team management

Sr. No.	COURSE CODE	SUBJECT	PERIODS			INTERNAL ASSESMENT	ESE	SUBJE TOTA
			L	T	P			
1	MCA-501	Cloud Computing & Service Oriented Architecture	3	1		20	80	100
2	MCA-502	Analysis and Design of Algorithms	3	1		20	80	100
3	MCA-503	Wireless Technologies	3	1		20	80	100
4	MCA-504	Elective 2**	3	1		20	80	100
5	MCA-505	Elective 3***	3	1		20	80	100
Practicals								
1	MCA-551	Case Study on Mobile Applications			4	20	80	100
2	MCA-552	ADA Lab Mini Project			4	20	80	100

3	MCA-553	Wireless Technology Lab			4	20	80	100
4	MCA-554	Seminar Presentation-II			4	20	80	100
		Total				**180**	**720**	**900**
		Elective 2**						
	MCA-504A	Big Data Technologies & Analytics						
	MCA-504B	Cyber Security & Quantum Cryptography						
	MCA-504C	Bio-Informatics						
	MCA-504D	Mobile Operating System						
	MCA-504E	ERP Systems						
		Elective 3***						
	MCA-505A	Database Intensive Computing & Security						
	MCA-505B	Cryptography						
	MCA-505C	Artificial Neural Networks						
	MCA-505D	Embedded Systems						
	MCA-505E	Web Mining						

MCA- 501

Cloud Computing and Service Oriented Architecture

Class: V Sem. MCA

Evaluation

Branch: MCA
Schedule Per Week
Lectures: 3
Examination Time: Three Hours   Maximum Marks= 100 [Mid-term (20) & End-term (80)]

Content of the Subject

Introduction: Historical development, Vision of Cloud Computing, Characteristics of cloud computing as per NIST, Migration into cloud, Cloud computing environments, Cloud services requirements, Cloud and dynamic infrastructure, Cloud Adoption and rudiments

Cloud Computing Architecture: Cloud Reference Model, Types of Clouds, Service Model of Cloud, Cloud Interoperability & Standards, Scalability and Fault Tolerance, Cloud Solutions: Cloud Ecosystem, Cloud Business Process Management, Cloud Service Management. Cloud Offerings: Cloud Analytics, Testing Under Control, Virtual Desktop Infrastructure, Architectural Design of Compute & Storage Cloud

Cloud Management & Virtualization Technology: Resiliency, Provisioning, Asset management, Concepts of Map reduce, Cloud Governance, High Availability and Disaster Recovery. Virtualization: Fundamental concepts of compute, Implementation Level of Virtualization, Storage, Networking, Desktop and application virtualization. Virtualization benefits, server virtualization, Block and file level storage virtualization Hypervisor management software- VMware, KVM, Xen, Infrastructure Requirements, Virtual LAN (VLAN) and Virtual SAN (VSAN) and their benefits.

Introduction to SOA: Fundamental SOA- Common Misperceptions about SOA- Common tangible benefits of SOA- Common pitfalls of adopting SOA. The Evolution of SOA:-from XML to Web services to SOA, Comparing SOA with N-tier architecture, The continuing evolution of SOA, The roots of SOA. Benefits of SOA, Principles of Service orientation , Service layers.

Web Service: Service descriptions, WSDL, Messaging with SOAP, Service discovery, UDDI, Message Exchange Patterns, Orchestration, Choreography, WS Transactions. Service Oriented Analysis and Design , Service Modeling, Design standards and guidelines, Composition , WS-BPEL , WS-Coordination , WS-Policy , WS-Security, SOA support in J2EE

Text Books:
1.   RajkumarBuyya, J.Broberg, A. Goscinski, "Cloud Computing Principles and Paradigms", Wiley, 2011
2.   A. Srinivasan, J. Surish " Cloud Computing A Practical Approach for Learning and implementation"", Pearson, 2014
3.   Ron Schmelzer et al. "XML and Web Services", Pearson Education, 2002.
4.   Thomas Erl, "Service Oriented Architecture: Concepts, Technology, and Design", Pearson Education, 2005.

References:

1. Barrie Sosinsky, " Cloud Computing Bible", Wiley., 2010
2. Tim Mather, "Cloud Security and Privacy", O'REILLY., 2009
3. Kai Hwang, Jack Dungaree, and Geoffrey Fox: Distributed and Cloud Computing From Parallel Processing to the Internet of Things, MK Publishers, 2012.
4. Frank P.Coyle, "XML, Web Services and the Data Revolution", Pearson Education, 2002
5. Eric Newcomer, Greg Lomow, "Understanding SOA with Web Services", Pearson Education, 2005
6. Sandeep Chatterjee and James Webber, "Developing Enterprise Web Services: An Architect's Guide", Prentice Hall, 2004.
7. James McGovern, Sameer Tyagi, Michael E.Stevens, Sunil Mathew, "Java Web Services Architecture", Morgan Kaufmann Publishers, 2003.

MCA- 502
Analysis and Design of Algorithms

Class: V Sem. MCA

                                  Evaluation

Branch: MCA
Schedule Per Week
Lectures: 3
Examination Time: Three Hours   Maximum Marks= 100 [Mid-term (20) & End-term (80)]

Content of the Subject

Introduction
Algorithm definition and specification – Design of Algorithms, and Complexity of Algorithms, Asymptotic Notations, Growth of function, Recurrences, Performance analysis

Elementary Data structures
Stacks and queues – trees – priority queues –Linked List– graphs – basic traversal and search techniques. Divide and conquer:- General method – binary search – merge sort – Quick sort

The Greedy method
General method – knapsack problem – minimum cost spanning tree(Prims and Kruskal algorithm) – single source shortest path-Dijkastra Algorithm .

Dynamic Programming – general method – multistage graphs – all pair shortest path – 0/1 Knapsack – traveling salesman problem – flow shop scheduling.

Backtracking
General method – 8-Queens problem – sum of subsets – graph coloring – Hamiltonian cycles – knapsack problem, Branch and bound:- The Method – 0/1 Knapsack problem – traveling salesperson.

Parallel models
Basic concepts, performance Measures, Parallel Algorithms: Parallel complexity, Analysis of Parallel Addition, Parallel Multiplication and division, parallel Evaluation of General Arithmetic Expressions, First-Order Linear recurrence.

Text Books:
1. Anany Levitin, "Introduction to the Design and Analysis of Algorithms", Third Edition, Pearson
   Education, 2012.
2. Thomas H.Cormen, Charles E.Leiserson, Ronald L. Rivest and Clifford Stein, "Introduction to
   Algorithms", Third Edition, PHI Learning Private Limited, 2012.

References:
1. Donald E. Knuth, "The Art of Computer Programming", Volumes 1& 3 Pearson Education,2009.
2. Steven S. Skiena, "The Algorithm Design Manual", Second Edition, Springer, 2008.

Wireless Technologies

Class: V Sem. MCA   **Evaluation**
Branch: MCA
Schedule per Week
Lectures: 3
Examination Time: Three Hours   Maximum Marks: 100 [Mid-term (20) & End-term (80)]

Contents of the Subject
Introduction
Introduction, wireless transmission - frequencies for radio transmission - signals - antennas - signal propagation - multiplexing - modulation - spread spectrum - cellular systems - medium access control - specialized MAC - SDMA - FDMA - TDMA - aloha - CSMA - collision avoidance - polling - CDMA - comparison of S/T/F/CDMA

Telecommunication systems
Mobile services - system architecture - radio interface - protocols - localization and calling - handover - security - new data services - satellite systems- broadcast systems - digital audio broadcasting, - digital video broadcasting

Wireless LAN
Infrared Vs radio transmissions - infrastructure and adhoc networks - IEEE 802.11 - bluetooth - Mobile network layer - mobile IP - packet delivery - registration - tunneling and encapsulation - optimizations - reverse tunneling - dynamic host configuration protocol Adhoc networks - routing - algorithms - metrics –

Mobile transport layer
TCP - indirect TCP - snooping TCP - mobile TCP - retransmission - recovery - transaction oriented TACP - support for mobility
File systems
 WWW - WAP - architecture - datagram protocol - transport security - transaction protocol - session protocol - application - environment - WML - WML script - wireless telephony application.

Text Books:
1. Communications, Pearson Schiller J., Mobile Education,2003
2. Stallings, W; Wireless Communications and Networks ,2002

References:
1. Blake Roy, Wireless Communication Technology, Thompson, 2001
2. Shambhu Upadhyaya, Abhijeet Chaudhary, Kevin Kwiat, Mark Weises, "Mobile Computing", Kluwer Academic Publishers. 2002
3. C. Siva Ram Murthy, Ad Hoc Wireless Networks: Architectures and Protocols, Pearson Education.2004
4. C. Siva Ram Murthy, WDM Optical Networks: Concepts, Design, and Algorithms, Pearson
      Education.2002

MCA- 504A
Big Data Technologies & Analytics

Class: V Sem. MCA   **Evaluation**
Branch: MCA
Schedule Per Week
Lectures: 3
Examination Time: Three Hours   **Maximum Marks= 100 [Mid-term (20) & End-term (80)]**

Content of the Subject

Introduction to Big Data
Classification of Digital Data, Big Data and its importance, Four Vs, Drivers for Big data, Big data analytics, Classification of Analytics , Top Challenges Facing Big Data, Responsibilities of data scientists, Big data applications in healthcare, medicine, advertising.

Hadoop Architecture
Hadoop Architecture, Hadoop Storage: HDFS, Common Hadoop Shell commands , Anatomy of File Write and Read., NameNode, Secondary NameNode, and DataNode, Hadoop MapReduce paradigm, Map and Reduce tasks, Job, Task trackers - Cluster Setup – SSH & Hadoop Configuration – HDFS Administering –Monitoring & Maintenance, Managing Resources and Applications with Hadoop YARN. Interacting with Hadoop Ecosystem. Introduction to Hive, Introduction to Pig.

Introduction to NoSQL & Hadoop
Introduction to NoSQL Advantages of NoSQL, SQL versus No SQL, Introduction to Hadoop, Features of Hadoop, Hadoop Versions, Hadoop Ecosystems, Hadoop Distributions, Hadoop Versus SQL.

Types of Analytics & Techniques
Open source technology for Big Data Analytics – cloud and Big Data – Mobile Business Intelligence and Big Data – Crowd Sourcing Analytics – Inter- and Trans-Firewall Analytics In-Memory Analytics, In-Database Processing, Symmetric Multiprocessor System, Massively Parallel Processing, Shared Nothing Architecture, Open source Analytical Tools, Sampling Techniques, Data classification, Tabulation, Frequency and Graphic representation, Measures of central value - Arithmetic mean, Geometric mean, Harmonic mean, Mode, Median, Regression Analysis, Correlation analysis.

Predictive Analysis
Predictive Analytics, Supervised, Unsupervised learning, Clustering Techniques, Hierarchical, K- Means, Basics of R, Working of R - Creating, listing and deleting the objects in memory - The on-line help Data with R Objects, R data Frames and Matrices, Reading data in a file , Saving data, Generating data, Manipulating objects Graphics with R Managing graphics , Graphical functions

Text Books:
1. Seema Acharya ,Subhashini Chellappan ,"Big Data and Analytics (WIND)", Wiley, ISBN: 8126554789, 2015.

2. Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, "Professional Hadoop Solutions",
Wiley, ISBN: 9788126551071, 2015.
3. Chris Eaton, Dirk deroos et al. , "Understanding Big data ", McGraw Hill, 2012.
4. Alberto Cordoba, "Understanding the Predictive Analytics Lifecycle", Wiley, 2014.

References:
1. Tom White, "HADOOP: The definitive Guide" , O Reilly 2012. 6 IT2015 SRM(E&T)
2. VigneshPrajapati, "Big Data Analytics with R and Haoop", Packet Publishing 2013.
3. Tom Plunkett, Brian Macdonald et al, "Oracle Big Data Handbook", Oracle Press, 2014.
4. Jay Liebowitz, "Big Data and Business analytics",CRC press, 2013.

MCA- 504B
Cyber Security and Quantum Cryptography

Class: V Sem. MCA   **Evaluation**
Branch: MCA
Schedule per Week
Lectures: 3
Examination Time: Three Hours   Maximum Marks: 100 [Mid-term (20) & End-term (80)]

Contents of the Subject
Introduction: Cyber Security, Cyber Security policy, Domain of Cyber Security Policy ,Laws and Regulations, Enterprise Policy, Technology Operations ,Technology Configuration , Strategy Versus
Policy, Cyber Security Evolution, Productivity, Internet, E commerce, Counter Measures Challenges.

Cyber Security Objectives and Guidance: Cyber Security Metrics, Security Management Goals ,Counting Vulnerabilities , SecurityFrameworks ,E Commerce Systems ,Industrial Control   Systems ,Personal Mobile Devices ,Security Policy Objectives ,Guidance for Decision Makers ,
 Tone at the Top, Policy as a Project**, Cyber** Security Management, Arriving at Goals, Cyber Security Documentation, the CatalogApproach, Catalog Format, Cyber Security Policy Taxonomy.

Cyber Security Policy Catalog: Cyber Governance Issues ,Net Neutrality ,Internet Names and Numbers ,Copyright and Trademarks , Email and Messaging , Cyber User Issues ,Advertising , Impersonation ,Appropriate Use ,Cyber Crime ,Geo location , Privacy , Cyber Conflict Issues,
 IntellectualProperty Theft, Cyber Espionage, Cyber Sabotage, Cyber Welfare.

Cyber Management Issue: Fiduciary Responsibility, Risk Management, Professional Certification, Supply Chain, SecurityPrinciples, Research and Development, Cyber Infrastructure Issue, Banking and finance,Health care, Industrial Control systems

Quantum Cryptography. Introduction, quantum cryptography. Key distribution and bit commitment, BB84 B92 protocols. Introduction to security proofs for these protocols

Text Books:
1. Jennifer L. Bayuk J. Healey P. Rohmeyer Marcus Sachs Jeffrey Schmidt Joseph Weiss "Cyber Security Policy Guidebook" John Wiley & Sons 2012.
2. Rick Howard "Cyber Security Essentials" Auerbach Publications 2011.
3. Dan Shoemaker Cyber security The Essential Body Of Knowledge 1st ed. Cengage Learning 2011.
4. Quantum Computation and Quantum Information M.A. Nielsen and I.L.Chuang Cambridge University Press 2000.

References:
1 Richard A. Clarke Robert Knake "Cyberwar: The Next Threat to National Security & What

to Do About It" Ecco 2010

Class: V Sem. MCA   Evaluation
Branch: MCA
Schedule per Week
Lectures: 3
Examination Time: Three Hours   Maximum Marks: 100 [Mid-term (20) & End-term (80)]

Contents of the Subject

Introduction:
Importance of Bioinformatics, Biological Sequence Structure, Deficit, Genome Projects – Status, Sequence analysis, Homology and analogy. EMBNET – NCBI – virtual Tourism.

Primary Sequence Databases Biological Database: Primary Sequence Database, Composite Protein Sequence Database, Secondary Database, Composite Protein, Pattern database structure and classification of database.

Genome Information Resources: DNA Sequence database, Specialized genomic Resources. DNA Sequence analysis, Gene structure, Features of DNA sequence analysis, Issues in the interpretation and EST search – Approach of Gene hunting, Cell CDNA libraries and ESTs – Approaches to EST analysis – Effect of EST data on DNA data base examples of EST analysis.

Database Searchers and Pair Wise Alignment Database searching: Alphabets and Complexity, Comparing Two Sequences, Sub-Sequence, Identity and Similarity, Dot plots, Simple alignment – Gaps – Scoring Matrices, Dynamic programming – BLAST , FSTA and related algorithms – Alignment scores and statistical significance of data base sequences.

Global and local Alignments: Algorithms, Similarities, Semi global alignment, Multiple Sequence Alignment Goals, Definition, Complex methods, Database of multiple Alignment, searching database with multiple alignment.

Methods of Photo Genetics: Distance Based Methods & their Comparison.
RNA Structure: Amino Acids, Polypeptide Composition Algorithm, Modeling protein folding prediction, RNA Sequence Structure.

Proteomics: Classification, Techniques, Inheritors, Drying Design, Structures, X-Ray Crystal – NMR – Empirical methods and prediction techniques.

Text/References:
1. T.K.Attwood, D.J. Parry-Smith, Introduction to Bioinformatics, Pearson Education Asia, 2004
2. Dan E. Krane, Michale L. Raymer, Fundamental Concepts of Bioinformatics, Pearson Education Asia, 2004
3. Cynthia Gibas, Per Jambeck, Developing Bioinformatics Computer Skills, O' Reilly, 2001

MCA- 504D
Mobile Operating System

Class: V Sem. MCA   **Evaluation**
Branch: MCA
Schedule per Week
Lectures: 3
Examination Time: Three Hours   Maximum Marks: 100 [Mid-term (20) & End-term (80)]

Contents of the Subject
Fundamentals of Operating Systems
   Overview Synchronization Mechanisms Processes and Threads Process Scheduling Deadlocks: Detection, Prevention and Recovery Memory Management Techniques

Basic Concept of Mobile Operating Systems
 Introduction, Design Principal, Structure, platform and features of mobile operating system comparison of mobile os to traditional os Application life cycle Micro Kernel Design concept of MOS

Type of Mobile Operating Systems
 Type of Mobile OS Android OS (Google Inc.), Bada (Samsung Electronics), BlackBerry OS (Research In Motion), iPhone OS / iOS (Apple), MeeGo OS (Nokia and Intel) Palm OS (Garnet OS), Windows Mobile (Windows Phone 7) Basic Model of Real Time Systems - Characteristics- Applications of Real Time Systems – Commercial Real Time Systems: General concepts, Unix and Windows as RTOS

Mobile Issues and Development Strategies
Issues facing Mobile devices, Securing mobile application development, Android Securable IPC Mechanism, Android Security Model, Intents, Activities, Services, Android Security tools

CASE STUDIES: Case study of Android as Mobile OS

Text Books:
   1. Mukesh Singhal and Niranjan G. Shivaratri, "Advanced Concepts in Operating Systems – Distributed,   Database, and Multiprocessor Operating Systems", Tata McGraw-Hill, 2001
2.   Abraham Silberschatz; Peter Baer Galvin; Greg Gagne, "Operating System Concepts", Seventh Edition, John Wiley & Sons, 2004.
References:
   1. Daniel P Bovet and Marco Cesati, "Understanding the Linux kernel", 3rd edition, O'Reilly, 2005.
   2. Mobile Application Security, Himanshu Dwivedi, Chris Clark, David Thiel, Tata McGraw Hill, 1st Edition, 2010.

MCA- 504E
ERP Systems

Class: V Sem. MCA   **Evaluation**
Branch: MCA
Schedule per Week
Lectures: 3
Examination Time: Three Hours   Maximum Marks: 100 [Mid-term (20) & End-term (80)]

Contents of the Subject
Introduction to ERP
Enterprise wide information system, Custom built and packaged approaches, Needs and Evolution of ERP Systems, ERP and Related Technologies: Business Process Reengineering and Information Technology, Supply Chain Management, Relevance to Data Warehousing, Data Mining and OLAP, ERP Drivers, Decision support system.

Market & Life Cycle
ERP Domain, ERP Benefits, Classification, Present global and Indian market scenario, pitfalls, Forecast, Market players and profiles, Evaluation criterion for ERP product, ERP Life Cycle: Adoption decision, Acquisition, Implementation, Use & Maintenance, Evolution and Retirement phases, ERP Modules.

Evaluation
Framework for evaluating ERP acquisition, Analytical Hierarchy Processes (AHP), Applications of AHP in evaluating ERP, Role of consultants, vendors and users in ERP implementation, Vendors Evaluation Criterion, ERP Implementation approaches and methodology, ERP implementation strategies, ERP Customization, ERP-A manufacturing Perspective.

Critical success and failure factors for implementation
ROI of ERP implementation, Hidden costs, ERP success inhibitors and accelerators, Management concern for ERP success, Useful guidelines for ERP Implementations.

ERP Technology
ERP Software, Functionality of ERP Packages, Multimedia, Virtual Reality, Persuasive Computing and Internet in ERP, ERP and Ecommerce.

Text Books:
1.   Textbook of Enterprise Resource Planning, Mahadeo Jaiswal, Ganesh Vanapalli, Macmillan Publishers India, 2005.
2.   ERP: A Managerial Perspective Book Description, Sadagopan S, Tata McGraw Hill, 2013

References:
1.   ERP tools techniques and applications for integrating the supply chain by Carol A. Ptak, Eli Schragenheim.
2.   ERP A-Z Implementer's Guide for Success, Travis Anderegg, Resource Publishing, 2000.
3.   Enterprise Resource Planning Systems System, Lifecycle, Electronic Commerce and Risk by Daniel E.O. Leary, 2011
4.   Enterprise Resource Planning (ERP): The Dynamics of Operations Management by Avraham Shtub. 2011

MCA- 505A
Data Intensive Computing and Security

Class: V Sem. MCA   **Evaluation**
Branch: MCA
Schedule per Week
Lectures: 3
Examination Time: Three Hours   Maximum Marks: 100 [Mid-term (20) & End-term (80)]

Contents of the Subject

Distributed Computing: Introduction, Distributed Computing Architecture, web based distributed model and protocols, Message Passing Inter process Communication, Synchronization, Buffering, Multi-datagram Messages, Encoding and Decoding of Message Data, Process Addressing, Failure Handling, Group Communication, Remote Procedure Calls (RPC), RPC Model, Transparency of RPC, Implementing RPC Mechanism, RPC Messages

Parallel Computing: Introduction, Parallel Architectures and network topologies, Parallel Algorithms, Parallel Metrics, Parallel Languages, granularity, applications, Parallel Programming Design and debugging, Message based Parallelism (MPI), Thread based Parallelism (Open PM)
Grid Computing: Introduction, Infrastructure of hardware and software, The Open Grid Forum, Grid Architecture, Overview of Grid Systems, Web Services, Grid Portals
Security: -Introduction, Overview of Security techniques, Cryptographic algorithms, Digital signatures,Distributed Database Security, Grid Computing Security.

Big Data Privacy, Ethics and Security: Privacy-Re-identification of Anonymous People, Ethics-Ownership and Ethical Guidelines, Big data Security, Organizational Security, Steps to secure Big Data, Protecting, Big Data Compliance, Intellectual Property Challenge

Text Books:
1. Distributed Computing, Principles, Algorithms and Systems, Ajay D.Kshemakalyani and Mukesh Singhal, Cambridge, rp 2010.
2. Parallel Algorithms, Henri Casanova, A.Legrand, Y.Robert, Chapman &Hall/CRC, Taylor and Francis Group.
3. Security in Data Intensive Computing Systems, Eduardo B. Fernandez, Springer, New York 2011

References:
1. Handbook of Parallel Computing, S.Rajasekaran, John Reif, Chapman & Hall/CRC,Taylor and Francis Group,2008
2. Distributed and Cloud Computing, Kaittwang Geoffrey C.Fox and Jack J Dongrra, Elsevier India 2012.
3. Distributed Computing, M.L.Liu, Pearson, 2004.

Cryptography

Class: V Sem. MCA   **Evaluation**
Branch: MCA
Schedule per Week
Lectures: 3
Examination Time: Three Hours   Maximum Marks: 100 [Mid-term (20) & End-term (80)]

Contents of the Subject

Introduction & Number Theory
Services, Mechanisms and attack the OSI security architecture-Network security model-Classical Encryption techniques (Symmetric cipher model, substitution techniques, transposition techniques, steganography).FINITE FIELDS AND NUMBER THEORY: Groups, Rings, Fields Modular arithmetic Euclid"s algorithm-Finite fields- Polynomial Arithmetic Prime numbers Fermat"s and Euler"s theorem Testing for primality The Chinese remainder theorem Discrete logarithms.

Block Ciphers & Public Key Cryptography
 Data Encryption Standard Block cipher principles-block cipher modes of operation-Advanced Encryption Standard (AES)-Triple DES Blowfish-RC5 algorithm. Public key cryptography: Principles of public key cryptosystems-The RSA algorithm Key management Diffie Hellman Key exchange Elliptic curve arithmetic Elliptic curve cryptography

Hash Functions and Digital Signatures
Authentication requirement Authentication function MAC Hash function Security of hash function and MAC MD5 SHA HMAC CMAC Digital signature and authentication protocols DSS EI Gamal Schnorr.

Security Practice & System Security
Authentication applications Kerberos X.509 Authentication services Internet Firewalls for Trusted System: Roles of Firewalls Firewall related terminology Types of Firewalls Firewall designs SET for E Commerce Transactions. Intruder Intrusion detection system Virus and related threats Countermeasures Firewalls design principles Trusted systems Practical implementation of cryptography and security.

E-Mail, IP & Web Security
E-mail Security: Security Services for E-mail-attacks possible through E-mail establishing keys privacy authentication of the source Message Integrity Non-repudiation Pretty Good Privacy S/MIME. IPSecurity: Overview of IPSec IP and IPv6 Authentication Header Encapsulation Security Payload (ESP) Internet Key Exchange (Phases of IKE, ISAKMP/IKE Encoding). Web Security: SSL/TLS Basic Protocol-computing the keys- client authentication-PKI as deployed by SSLAttacks fixed in v3- Exportability-Encoding-Secure Electronic Transaction (SET).

Text Books:

1. William Stallings, Cryptography and Network Security, 6th Edition, Pearson Education, March 2013.
2. Charlie Kaufman, Radia Perlman and Mike Speciner, "Network Security", Prentice Hall of India, 2002.

References:
1. Behrouz A. Ferouzan, "Cryptography & Network Security", Tata Mc Graw Hill, 2007.
2. Man Young Rhee, "Internet Security: Cryptographic Principles", "Algorithms and Protocols", Wiley Publications, 2003.
3. Charles Pfleeger, "Security in Computing", 4th Edition, Prentice Hall of India, 2006.
4. Ulysess Black, "Internet Security Protocols", Pearson Education Asia, 2000.
5. Charlie Kaufman and Radia Perlman, Mike Speciner, "Network Security, Second Edition, Private Communication in Public World", PHI 2002.
6. Bruce Schneier and Neils Ferguson, "Practical Cryptography", First Edition, Wiley Dreamtech India Pvt Ltd, 2003.
7. Douglas R Simson "Cryptography – Theory and practice", First Edition, CRC Press, 1995.

MCA- 505C
Artificial Neural Networks

Class: V Sem. MCA   **Evaluation**
Branch: MCA
Schedule per Week
Lectures: 3
Examination Time: Three Hours   Maximum Marks: 100 [Mid-term (20) & End-term (80)]

Contents of the Subject
Introduction
Concept of neural network, Human Brain, Models of a Neuron, Neural networks viewed as Directed Graphs, Network Architectures, Knowledge Representation, Artificial Intelligence and Neural Networks.

Models of ANNs
Feedforward & feedback networks; learning rules; Hebbian learning rule, perception learning rule, delta learning rule, Widrow-Hoff learning rule, correction learning rule, Winner –lake all learning rule, etc.

Single Layer Perceptrons
Adaptive filtering problem, Unconstrained Organization Techniques, Linear least square filters, least mean square algorithm, learning curves, Learning rate annealing techniques, perception –convergence theorem, Relation between perception and Bayes classifier for a Gaussian Environment.

Multilayer Perceptron
Back propagation algorithm XOR problem, Heuristics, Output representation and decision rule, Computer experiment, feature detection.

Back Propogation
Back propagation and differentiation, Hessian matrix, Generalization, Cross validation, Network pruning Techniques, Virtues and limitations of back propagation learning, Accelerated convergence, supervised learning.

Applications of ANN
Pattern classification – Recognition of Olympic games symbols, Recognition of printed Characters. Neocognitron – Recognition of handwritten characters, to convert English text to speech. Recognition of consonant vowel (CV) segments, texture classification and segmentation.

Text Books:
1. Neural networks A comprehensive foundations, Simon Hhaykin, Pearson Education 2nd Edition 2004
2. Artificial Neural Networks – B.Yegnanarayana PHI

References:
1. Artificial neural networks - B.Vegnanarayana Prentice Halll of India P Ltd 2005
2. Neural networks in Computer intelligence, Li Min Fu TMH 2003

3. Neural networks James A Freeman David M S kapura Pearson Education 2004

Embedded Systems

Class: V Sem. MCA   **Evaluation**
Branch: MCA
Schedule per Week
Lectures: 3
Examination Time: Three Hours   Maximum Marks: 100 [Mid-term (20) & End-term (80)]

Contents of the Subject

Introduction to Embedded systems. Embedded system vs general Computing system. Classification of Embedded system. Core of Embedded system. RISC vs CISC controllers. Harvard vs Van Neumen architecture.

Application market segments, control system and industrial automation, Data communication, Networked Information Appliances, Telecommunications.

Hardware Architecture: Processor, Memory, Latches and buffers, ADC & DAC, Application specific control, Display units, keypads, DSP.

Microcontrollers and their applications, Communication interfaces: Serial interface, IEEE 1394, USB, Infra red, Ethernet and PCI bus.

Embedded system development process : requirement ,system architecture, operating system and processes. Development platform and tools, HLL support Cross compilers, Linux and Windows CE based development Tools. Mobile/ handheld systems.

Basic idea of embedded system application like mobile networks, GPS, Real time system, Database applications, Networked and JAVA-enabled information appliances, Mobile JAVA applications.

Text Books:
1.   Introduction to Embedded Systems -Shibu K.V, Mc Graw Hill ,2011

References:
1.   Embedded Systems -Raj Kamal, TMH.
2.   Embedded System Design -Frank Vahid, Tony Givargis, John Wiley, 2007.
3.   Embedded Systems –Lyla, Pearson, 2013
4.   An Embedded Software Primer -David E. Simon, Pearson Education 2010

MCA- 505E
Web Mining

Class: V Sem. MCA   **Evaluation**
Branch: MCA
Schedule per Week
Lectures: 3
Examination Time: Three Hours   Maximum Marks: 100 [Mid-term (20) & End-term (80)]

Contents of the Subject
Introduction
Introduction – Web Mining – Theoretical background –Algorithms and techniques – Association rule mining – Sequential Pattern Mining -Information retrieval and Web search – Information retrieval Models-Relevance Feedback- Text and Web page Pre-processing

Web Content Mining
Web Content Mining – Supervised Learning – Decision tree - Naïve Bayesian Text Classification -Support Vector Machines - Ensemble of Classifiers. Unsupervised Learning - K-means Clustering -Hierarchical Clustering –Partially Supervised Learning

Web Structure Mining
Web Link Mining – Hyperlink based Ranking – Introduction -Social Networks Analysis- Co-Citation and Bibliographic Coupling - Page Rank -Authorities and Hubs -Link-Based Similarity Search -Enhanced Techniques for Page Ranking - Community Discovery – Web Crawling -A Basic Crawler Algorithm- Implementation Issues- Universal Crawlers- Focused Crawlers- Topical Crawlers Evaluation- Crawler Ethics and Conflicts - New Developments

Structured Data Extraction
Structured Data Extraction: Wrapper Generation – Preliminaries- Wrapper Induction-Instance-Based Wrapper Learning ·- Unstructured Data Mining Techniques- Automatic Wrapper Generation: Problems - String Matching and Tree Matching -Multiple Alignment - Building DOM Trees - Extraction Based on a Single List Page and Multiple pages-Introduction to Schema Matching - Schema-Level Match -Domain and Instance-Level Matching – Extracting and Analyzing Web Social Networks. Tools

Web Usage Mining
Web Usage Mining – sources of data- Applications -Click stream Analysis -Web Server Log Files - Data Collection and PreProcessing- Cleaning and Filtering- Data Modeling for Web Usage Mining – Issues- Discovery and Analysis of Web Usage Patterns – Used tools in Web Usage mining.

Text Books:
1. Bing Liu, " Web Data Mining: Exploring Hyperlinks, Contents, and Usage Data (Data-Centric Systems and Applications)", Springer; 2nd Edition 2009

References:
1. Guandong Xu ,Yanchun Zhang, Lin Li, "Web Mining and Social Networking: Techniques and Applications", Springer; 1st Edition.2010
2. Zdravko Markov, Daniel T. Larose, "Data Mining the Web: Uncovering Patterns in Web Content, Structure, and Usage", John Wiley & Sons, Inc., 2007

3. Soumen Chakrabarti, "Mining the Web: Discovering Knowledge from Hypertext Data", Morgan Kaufmann; edition 2002.

Case Study on Mobile Applications

Class: V Sem. MCA   **Evaluation**

Branch: MCA
Examination Time: Three Hours   Maximum Marks: 100 [Mid-term (20) & End-term (80)]

Introduction to Android: Setting up development environment, Dalvik Virtual Machine & .apk file extension, Basic Building blocks – Activities, Services, Broadcast ,Receivers & Content, UI Components- Views & notifications, Components for communication -Intents & Intent Filters, Android API levels(versions & version names), Providers.

Application Structure (in detail): AndroidManifest.xml, Uses-permission & uses-sdk, Activity/services/receiver declarations, Resources & R.java, Assets, Layouts & Draw able Resources, Activities and Activity lifecycle, First sample Application.

Emulator & Intents: Launching emulator, Editing emulator settings, Emulator shortcuts, Logcat usage, Introduction to DDMS, File explorer, Explicit Intents.

Basic UI design, Styles & Themes: Form widgets, Text Fields, Layouts, styles.xml, drawable resources for shapes, gradients(selectors), style attribute in layout file, Applying themes via code and manifest file Examples.

Dialog boxes: Alert Dialogs, Toast, Time and Date

Images and media, Composite: ListView and ListActivity, Custom listview, GridView using adapters, Gallery using adapters.

Menu: Option menu, Context menu, Sub menu, menu from xml, menu via code, Examples

Adapters: ArrayAdapters, BaseAdapters

Receivers and services: Alarm Via services, Broadcast Receiver

Content Providers: SQLiteDatabase and SQLiteOpenHelper, DB programming using 2 and 3 tier architecture, Reading and updating Contacts, Reading bookmarks

Customized controls: • Custom Toast, Custom dialogs, Custom Tabs, Custom animated popup panels

Fragments: Fragment Life Cycle, Fragments in Activity, Develop Fragment based UI designs

Location based Services: GPS, Geocoding

Accessing Phone services: Call,SMS,MMS

Text Book:

1. Jeff McWherter and Scott Gowell, "Professional Mobile Application Development", Wrox, 2012
2. Charlie Collins, Michael Galpin and Matthias Kappler, "Android in Practice", DreamTech, 2012

References:
1. David Mark, Jack Nutting, Jeff LaMarche and Frederic Olsson, "Beginning iOS 6 Development: Exploring the iOS SDK", Apress, 2013.
2. James Dovey and Ash Furrow, "Beginning Objective C", Apress, 2012
3. Paul Deitel ,Harvey Deitel, Abbey Deitel and Michael Morgano "Android for Programmers An App-Driven Approach" ,Pearson, 2004

<div align="center">

MCA-552
ADA Lab Mini Project

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Class: V Sem. MCA   **Evaluation**

Branch: MCA
Examination Time: Three Hours   Maximum Marks: 100 [Mid-term (20) & End-term (80)]

Objective: Student should able to develop an application using ADA.

Guidelines regarding project:
1.   Students shall use "C" or "C++" language to develop 3 applications using different algorithms for application based problems (e.g. calculating shortest distance in ATM network using different Shortest Path Algorithms)
2.   Students shall provide documentation and it should be based on the prescribed standards
3.   Need to submit a Report, Presentation with Demonstration.
4.   Students shall work individually for project.
5.   Students will submit a synopsis of the project.
6.   Two copies of the report should be submitted.
7.   The reports should be spiral bound along with the soft copy of the project.
8.   The reports should be submitted with the following guidelines in the prescribed format.
- Paper: A4
- Font: Times New Roman
- Chapter Heading: 16pt
- Sub Heading: 14, Sub-Sub Headings: 12
- Bold Running Matter: 12 pt
- All topics should be numbered accordingly.
- Paragraph Gap: 6 Pt Maximum
- Line Gap: 1.5
- Margins: Left 1.5, Right, Top and Bottom 1 inch

MCA-553
Wireless Technology Lab

Class: V Sem. MCA   **Evaluation**
Branch: MCA
Examination Time: Three Hours   Maximum Marks: 100 [Mid-term (20) & End-term (80)]

Contents of the Subject:

List Of Experiments (NS2/QUALNET/BWSIM/MATLAB)
1. Wired and Wireless network scenario creation.
2. Study of Routing Protocols
3. Analysis of Network Security Algorithms
4. Study of Zig Bee Energy Model and MAC protocols
5. Queuing mechanism.
6. QoS analysis of Multimedia traffic.
7. Bandwidth Analysis
8. Call establishment in cellular network
9. Handover in cellular network (Inter cell)
10. Handover in cellular network (Intra cell)
11. Handover in cellular network (Inter BSC)
12. Handover in cellular network (Inter MSC)
13. Throughput performances for various terrain models,
14. Transmission modes
15. Loading   conditions
16. Traffic profiles in LTE network
17. Introduction of Basic Networking command (ping, pathping, tracert, ipconfig, ipconfig/all,arg)

<p style="text-align:center">**MCA – 554**
Seminar Presentation-II</p>

Class: V Sem. MCA   **Evaluation**
Branch: MCA
Examination Time: Three Hours   Maximum Marks: 100 [Mid-term (20) & End-term (80)]

Objective: To carry out a research based study in the field of Computer Science/ Application. The objective of the seminar is to prepare the student for a systematic and independent study of the state of the art topics in a broad area of his / her specialization.

Term Paper Presentation:
- Research work / Technical Learning must be done individually.
- Final Evaluation will be done by electronic presentation
- The semester end assessment of Seminar Presentation shall be on the basis of Presentation, Seminar Report and Viva Voice.

General Instructions for Seminar Presentation Report
Each student is required to write a comprehensive report about the seminar. The report should consist of 15 to 20 pages describing the topic selected. The report should be in the format as described below.

1. **Page Dimension and Binding Specifications:**
The dimension of the seminar report should be in A4 size. The project report should be **hard bound** using flexible cover of the thick art paper. Report (hard copy only) should be submitted along with soft copy of the presentation in a CD.

2. **Typing Instructions:**
One and a half spacing should be used for typing the general text. The general text shall be justified and typed in the Font style 'Times New Roman' and Font size 12.
Subheading shall be typed in the Font style 'Times New Roman' and Font size 12 and bold. **Heading** shall be typed in the Font style 'Times New Roman' and Font size 14 and bold.

3. **Preparation Format:**
   Cover Page–The Cover page of the Seminar Presentation Report must include College Name along
   with Logo, University associated with along with Logo, title of Seminar Presentation and Paper Code.

   Abstract – Abstract should be one page synopsis, it should summarize the aims, conclusions and
   implications of the seminar topic, typed with double line spacing, Font Style Times New Roman and
   Font Size 14.

   Table of Contents – The table of contents should list all material following it as well as any material,
   which precedes it. The page numbers of which are in lower case Roman letters. One and a half

spacing should be adopted for typing the matter under this head.

Subject Contents -   The Term Paper should be a culmination and final product of involved process
 of research, critical thinking, source evaluation, organization, and composition that encourages
 students to explore, interpret, and evaluate sources related to a specific topic.

List of References –The listing of references should be typed 2 spaces below the heading
 "REFERENCES" in alphabetical order in single spacing left – justified. Should be numbered
 consecutively (in square [] brackets, throughout the text and should be collected together in the
 reference list at the end of the report. The references should be numbered in the order they are used
 in the text. The name of the author/authors should be immediately followed by the year and other
 details.