SHIVAJI UNIVERSITY, KOLHAPUR.

" A" Re- accredited By NAAC
(2014) with CGPA-3.16

Faculty of Commerce

Structure, Scheme & Revised Syllabus For

MCA (Choice Based Credit System)

Part – III (Sem- V & VI)

(Subject to the modifications that will be made from time to time)
Syllabus to be implemented from June 2016 onwards.

MCA III (Choice Based Credit System)
(Introduced from June 2016 and Onwards)
To be implemented from the academic year 2016-2017
(i.e. June 2016) onward

Semester – V						
Sr. No.	**Subject Code**	**Subject Title**	**Internal Marks**	**External Marks**	**Workload per Week**	
					T	**P**
33	MCA501	Emerging Trends in Information Technology	20	80	4	-
34	MCA502	Cloud Computing	20	80	4	-
35	MCA503	Software Project Management	20	80	4	-
36	MCA504	Advanced Web Technology	20	80	4	-
37	MCA505	Elective II E2.1 Computer Graphics E2.2 Big data Management E2.3 Software Testing and Quality Assurance E2.4 Artificial Intelligence and Expert System	20	80	4	
38	MCA506	Communication Skill -III	50		2	-
39	MCA507	LAB IX (Advanced Web Technology)		100	-	4
40	MCA508	LAB X (Elective II)		100	-	4
		Total	**150**	**600**	**22**	**8**

Semester – VI				
Sr. No.	**Subject Code**	**Subject Title**	**Internal**	**External**
41	MCA601	Project Work	200	300
Total Credits			12	18

Semester – V				
Sr. No.	**Subject Code**	**Subject Title**	**Internal Marks**	**External Marks**
33	**MCA501**	**Emerging Trends in Information Technology**	20	80

Objective: To make aware student the changes in technologies, applications and systems around us.

UNIT –1	**Python** Introduction to python, Features, variables , Operator, loops, String Accessing values in List, Tuple, Dictionary , Function in Python ,Import statement , File – I/O ,Classes ,Object , CGI Program , Database Access , Multithreading, GUI programming.
UNIT -2	**Introduction to MongoDB and NoSQL:** **MangoDB**-concept, features, difference between RDBMS and MongoDB, advantages, limitations, data model, schema, query types, data management **NoSQL :** Introduction, Basic Schema in NoSQL, High level understanding of MongoDB, Cassandra, Aggregate data models – aggregates , Key-value and document data models – relationships , Graph databases , Schemaless databases – materialized views – Distribution models – sharding – master-slave replication –Sharding and replication –Consis*tency* – relaxing consistency –Version stamps
UNIT -3	**AngularJs :** Overview, AngularJs - MVC Architecture, Directives : ng-app, ng-init, ng-model,ng-repeat, Expression using number, string, array, object, Controllers using ng-controller, Filters and tables. Forms validation with AngularJs events. **Bootstrap :** Introduction to Bootstrap, Incorporate Bootstrap into an HTML document, Bootstrap Tables, list, forms, Input groups, Images, Icon, Progress bars, Panels, Thumbnails, Alerts, Responsive embed, Navbar. Bootstrap Grid system, Bootstrap Layout :Fixed, Fluid, Responsive .Bootstrap Typography, Bootstrap pagination,
UNIT -4	**Introduction to Cybercrime** Cybercrime definition and origins of the world, Cybercrime and information security, Classifications of cybercrime, **ITA 2000 :** Cybercrime and the Indian ITA 2000 **Cyber offenses & Cybercrime: Issues and challenges** How criminal plan the attacks, Social Engg, Cyber stalking, Cyber cafe and Cybercrimes, Botnets, Attack vector, Cloud computing, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit Card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication Service Security, Attacks on Mobile/Cell Phones, What is Cyber squatting? Ant cyber squatting, Software Piracy, Domain Name Disputes, File Sharing .

Reference Books:

Sr. No.	Title
1	Nina Godbole, SunitBelapure, Cyber Security: Understanding Cyber Crimes, ComputerForensics and Legal Perspectives, Wiley India, New Delhi
2.	Information Systems Security, Nina Godbole, Wiley India, New Delhi
3.	Cybersecurity: The Essential Body of Knowledge, Dan Shoemaker, William Arthur
4.	Conklin, Wm Arthur Conklin, Cengage Learning.
5.	Cyber Security, Edward Amoroso, Silicon Press, First Edition
6.	Professional AngularJs , By Valeri Karpov,Diego netto,Wrox Pub.
7.	Pro AngularJs,By Adam Freeman,Apress .
8.	Bootstrap By Jake spurlock ,O'RELLY .

Semester – V				
Sr. No.	**Subject Code**	**Subject Title**	**Internal Marks**	**External Marks**
34	**MCA502**	**Cloud Computing**	20	80
Objective: This module gives students the skills and knowledge to understand how Cloud Computing Architecture can enable transformation, business development and agility in an organization.				
UNIT –1	**CLOUD ARCHITECTURE AND MODEL -** Technologies for Network-Based System – System Models for Distributed and Cloud Computing – NIST Cloud Computing Reference Architecture. Cloud Models:- Characteristics – Cloud Services – Cloud models (IaaS, PaaS, SaaS) – Public vs Private Cloud –Cloud Solutions - Cloud ecosystem – Service management – Computing on demand.			
UNIT -2	**VIRTUALIZATION -** Basics of Virtualization - Types of Virtualization - Implementation Levels of Virtualization - Virtualization Structures - Tools and Mechanisms - Virtualization of CPU, Memory, I/O Devices - Virtual Clusters and Resource management – Virtualization for Data-center Automation. **CLOUD INFRASTRUCTURE -** Architectural Design of Compute and Storage Clouds – Layered Cloud Architecture Development – Design Challenges - Inter Cloud Resource Management – Resource Provisioning and Platform Deployment – Global Exchange of Cloud Resources.			
UNIT -3	**PROGRAMMING MODEL -**Parallel and Distributed Programming Paradigms – MapReduce , Twister and Iterative MapReduce – Hadoop Library from Apache – Mapping Applications - Programming Support - Google App Engine, Amazon AWS - Cloud Software Environments -Eucalyptus, Open Nebula, OpenStack, Aneka, CloudSim			
UNIT -4	**SECURITY IN THE CLOUD -** Security Overview – Cloud Security Challenges and Risks – Software-as-a-Service Security – Security Governance – Risk Management – Security Monitoring – Security Architecture Design – Data Security – Application Security – Virtual Machine Security - Identity Management and Access Control– Autonomic Security.			

Reference Books:

Sr. no.	Reference books:
1.	Kailas jayaswal, jagannath kallakurchi,Donald, Dr. Devan shasha- Cloud computing black book-Kongent dreamtech
2	Kai Hwang, Geoffrey C Fox, Jack G Dongarra, "Distributed and Cloud Computing, From Parallel Processing to the Internet of Things", Morgan Kaufmann Publishers, 2012.
3	John W.Rittinghouse and James F.Ransome, "Cloud Computing: Implementation, Management, and Security", CRC Press, 2010.
4	Toby Velte, Anthony Velte, Robert Elsenpeter, "Cloud Computing, A

	Practical Approach", TMH, 2009.
5	Kumar Saurabh, "Cloud Computing – insights into New-Era Infrastructure", Wiley India,2011.
6	George Reese, "Cloud Application Architectures: Building Applications and Infrastructure in the Cloud" O'Reilly
7	James E. Smith, Ravi Nair, "Virtual Machines: Versatile Platforms for Systems and Processes", Elsevier/Morgan Kaufmann, 2005.
8	Rajkumar Buyya, Christian Vechhiola, S.Thamarai Selvi , "Mastering Cloud Computing ", McGraw Hill Education (India) Private Limited.

Suggested Additional Reading

1. Cloud Computing: A practical approach by Anthony T. Vetle – Tata McGraw Hill Education Private Limited (2009)
2. Cloud Computing Bible - Barrie Sosinsky – Wiley India Pvt Ltd (2011)
3. Cloud Computing For Dummies-- Judith Hurwitz , Robin Bloor , Marcia Kaufman , Fern Halper - – Wiley India Pvt Ltd
4. Cloud Computing: SaaS, PaaS, IaaS, Virtualization, Business Models, Mobile, Security and More (Student Edition) - Kris Jamsa- Published by - Jones & Bartlett Learning
5. *http://googcloudlabs.appspot.com/*
6. http://aws.amazon.com/sdkforjava/
7. http://aws.amazon.com/code
8. http://docs.aws.amazon.com/amazonswf/latest/awsflowguide/awsflow-developing-workflows.html
9. http://aws.amazon.com/swf/flow/

Semester – V				
Sr. No.	**Subject Code**	**Subject Title**	**Internal Marks**	**External Marks**
35	**MCA503**	**Software Project Management**	20	80
Objective: To learn process of software projects management, estimations, use of project management tools, configuration management, quality and testing and software teams.				
UNIT –1	**Introduction to SPM** What is project? software project vs. other types of projects, activities in project management, the people involved in project, What is project management ? project success and failure and Importance of SPM, stepwise project planning.			
UNIT -2	**Software Project Estimation** Project estimation, Resources for project estimation, decomposition techniques- software sizing, problem based estimation, process based estimation, estimation with use-cases, reconciling estimates. Estimation models- COCOMO, Delphi, function point analysis, estimation for object oriented projects and web engineering projects, to make/buy decision.			
UNIT -3	**Project scheduling & Risk management** Basic principles, relationship between people and effort, effort distribution, defining a task, scheduling- timeline chart, tracking progress, project management tools and techniques-PERT and Gantt charts. Software risk, reactive vs. proactive risk strategies, risk identification- assessing overall project risk, risk component and drivers, risk projection- developing a risk table, assessing a risk impact. Risk refinement, mitigation, monitoring and management.			
UNIT -4	**Software Quality and SCM** Importance of software quality, quality control, quality assurance, metrics for measuring software quality, six sigma for s/w engineering, measures of s/w reliability and availability, ISO 9000 quality standards. What is SCM, its elements, SCM process-version and change control, configuration audit, Introduction to agile techniques –SCRUM, DSDM			

Reference Books:

1.Software Project Management, Hughes, Cotterell, Mall, 5th Edition, McGraw Hill

2. Software Engineering, 6th Edition, Pressman, McGraw Hill International Edition

3. Software Engineering concepts Richard Fairley

4. Software Project Management S.A. Kelkar

5. Software Engineering IAN Sommerville

6. Effective Project Management: Traditional, Agile, Extreme, by Wysocki 7ed , wiley

7. Software Engineering Project Management, Thayer 2ed, Wiley

8. Project Management Core Textbook, 2 ed, w/cd by Gopalan, Wiley

Semester – V				
Sr. No.	**Subject Code**	**Subject Title**	**Internal Marks**	**External Marks**
36	**MCA504**	**Advanced Web Technology**	20	80

Objective: The course aims to impart the concepts of advanced web programming techniques, provide extension to web technology acquired . Helps to understand basics of server side technologies and apply them to develop dynamic web applications and the DOTNET framework, C# language features and Web development using ASP.NET

UNIT –1	**Introduction to .NET framework:** Evolution of .NET , Comparison of Java & .NET, Features of .Net, Introduction VS IDE, Architecture of .NET framework ,Managed code and Unmanaged Code, Common Language Runtime, WPF, LINQ, CTS,CLS,FCL, Metadata and Assemblies, Application Domains, Advantages and Application of .Net. **C#:**Features of C#, Principles object oriented programming, keywords, Data Types, operators, type of casting, Boxing & UnBoxing, Control Structures, Reference Data Types- Strings , Data time objects, Arrays, Classes and object, properties, parameter passing-pass by value, Reference, out parameter and params array, Inheritance and Polymorphism, Abstract class, interfaces, sealed classes and sealed methods, Delegates, Exception Handling, Generics, File Handling and Database programming.
UNIT -2	**Web Applications in ASP.NET:** Introduction to Asp.Net**,** Features of Asp.Net, ASP.Net Coding Modules, Page Directives, Page events and Page Life Cycle, PostBack and CrossPage Posting,ASP.Net Application Compilation models, ASP.NET server Controls , HTML Controls, Validation Controls, Login controls, Response.Redirect() and server.Transfer() methods. **ADO.Net**-features of ADO.Net, Connected and disconnected architecture, database objects, Database operation using various Data controls and data providers. **Introduction to JQuery :** What is jQuery? JavaScript vs jQuery , How to use jQuery in ASP.NET?
UNIT -3	**Introduction to ASP.NET MVC:** MVC Pattern and MVC applied to Web Frameworks, MVC overview, Advantages & Disadvantages of ASP.NET MVC, Software Requirement and Installation for ASP.NET MVC. **The MVC Application Structure:** Creating an ASP.NET MVC Project, Project Templates, Convention over Configuration, Running the Application, Creating Model, Setting up/ Creating Routes, Creating Controllers, Creating Views.
UNIT -4	**Managing State:** Preserving State in Web Applications, Page-Level State(view state), Using Cookies to Preserve State, ASP.NET Session State, Storing Objects in Session State, Configuring Session State, Setting Up an Out-of-Process State Server, Storing Session State in SQL Server, Using Cookie less Session IDs, Application State.

	Introduction to web services: What is a Web Service? Software as a service, Web Service Architectures, SOA, Creating and consuming Web service, XML Web Services. **Use of AJAX on web forms:** Introduction to Ajax Controls, Using Ajax controls on web forms, JSON – Array, object, mixing literals, syntax, encoding/decoding, JSON versus XML, server-side JSON tools

Reference Books:

1. B.M. Harwani ,"Practical ASP.NET Projects", SPD Publication
2. .NET programming Black Book, DreamTech Press
3. Beginning ASP.NET 4.5.1 in C# and VB Spaanjaars
4. .NET 4.5 Programming 6-in-1, Black Book Kogent
5. C# 2012 Programming Black Book Covers .NET 4.5 Kogent
6. C# 2010 Programming: Covers .NET 4.0 Black Book, w/cd Kogent
7. Jack Purdum, "Beginning C# 3.0: An Introduction to Object Oriented Programming", Wrox Publication,2008
8. Jonathan Chaffer and Karl Swedberg "Learning jQuery", 3rd Edition , SPD Publication,2012
9. ChiragPatel, "Advance .NET Technology" 2nd Edition , DreamTech Press,2012
10. CristianNagel,BillEvjen,JayGlynn,Karli Watson, Morgan Skinner, "Professional C# 2012 and .NET 4.5" , Wrox Publication
11. Anne Boehm,JoelMurach, "murach's ASP. NET 4 Web Programming with C# 2010", 4th Edition , SPD Publication,2011
12. Anne Boehm,Ged Mead, "murach's ADO. NET 4 database Programming with C# 2010", 4th Edition , SPD Publication,2011
13. Andrew Trolsen, "Pro C# 5.0 and the .NET 4.5 Framework" 6th Edition, APress, 2013
14. Vijay Mukhi and SonalMukhi, "Visual Studio .NET with C#" , BPB Publication
15. Andrew Stellman and Jennifer Greene, "Head First C#", 2nd Edition , O'Reilly, SPD Publication
16. Web Technologies Black book , DreamTech Press, 2013
17. Ralph Moseley & M. T. Savaliya, "Developing Web Application", 2nd Edition, Wiley,2012

Semester – V				
Sr. No.	**Subject Code**	**Subject Title**	**Internal Marks**	**External Marks**
37	**MCA505**	**Elective II** **E2.1 Computer Graphics**	20	80
Objective: Through this course students are introduced to fundamental principles and algorithms underlying computer graphics, including line drawing algorithms, circle/ellipse drawing algorithms, 2D geometrical transformation, 3D geometric transformations, viewing in 3D(orthographic projection and perspective projection), visible surface detection algorithms. They are also introduced to different image enhancement techniques.				
UNIT –1	**Introduction :**Introduction to Computer Graphics and its applications, Components and working of Interactive Graphics; **Video Display Devices:** Raster scan and Random Scan displays, Display Processors; Resolution, Aspect Ratio, Refresh CRT, interlacing; Color CRT monitors, LookUp tables, Plasma Panel and LCD monitors, **Interactive Input and Output Devices:** keyboard, mouse, trackball, joystick, light pen, digitizers; image scanners, Touch Panels; Voice systems; printers, plotters; Graphics Software; Coordinate Representations;			
UNIT -2	**Drawing Geometry:** Symmetrical and Simple DDA line drawing algorithm, Bresenham's line Algorithm; loading frame buffer; Symmetrical DDA for drawing circle, Polynomial method for circle drawing; circle drawing using polar coordinates, Bresenham's circle drawing; Generation of ellipse; parametric representation of cubic curves, drawing Bezier curves; **Filled-Area Primitives:** Flood fill algorithm, Boundary fill algorithm, Scan-line polygon fill algorithm			
UNIT -3	**2-D Transformations:** translation, rotation, scaling, matrix representations and homogeneous coordinates, composite transformations, general pivot point rotation, general fixed point scaling, Shearing; Reflection ; Reflection about an arbitrary line; **2-D Viewing:** window, viewport; 2-D viewing transformation, zooming, panning; **Clipping operations:** point and line clipping, Cohen-Sutherland line clipping, mid-point subdivision line clipping, Liang-Barsky line clipping, Sutherland-Hodgman polygon clipping; Weiler-Atherton polygon ClippingPointing and positioning techniques; rubber band technique; dragging;			
UNIT -4	**3-D Graphics:** 3-D modeling of objects, 3D transformation matrices for translation, scaling and rotation, parallel projection: Orthographic and oblique projection; perspective projection; Hidden surface removal: Zbuffer,depth-sorting, area subdivision, BSP-Tree method; Ray casting; **Shading:** Modelling light intensities, Gouraud shading, Phong shading; Introduction to Animation, Tweening, Morphing, Fractals;			

Reference Books:

1	Donald Hearn, M. Pauline Baker, Computer Graphics, Pearson Education.
2	Maurya, Computer Graphics with Virtual Reality Systems, 2ed , Wiley
3	Foley etc., Computer Graphics Principles & Practice, Pearson Education.
4	D.P. Mukherjee, Fundamentals of Computer Graphics and Multimedia, PHI.
5	Newmann & Sproull, Principles of Interactive Computer Graphics, McGraw Hill.
6	Rogers, Procedural Elements of Computer Graphics, McGraw Hill.
7	Anirban Mukhopadhyay, Arup Chattopadhyay, Introduction to Computer Graphics and Multimedia, Vikas Publications.

Semester – V				
Sr. No.	**Subject Code**	**Subject Title**	**Internal Marks**	**External Marks**
37	**MCA505**	**Elective II** **E2.2 Big data Management**	20	80

Objective:

- Understanding of Big Data for Business Intelligence
- Understanding of Hadoop component and Ecosystem
- Learning various business case studies for Big Data Analytics
- Performing MapReduce Analytics with Hadoop and related tools
- Understanding Big Data Security

UNIT –1	**Understanding of Big Data** Introduction to Big Data, Definition of Big Data, Sources of Big Data, Characteristics of Big Data, Harnessing Big Data, Real time data processing, Structure of Big Data, Need of Big Data Management, Big Data life Cycle and processing, Data marts, Data warehousing, Data lake and Data vault concepts, Applications of Big Data, Benefits of Big Data Management.
UNIT -2	**Hadoop Architecture and MapReduce** Overview of Hadoop, Features of Hadoop, Introduction to HDFS, Architecture of Hadoop, Components of Hadoop, Hadoop daemons, HDFS operations, Cluster capacity planning, Hadoop cluster setup and administration, Introduction to Map-Reduce, Map-Reduce Architecture, Writing Map-Reduce program, Examples of Map-Reduce. Introduction to MRv2, YARN, NameNode High Availability
UNIT -3	**HADOOP ECOSYSTEM AND TOOLS** Pig-Introduction, Features of Pig, Pig architecture, Pig data types, Defining schema, Reading and storing data through Pig, Pig operators, Examples of Pig. Hive-Introduction, Architecture of Hive, Hive shell, Data types, Operators in Hive, Built-in functions in Hive, Database operations in Hive, HiveQL basics, Hive Vs RDBMS , Examples of Hive, Introduction to HBase ,Sqoop,Oozie, Spark, Tez ,Flume, Ambari or Cloudera.
UNIT -4	**BIG DATA SECURITY** Big Data Security , Security concerns with Hadoop ,Hadoop Security Challenges and threats ,Hadoop security best practices,Hadoop Kerberos Security Implementation & Configuration,Securing Sensitive Data in Hadoop Setting up audit logging in Hadoop cluster,Data encryption in Hadoop Ranger- Provide authentication, authorization and data protection,Knox- Provides a single point of secure access for Apache Hadoop clusters.

Reference Books:

1. Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, "Professional Hadoop Solutions", Wiley, ISBN: 9788126551071, 2015.
2. Tom White, Hadoop: The Definitive Guide, O'Reilly, 3rd edition
3. Dirk Deroos, Hadoop for Dummies, wiley
4. Alex Holmes, Hadoop in Practice, manning 1 st edition.

5. Alan Gates, Programming Pig, O'Reilly
6. Edward Capriolo, Dean Wampler, Jason Rutherglen, - Programming Hive, O'Reilly
7. Chris Eaton, Dirk deroos et al. , "Understanding Big data ", McGraw Hill, 2012.
8. Tom White, "HADOOP: The definitive Guide" , O Reilly 2012. 6 IT2015 SRM(E&T)
9. VigneshPrajapati, "Big Data Analytics with R and Haoop", Packet Publishing 2013.
10. Tom Plunkett, Brian Macdonald et al, "Oracle Big Data Handbook", Oracle Press, 2014.
11. http://www.bigdatauniversity.com/ 7. JyLiebowitz, "Big Data and Business analytics",CRC press, 2013.
12. Gazzang for Hadoop http://www.cloudera.com/content/cloudera/en/solutions/enterprisesolutions/security-for-hadoop.html
13. Eric Sammer, "Hadoop Operations", O'Reilley, 2012.
14. HADOOP SECURITY : TODAY AND TOMORROW " http://hortonworks.com/blog/hadoop-security-today-and-tomorrow/"

Semester – V				
Sr. No.	**Subject Code**	**Subject Title**	**Internal Marks**	**External Marks**
37	**MCA505**	**Elective II** **E2.3 Software Testing and Quality Assurance**	20	80
Objective: To enable student to learn Software Quality and Assurance practices and various software testing techniques through case studies.				
UNIT –1	**Software Testing Fundamentals-** Terminology, error, fault and failures, objectives, principles, Purpose of testing, Debugging, Theoretical and practical limitations of testing, The problem of infeasible paths, Testability, Relationship of testing with other activities, Testing levels, Unit testing, Integration testing, System testing, Acceptance testing. **Testing Techniques and Strategies**- Static and dynamic testing, Software technical reviews, Testing techniques and their applicability, Functional testing and analysis, Structural testing and analysis, Hybrid approaches, Transaction flow analysis, Stress analysis, Failure analysis, Concurrency analysis, Performance analysis.			
UNIT -2	**Flow graphs and Path Testing:** Path testing basics, Path predicates, Application of path testing. **Data Flow Testing:** Basics of data flow testing, Data flow model, Data flow testing strategies, Applications. **Software Testing and Regular Expression:** Path products, Path sums, Loops, Reduction procedure, Applications, Approximate number of paths, The mean processing time of any routine, Regular expression and Flow-anomaly detection			
UNIT -3	**Software Quality:** Software Quality Metrics, Standards, Certification and assessment, Quality management standards, Quality standards with emphasis on ISO approach, Capability Maturity Models-CMM and CMMI, TQM Models, The SPICE project, ISO/IEC 15504, Six Sigma Concept for Software Quality. **Quality Planning:** Inputs, Tools and techniques, Outputs			
UNIT -4	**Quality Assurance:** Inputs, Quality management plan, Results of quality control measurements, Operational definitions, Quality planning tools and techniques, Quality audits, Quality improvements **Quality Control:** Inputs, Tools and techniques: Inspection, Control charts, Pareto diagrams, Statistical sampling, Flowcharting, Trend analysis, Outputs: Quality improvements, Acceptance decisions, Rework, Completed checklist, Process adjustments. **Study of testing tool**- Introduction and usage of Win runner, Selenium, Bugzilla, bugbit, Test Director, Test Link			

Reference Books:

Sr. no.	Book title
1.	K shirasagar Naik and tripathy : software testing and quality assurance, Wiley publication
2	Jeff Tian, Software Quality Engineering: Testing, Quality Assurance, and Quantifiable Improvement, Wiley.
3	Boris B. Bezier, Software Testing Techniques, Wiley Dreamtech Publication (2004).
4	William Perry, Effective Methods for Software Testing, John Wiley & Sons, Inc. (2006).
5	Glenford J. Myers, The Art of Software Testing, Wiley India Pvt. Ltd 2nd edition (2006).

Semester – V				
Sr. No.	**Subject Code**	**Subject Title**	**Internal Marks**	**External Marks**
37	**MCA505**	**Elective II** **E2.4 Artificial Intelligence and Expert System**	20	80
Objective: The goals of AI research include reasoning, knowledge, planning, and learning, natural language processing (communication), perception and the ability to move and manipulate objects.				
UNIT –1	**AI Problem solving:** Introduction to AI, heuristic techniques- Generate-and-test, Hill climbing, Best-First Search problem reduction, constraint satisfaction, Mean-Ends analysis Knowledge representation – mapping between facts and representations, Approaches to knowledge representation, Issues in knowledge representations, searching techniques			
UNIT -2	**Expert system :** Introduction and Characteristics of Expert system , Advantages and disadvantages , Applications of Expert system, Components of Expert Systems, Rule based knowledge representation techniques , Inference Engine, Forward chaining, backward chaining, Factors associated with development of an Expert System, Expert system life cycle. Introduction to Expert system shell.			
UNIT -3	**Introduction Fuzzy Sets**, Fuzzy Rules, Linguistic Variables and hedges Operations of Fuzzy sets, Fuzzy inference, Certainty factor **Artificial Neural Network :** The Neural as a simple computing element, The perception Multilayer Neural network, Application of Neural Network.			
UNIT -4	**Introduction to PROLOG**- PROLOG programming environment, essential of prolog programming- data types, variables, prolog rules unification, conjunction, PROLOG list, prolog inference engine, built in predicates, prepositions, developing A* search program			

Reference Books:

1. E. Rich and K. Knight," Artificial Intelligence", Tata McGraw Hill.
2. Sivanandam Principles of Soft Computing, 2ed, w/cd, wiley
3. E. Charnaik and D. McDermott," Introduction to artificial Intelligence", Addison-Wesley Publishing Company.
4. Dan W. Patterson, "Introduction to Artificial Intelligence and Expert Systems", PHI.
5. Nils J. Nilson, "Principles of Artificial Intelligence", Narosa Publishing Co.
6. W.F. Clofisin and C.S. Mellish, "Programming in PROLOG", Narosa Publishing Co.
7. Sanjiva Nath, "Turbo PROLOG", Galgotia Publications Pvt. Ltd.
8. M. Chandwick and J.A. Hannah, "Expert Systems for Personal Computers", Galgotia Publications Pvt. Ltd.
9. M.Sasikumar,S.Ramani etc. "Rule based Expert System", Narosa Publishing House.

Semester – V				
Sr. No.	**Subject Code**	**Subject Title**	**Internal Marks**	**External Marks**
38	**MCA506**	Communication Skill -III	50	-

Objective:

- To enable all the students to develop their basic communication skills in English
- To ensure that student's speaking and writing ability is developed.
- To enable students to understand technical communication.

To enable the students to face the global challenges of employment

UNIT –1	**Features of Indian English**: Correction of sentences, Structures, Tenses, ambiguity, idiomatic distortion.
UNIT -2	**Writing Skills:** Writing tactfully: content, tactful use of language, handling negatives, correction of errors, Effective sentences, cohesive writing, clarity and conciseness in writing. **Technical writing:** definition, description of instruments, process writing , technical Proposal writing, email writing, **Business correspondence:** CVs and SOPs (Statement of purpose)
UNIT -3	**Corporate/ Business Etiquettes:** Corporate grooming and dressing, Email and telephone etiquettes, Etiquettes in social and office setting, Telephone manners
UNIT -4	**Speaking Skills:** Importance of speaking effectively, Conversation skills, Speech process and speech style **Presentation skills:** Effective presentation strategies, presentation outline, organizing content, visual aids, body language and effective presentation **Interviews:** Introduction, general preparations for an interview, types of questions generally asked, importance of nonverbal aspects.

Reference Books:

1.	Raman Meenakshi and Sharma Sangeeta, ―Technical communication: Principles & practice□, OUP New Delhi 2005.
2	Weiss, Edmond H. Writing Remedies, ―Practical Exercises for Technical Writing□, UP, 2000.
3	Hamp-Lyons, Liz and Ben Heasley, Study Writing, ―A Course written in English for Academic and Professional Purposes□, Cambridge University Press, Cambridge 1987.
4	Goatly, Andrew, ―Critical Reading and Writing□, London: Routledge, 2000
5	English for Engineers and Technologists : A skills approach Humanities and Social Sciences Division, Anna University, Chennai.
6	Essentials of Business Communication, Rajendra Pal, J S KorlahaHi : Sultan

	Chand & Sons, New Delhi.
7	Basic Communication Skills for Technology, Andrea J. Rutherford: Pearson Education Asia, Patparganj, New Delhi-92
8	Advanced Communication Skills, V. Prasad, Atma Ram Publications, New Delhi.
9	Raymond V. Lesikav; John D. Pettit Jr.; Business Communication; Teory & Application, All India Traveller Bookseller, New Delhi-51.
10	WEBSITE RESOURCES *1. www.uefap.com* *2. www.eslcafe.com* *3. www.listen-to-english.com* *4. www.owl.english.purdue.edu* *5. www.chompchomp.com*

	Teaching Methodology: All the sessions should be activity based and should give students adequate opportunity to participate actively in each activity. Teachers and students must communicate only in English during the session.
	Internal Evaluation
	Q.1 One Home Assignments based on unit 1 (10 marks)
	Q.2 One class tutorial based on unit II (10 marks)
	Q.3 One unit test based on unit III (10 marks)
	Q.4 Activities based on unit IV: (20 Marks) 1. Presentation (Seminar/ speech) student should be asked to give a seminar or speech and he/she should be evaluated on the basis of performance (10 marks) 2. Mock interview: mock interview should be conducted in the classroom. One student should be asked to face the interview and a group of students should work as a panel. Teacher should monitor these activities. (10 marks) **Total marks: 50**

Semester – V				
Sr. No.	**Subject Code**	**Subject Title**	**Internal Marks**	**External Marks**
39	**MCA507**	**LAB IX (Advanced Web Technology)**	-	100

Objective: To enable the students to understand the concepts of the advanced web technologies and enable students to learn to produce well designed, effective standalone applications using.NET technology and enable students to learn the implementation of web services. The subjects enable students to learn to produce well designed, effective Web applications

1. **Introduction to C#**
   - Program to demonstrate reference data types i.e. string, date time
   - Program using array, using object and class , using array list, collection

2. **Program based on Exception Handling ,Generic, Inheritance and polymorphism**
   - Program to demonstrate getter and setter method
   - Program to On Exception Handling Mechanism covering try, Catch, Throw, Throws, Finally)
   - Program to demonstrate generic, to demonstrate inheritance and polymorphism

3. **Program based on File handling and Database programming**
   - Program to demonstrate use of directories, sequential access file, random access file
   - Program to demonstrate LINQ , based on database access using ADO.NET

4. **ASP.NET :**
   - Program based on PostBack and CrossPage posting
   - Master Pages and Themes and Skins
   - Program to demonstrate PageLife Cycle
   - Program based on validation controls
   - Program to demonstrate the use of jQuery

5. **Managing State:**
   - Program to demonstrate Managing State with ViewState and Session
   - Program based on Cookies for maintaining state.
   - Program using Cache Object to store Data, Program on a Shopping Cart

6. **Web services :**
   - Program to create web service
   - Program to create web service which returns DataSet.
   - Program to call web service asynchronously
   - Program for securing a Service using Windows Authentication
   - Program for securing a Service using SOAP header

7. **Advance .NET Concepts :**
   - Simple Program based on WPF
   - Program using AJAX controls

Reference Books :

1. B.M. Harwani ,"Practical ASP.NET Projects", SPD Publication
2. .NET programming Black Book, DreamTech Press
3. Jack Purdum, "Beginning C# 3.0: An Introduction to Object Oriented Programming", Wrox Publication,2008
4. Jonathan Chaffer and Karl Swedberg "Learning jQuery", 3rd Edition , SPD Publication,2012
5. ChiragPatel, "Advance .NET Technology" 2nd Edition , DreamTech Press,2012
6. CristianNagel,BillEvjen,JayGlynn,Karli Watson, Morgan Skinner, "Professional C# 2012 and .NET 4.5" , Wrox Publication
7. Anne Boehm,JoelMurach, "murach's ASP. NET 4 Web Programming with C# 2010", 4th Edition , SPD Publication,2011
8. Anne Boehm,Ged Mead, "murach's ADO. NET 4 database Programming with C# 2010", 4th Edition , SPD Publication,2011
9. Andrew Trolsen, "Pro C# 5.0 and the .NET 4.5 Framework" 6th Edition, APress, 2013
10. Vijay Mukhi and SonalMukhi, "Visual Studio .NET with C#" , BPB Publication
11. Andrew Stellman and Jennifer Greene, "Head First C#", 2nd Edition , O'Reilly, SPD Publication
12. Web Technologies Black book , DreamTech Press, 2013
13. Ralph Moseley & M. T. Savaliya, "Developing Web Application", 2nd Edition, Wiley,2012

Semester – V				
Sr. No.	**Subject Code**	**Subject Title**	**Internal Marks**	**External Marks**
40	**MCA508**	**LAB X (Elective II) based on Computer Graphics**	-	100

Practical list : Using C/C++

1. Study Graphics library functions – initgraph, detectgraph, closegraph, cleardevice, putpixel, getpixel, getmaxx, getmaxy, line, circle, rectangle, ellipse, arc, drawpoly, setfillstyle, fillpoly, outtextxy, pieslice, setcolor, getcolor, setbkcolor, getbkcolor, outtextxy

2.(i) Implement the program that draws line, circle, rectangle and ellipse using graphics library functions.
(ii) Write a program for displaying text in different sizes, colours and font style using graphics library functions.

3. (i) Implement the program that draws polygon using library functions and fill colour in polygon.
(ii) Implement a program that create and fill 2D objects using graphics library function. – House- Fish
4. Implement the program that draws square using DDA Line drawing algorithm.

5. Implement the program that draws triangle using Bresenham's Line drawing algorithm.

6. Implement Midpoint Circle Algorithm.
7. Implement Midpoint Ellipse Algorithm.
8. Implement Polygon filling Algorithms:
- Boundary fill
- Flood fill Algorithm
9. Implement following 2D transformations for line and polygon.
- Translation
- Rotations (about origin & pivot point)
- Scaling (about origin & fixed point)

10. Implement Cohen-Sutherland Line Clipping Algorithm.

11. Implement Liang - Barsky Line Clipping Algorithm

12. Implement Sutherland-Hodgmen Polygon Clipping Algorithm.

13. Mini Project based on Graphics Concepts.

Semester – V				
Sr. No.	**Subject Code**	**Subject Title**	**Internal Marks**	**External Marks**
40	**MCA508**	**LAB X (Elective II) based onE2.3 Software Testing and Quality Assurance**	-	100

Objective: Developing applications to automate basis path testing, Boundary value analysis, Data flow testing, Branch and statement coverage, etc. Exposure to automated testing tools such as Rational test, manager, Selennium, Loadrunner or any other similar tools.

Software Testing Lab

List of Experiments

1. Write programs in 'C' Language to demonstrate the working of the following constructs:
   i) do...while ii) while….do iii) if…else iv) switch v) for
2. "A program written in 'C' language for Matrix Multiplication fails" Introspect the causes for its failure and write down the possible reasons for its failure.
3. Take any system (e.g. ATM system) and study its system specifications and report the various bugs.
4. Write the test cases for any known application (e.g. Banking application)
5. Create a test plan document for any application (e.g. Library Management System)
6. Study of any testing tool (e.g. Win runner)
7. Study of any web testing tool (e.g. Selenium)
8. Study of any bug tracking tool (e.g. Bugzilla, bugbit)
9. Study of any test management tool (e.g. Test Director)
10. Study of any open source-testing tool (e.g. Test Link)
11. Take a mini project (e.g. University admission, Placement Portal) and execute it. During the Life cycle of the mini project create the various testing documents* and final test report document.

*Note: To create the various testing related documents refer to the text "Effective Software Testing Methodologies by William E. Perry

Reference Books:

1.Testing in 30 + open source tools by shende SPD
2. Software testing foundations 2edandreasspillner SPD

Semester – V				
Sr. No.	**Subject Code**	**Subject Title**	**Internal Marks**	**External Marks**
40	**MCA508**	**LAB X (Elective II) Big Data Management**	00	100

PRACTICAL ASSIGNMENTS

1. Install and configure multi node Hadoop cluster.
2. Explore HDFS operations: Put local file into HDFS and Get the file you saved in HDFS to your local file system and read their contents and check if files are same.
3. Explore Hadoop Daemons - NameNode, Secondary NameNode, DataNode, YARN etc.
4. Write and run word count program using Map Reduce
5. Explore NameNode High Availability (Active - Passive NameNode)
6. Explore Hadoop ecosystem: Install and configure different Tools, Start / Stop Hadoop services.
7. Explore Hive and Pig: Create database/Tables in Hive and use HiveQL. Write small Pig scripts.
8. Explore Sqoop : Import table data in Hadoop using Sqoop
9. Explore Hadoop cluster Security using Kerberos
10. Explore Ranger : administration ,authentication, authorization and data protection
11. You are given a data log file of say aircel having subscribers ID, tower id and Data Downloaded. Calculate Total Data Downloaded for each customer id using
    a) Java Program run in your local system.
    b) Map reduce program in Hadoop.
    c) Sort the result from b) according to Data Downloaded.

Semester – V				
Sr. No.	**Subject Code**	**Subject Title**	**Internal Marks**	**External Marks**
40	**MCA508**	**LAB X (Elective II) A I & Expert System**	00	100

PRACTICAL ASSIGNMENTS

1. WAP to convert temperature from faraignheight to centigrade.
2. WAP to find out factorial of given number using recursion.
3. WAP to implement simple I/O operations.
4. WAP to implement Linear search in LIST
5. WAP to sort list using Simple sort
6. WAP to implement A* Algorithm.
7. WAP to implement Truth table.
8. WAP to implement Matrix manipulation.
9. WAP for Tower of Honai

Semester – VI				
Sr. No.	***Subject Code***	***Subject Title***	***Internal***	***External***
41	*MCA601*	*Project Work*	*200*	*300*
Total Credits			*12*	*18*

General Instruction Regarding Preparation of Project Report For MCA-III (Sem VI)

Period : 150 days after completion of vth semester.

TYPING

1. The typing shall be standard 12 pts in double spaced using black ink only
2. Margins must be Left 2 inches Right 1.5 inches Top 2 inches Bottom 1.5 inches
3. Paper A4 size Bond Paper

COPIES

Two hard-bound copies should be submitted to institute.
(Black Rexine with Golden Embossing as per format displayed herewith)
One original and one clean Xerox Copy.

FORMAT FOR TITLE PAGE AND FOR EMBOSSING

A

PROJECT REPORT

ON

"NAME OF THE SYSTEM"

FOR

NAME OF THE COMPANY

SUBMITTED TO

SHIVAJI UNIVERSITY, KOLHAPUR

FOR THE AWARD OF

MASTER OF COMPUTER APPLICATION

(MCA-III, SEM-VI)

BY

<NAME OF STUDENT/S>

UNDER THE GUIDANCE OF

<NAME OF GUIDE>

THROUGH

<DIRECTOR >

< NAME OF THE INSTITUTE>

<YEAR>

The Guidelines regarding the documentation and scope of project are mentioned here below:

A) MCA-III SEM-VI Project (Desktop / Stand Alone Applications)

Project Report should be submitted in following format for Commercial Application Projects viz. Payroll, Sales, Purchase, Inventory, Book Shop, Examination system etc. Where C, C++, Python,Java, MS Access, Oracle, SQL Server, My SQL etc. are used.

1 Blank Pages at beginning
2 Title Page
3 Certificate from Company
4 Certificate from Institute
5 Declaration by Student
6 Certificate from project guide
7 Acknowledgement
8 Table of Contents

Chapter 1 : INTRODUCTION
- 1.1 Company Profile
- 1.2 Existing System and Need for System
- 1.3 Scope of Work
- 1.4 Operating Environment - Hardware and Software

Chapter 2 : PROPOSED SYSTEM
- 2.1 Proposed System
- 2.2 Objectives of System
- 2.3 User Requirements

Chapter 3 : ANALYSIS & DESIGN
- 3.1 Data Flow Diagram (DFD)
- 3.2 Functional Decomposition Diagram (FDD)
- 3.3 Entity Relationship Diagram (ERD)
- 3.4 Data Dictionary
- 3.5 Table Design
- 3.6 Code Design
- 3.7 Menu Tree
- 3.8 Menu Screens
- 3.9 Input Screens
- 3.10 Report Formats
- 3.11 Test Procedures and Implementation

Chapter 4 : USER MANUAL
- 4.1 User Manual
- 4.2 Operations Manual / Menu Explanation
- 4.3 Forms and Report Specifications

Drawbacks and Limitations
Proposed Enhancements
Conclusion Bibliography
ANNEXURES:
ANNEXURE 1 : INPUT FORMS WITH DATA
ANNEXURE 2 : copy of joining report and progress report

B) A) MCA-III SEM-VI Project (Web Based / Mobile Applications)

Project report should be submitted in following format for project using OOAD, Embedded System, WAP and other technologies and Web Deployed Systems where C, C++, J2EE, .NET, OOAD and JAVA, SDK's, API's are used.

1 Blank Pages at beginning
2 Title Page
3 Certificate from Company
4 Certificate from Institute
5 Declaration by Student
6 Certificate from project guide
7 Acknowledgement
8 Table of Contents

CHAPTER 1 : INTRODUCTION

1.1 Company Profile
1.2 Existing System and Need for System
1.3 Scope of Work
1.4 Operating Environment - Hardware and Software
1.5 Detail Description of Technology Used

CHAPTER 2 : PROPOSED SYSTEM

2.1 Proposed System
2.2 Objectives of System
2.3 User Requirements

CHAPTER 3 : ANALYSIS & DESIGN

3.1 Object Diagram
3.2 Class Diagram
3.3 Use Case Diagrams
3.4 Module Hierarchy Diagram
3.5 Component Diagram
3.6 Deployment Diagram (in case of Web Deployment)
3.7 Module Specifications
3.8 Interface Diagram (in case of WAP and Embedded Systems)
3.9 Web Site Map Diagram (in case of Web Site)
3.10 User Interface Design (Screens etc.)
3.11 Table specifications (in case back end is a database)
3.12 Test Procedures and Implementation

CHAPTER 4 : USER MANUAL

4.1 User Manual
4.2 Operations Manual / Menu Explanation
4.3 Program Specifications / Flow Charts

Drawbacks and Limitations
Proposed Enhancements
Conclusion
Bibliography
ANNEXURES:
ANNEXURE 1 : USER INTERFACE SCREENS
ANNEXURE 2 : OUTPUT REPORTS WITH DATA (if any)
ANNEXURE 3 : SAMPLE PROGRAM CODE (which will prove sufficient development is done by the student)
ANNEXURE4 : copy of joining report and progress report
1 Blank Pages at the end.

Note: 1) Student should perform all SDLC phases during project period.

Semester- V –Equivalence

Name of the old subject	**New Equivalance subject**
5.1 E-Commerce Applications	--
5.2 Data warehousing and Data Mining	--
5.3 IT Management	--
5.4 IT-Elective-II	
5.4.1 Dot Net Programming	Advanced Web Technology
5.4.2 SQL Server	--
5.4.3 Image Processing	--
5.4.4 Advanced Web Technology	--
5.5 BM- Elective-II	
5.5.1 Knowledge Management	--
5.5.2 Information System Audit	--
5.5.3 Cyber Law	--
5.5.4. Managerial Economics	--

Note : Except dot net programming no equivalent subject in new syllabi of sem V, hence two additional attempts for examination should be provided .

Semester- VI–Equivalence

Name of the old subject	**New Equivalence subject**
Project Work	-Project Work