Syllabus of
MCA (Master of Computer Application)

Part III (Semester- V)

COMPUTER SCIENCE BOARD

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GONDWANA UNIVERSITY,
GADCHIROLI

SESSION 2014-2015

MCA – III

Semester V	**Paper 1:**	**DYNAMIC WEB DEVELOPMENT**	**Theory : 80 Marks** **Internal : 20 Marks**	**Practical : 100 Marks**
	Paper 2:	**ADVANCE COMPUTER NETWORK**	**Theory : 80 Marks** **Internal : 20 Marks**	
	Paper 3:	**SOFTWARE TESTING**	**Theory : 80 Marks** **Internal : 20 Marks**	**Practical : 100 Marks**
	Paper 4:	**CLOUD COMPUTING**	**Theory : 80 Marks** **Internal : 20 Marks**	
	Paper 5: **Elective 1** **2** **3**	**EMBEDDED SYSTEM** **WEB SERVICES And SERVICE ORIENTED ARCHITECTURE** **SOFT COMPUTING TECHNIQUES**	**Theory : 80 Marks** **Internal : 20 Marks**	

Semester VI	**Paper 1:**	**Industrial Internship – Project**	**Marks : 300**	
	Paper 2:	**Seminar**	**Marks : 200**	

MCA – III (SEM-V)

Paper – I: Dynamic Web Development

Paper – II: Advance Computer Network

Paper – III: Software Testing Methodologies

Paper – IV: Cloud Computing

Paper – V: Elective – I: Embedded System

Elective – II: WEB SERVICES AND SERVICE ORIENTED ARCHITECTURE

Elective – III: Soft Computing Techniques

MCA – III
SEMESTER – V
PAPER-I: DYNAMIC WEB DEVELOPMENT [Marks: 80
(5MCA1)

Unit-I: Introduction to Core PHP

Introduction to PHP, Why PHP, Hardware & Software Requirements, Advantages of PHP Why PHP is better alternative, PHP Syntax, Data Types, Variables, Operators, Conditional Statements, Loops; Super Globals, String Manipulation, Working with Array, PHP functions, Working with Forms.

Unit-II: MySQL Database

MySQL Database - What is Database, Database Models, Tables, Records and Files, SQL Language, MySQL Command-Line.

Working with PHPMyAdmin – Working with PHPMyAdmin, Creating Web Databases, Database Engines, and Data types in MySQL, Creating Fields Unique Key; Insert, Update, View & Delete Records, Drop Database/Tables, and Primary/Foreign Keys.

Unit-III: Advanced PHP Programming

Cookies – What is Cookie, Cookie Syntax, How to Create, Store, Retrieve and Delete Cookie.

PHP File Upload – Create an Upload-File Form, Upload Script and Save Uploaded file, putting restrictions on uploads.

PHP File Handling – Opening and Closing of a File, Check End-of-file, Reading a File – Line by Line and Character by Character.

Session – What is Session? Creating, Storing and Destroying Sessions.

Classes & Object – OO Concepts, Define Class, Class Attributes, An Object, Creating an Object, Object Properties & Methods, Object constructors and destructors, Static Method, Class Inheritance, Abstract Class, Implement Inheritance.

Unit-IV: PHP MYSQL Administration & Security

Advanced MySQL Administration– Understanding privilege system, making database secure.

Authentication with PHP and MySQL: Identifying visitors. Controlling access. Basic authentication. Apache authentication. Custom authentication.

Books:

1) Larry Ullman, "PHP 6 and MYSQL 5 for Dynamic Web Sites: Visual Quick Pro Guide", Peachpit Press, ISBN- 978-0321525994
2) Luke Welling, Laura Thomson, "PHP and MYSQL Web Development", 4th Edition, 2008 ISBN 978-0-672-32916-6
3) Larry Ullman, "Effortless E-Commerce with PHP and MySQL", New Riders, 1st Edition, ISBN 978-0321656223
4) Janet Valade, "PHP MySQL for Dummies", Goels Computer Hut Publication, 4th Edition, 2012 ISBN: 9788126535118

References:

1) Steven Holzner, "PHP: The Complete Reference", McGraw Hill Osborne, 1st edition, 2008, ISBN- 978-0071508544

2) Sandy Carter, "Web Database Applications With Php And Mysql", Shroff Publication 2nd Edition 2004, ISBN-9788173669057

MCA – III
SEMESTER – V
PAPER-II: ADVANCE COMPUTER NETWORK [Marks: 80
(5MCA2)

Unit-I: Data Communication

Data Transmission- Concept and Terminology, Analog and Digital Data Transmission, Transmission Impairment, Transmission Media. Data Encoding- Digital Data, Analog Data, Digital Signal, Analog Signal. Digital Data Communication- Asynchronous and Synchronous Transmission, Error Detection Technique, Interfacing. Data Link Control- Line Configurations, Flow Control, Error Control, Data Link Control Protocols. Multiplexing Frequency Division Multiplexing, Synchronous Time Division Multiplexing.

Unit-II: Data Communication Networking

Circuit Switching- Communication Networks, Circuit Switching, Single Node Network, Digital Switching Concept, Control Signaling. Packet Switching- Packet Switching Principles, Virtual Circuits and Data Grams, Routing, Traffic Control, X.25. LAN and Man- LAN, MAN Technology, Bus/ Trees and Star Topologies, Optical Fiber Bus, Ring Topology, Medium Access Control Protocols, LAN/MAN Standards.

Unit-III: Communication Architecture

Protocols and Architecture- Protocols, Layered Approach, OSI Model, TCP/IP Protocol Suite, System Network Architecture. Internetworking- Principles of Internetworking, Bridge, Routing with Bridges, Connectionless Internetworking, Connectionless Internetwork Protocol, Router-Level Protocol, and Connection Oriented Internetworking.

Unit- IV: Digital Network

Transport Protocols- Transport Services, Protocol Mechanism, Network Services, ISO Transport Standards, TCP and UDP, Light Weight Transport Protocol. Session Service and Protocols- Session Characteristics, OSI Session Service Definition, OSI Session Protocols Definition. ISDN and Broadband ISDN- The Integrated Digital Network, Overview of ISDN, Transmission Structure, User Access, ISDN Protocols, Broadband ISDN.

Books:

1. Willam Stalling, "Data and Computer Communication", PHI Publication, "7th Edition", Year-2004, ISBN No- 81-203-2355-6.
2. Forouzan, "Data Communication and Network", Tata McGraw Hill, "2nd Edition", Year-2003, ISBN No- 07-049935-7.

Reference:

1. Tanenbaum, "Computer Networks", PHI Publication, "3rd Edition", ISBN No- 0130661023.

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PAPER-III: SOFTWARE TESTING [Marks: 80

(5MCA3)

Unit-I: Introduction to Software Testing

Introduction, Power and Challenges of Software projects, Software Fiascos, Reasons and solutions of software failure, Software testing professionals.

Fundamentals of Testing – What is testing? Significance of Testing, Psychology of Testing and its choices, who does the Testing? Testing Phases, Testing Systems and its strategies, Metrics in Testing Phase. Risk-based Testing and Types of Risks.

Unit-II: Testing Levels and Types

Testing Levels – Testing Levels and Testing Approaches, **Types of Testing** – Smoke, Black box, White Box, Interface, Use Case, Gorilla, etc.

Static Testing- Manual Reviews, Formal Code Reviews, Static Analysis.

Unit-III: Dynamic & Managing Testing Techniques.

Dynamic Testing – Review, Identify, Test Specification, Design Test Cases, Execute Test Cases, Generate Incident Report, Log the Defects, Test Documentation Standards, Formal Methods of Testing.

Managing Testing Process – Management Commitment, Testing Process Management, Planning, Budgeting and Scheduling the Testing, Alignment of Process to project, Team formation, Reviewing, Monitoring and Risk Management, Metrics, Defect tracking, configuration management, software testing maturity model.

Unit-IV: Software Testing Tools & Code of Ethics

Software Testing Tools – Need for Tools, Classification of tools, benefits of tools, risk associated with tools, selecting tools, introduction to tools in testing process.

Code of Ethics for Software Professionals – Human ethics, professional ethics, ethical issues in software engineering, code of ethics and professional practice, ethical issues.

Books:

1) Dr. K.V.K.K. Prasad, "ISTQB Certification Study Guide", Wiley-Dreamtech Press, Year-2004, ISBN- 9788177227116.
2) Boris Beizer, "Software testing techniques", Dreamtech Press, "2th Edition", Year- 2002
3) Srinivasan Desikan, Gopalaswamy Ramesh, "Software Testing: Principles and Practice", Pearson Education India, Year-2006

Reference:

1) Dr. K.V.K.K. Prasad, “Software Testing Tools”, Dreamtech Press, Year- 2004
2) Brian Marick, “The Craft of Software Testing”, Pearson Education India.
3) SPD, “Software Testing Techniques”, Oreille.

MCA – III
SEMESTER – V
PAPER-IV: CLOUD COMPUTING [Marks: 80
(5MCA4)

Unit – I: Fundamentals of Cloud Computing

Overview of Cloud Computing, Evolution of Cloud Computing, Types of Clouds, Key Characteristics of Cloud Computing, Intranets and Clouds. Benefits and challenges of cloud computing, Usage scenarios and Applications, Regulatory issues, major players in cloud computing.

Unit – II: Cloud Models & Services

Cloud Models – Benefits of Cloud Models, Public, Private, Hybrid, and Community Clouds **Types of Clouds Services**: SaaS, PaaS, IaaS, DaaS, MaaS, CaaS. **Service Providers:** Google App Engine, Microsoft Azure, Amazon EC2, IBM, Sales Force; Introduction to MapReduce, GFS, HDFS, Hadoop Framework.

Unit – III: Essentials & Collaborating with Cloud

Hardware and Infrastructure – Clients, Security, Network, Services**; Accessing Cloud –** Platforms, Web Applications, Web APIs, Web Browsers; **Cloud Storage –** Overview, Cloud Storage Providers; **Standards –** Application, Client, Infrastructure, Service; Centralizing Email Communications, Collaborating on Calendars, Schedules & Task Management, Event Management, Project Management and Contact Management.

Unit-IV: Virtualization & Security for Clouds

Need for Virtualization – Pros and Cons of Virtualization, Types of Virtualization, System VM, Process VM, **Virtual Machine Monitor –** Virtual Machine Properties, HLL VM, **Hypervisor** – VMWare, Virtual Box, Hyper-V; **Case Studies** on Cloud Data Centres.

Security in Clouds – Cloud security challenges, SaaS as Service Security; **Common Standards –** Open Cloud Consortium, Distributed Management Task Force, Standards for Application Developers; **Standards for Messaging** – Standards for Security, End User access to cloud computing, mobile internet devices and the cloud.

Books:

1. Bloor R., Kanfman M., Halper F. Judith Hurwitz "Cloud Computing for Dummies" (Wiley India Edition) 2010, ISBN 978-0-470-48470-8.
2. John W. Rittinghouse & James F. Ransome, "Cloud Computing: Implementation, Management and Security", CRC Press, 1st Edition, 2009, ISBN 978-1439806807.
3. Antohy T Velte, Toby J. Velte, Robert Elsenpeter, Cloud Computing: "A Practical Approach", McGraw Hill, 2009. ISBN 978-0-07-068351-8
4. Michael Miller, Cloud Computing: "Web-Based Applications That Change the Way You Work and Collaborate Online", Que Publishing, August 2008. ISBN 978-0-7897-3803-5
5. James E Smith, Ravi Nair, "Virtual Machines", Morgan Kaufmann Publishers, 2006. ISBN 9788131203293

References:

1. George Reese, "Cloud Application Architecture", O'Reilly and Associates.

2. Haley Beard, "Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing", Applications and Data Centers in the Cloud with SLAs, Emereo Pty Limited, July 2008.

MCA – III
SEMESTER – V
PAPER-IV: Electives I: EMBEDDED SYSTEMS
(5MCA5.1) [Marks: 80

Unit-I: Introduction to Embedded Systems
Overview of embedded systems, features, requirements and applications of embedded systems, recent trends in the embedded system design, common architectures for the ES design, embedded software design issues, communication software, introduction to development and testing tools, skills required for an embedded system designer

Unit-II: Architecture of Embedded System
Basics of 8 – bit RISC microcontroller (PIC), block diagram, addressing modes, instruction set, timers, counters, stack operation, programming using PIC controller, basics of 32 – bit microprocessor (ARM), processor and memory organization, data operations, flow of control, pipelining in ARM, ARM bus (AMBA).

Unit-III: Interfacing and Communication Links
Serial interfacing, real time clock, SPI / micro wire bus, I2C bus, CAN bus, PC parallel port, IRDA data link, PCI bus architecture. Inter-process Communication and Synchronization, RPC Functions, Interrupts, Latency and Response of the Tasks as Performance Metrics.

Unit-IV: Operating System for Embedded System
OS Fundamentals, processes and threads, context switching, scheduling issues, inter task communication, introduction to memory management, evaluating OS performance, real time operating systems, Real Time System, RTOS and their applications.
Applications of Embedded Systems: Industrial and control applications, networking and telecom applications, DSP and multimedia applications, applications in the area of consumer appliances, concept of smart home.

Books:
1) Daniel W. Lewis, "Fundamentals of Embedded Software with the ARM® Cortex-M3", Pearson Education, "2nd Edition" , Year- 2012, ISBN-13: 978-0-13-291654-7
2) John B. Peatman, Design with PIC Microcontrollers, Pearson Education, 1997.
3) Wayne Wolf, Computers as Components: Principles of Embedded Computing System Design, Elsevier Publication 2000.
4) Silberschatz, P.B. Galvin and G. Gagne, Operating System Concepts (6th ed.), John Wiley & Sons, Inc., 2001
5) K.V.K.K. Prasad, Embedded/Real Time Systems: Concepts, Design and Programming, Dreamtech Press, New Delhi, India, 2003.

References:

1) Robert B. Reese, Microprocessors: From assembly language to C using PIC18Fxx2, Shroff Publishers and Distributors Pvt Ltd. 2005.
2) Andrew N. Sloss, Dominic Symes, Chris Wright, ARM System Developer's Guide – Designing and Optimizing System Software, Elsevier Publications, 2007.
3) Graham Wilson, "Embedded System and Computer Architecture", Butterworth-Heinemann Publications, "1st Edition" , Year- 2002, ISBN No. 07506-5064-8

MCA –III
Semester - V
PAPER-IV: Electives II: WEB SERVICES AND SERVICE ORIENTED ARCHITECTURE
(WS&SOA) [Marks : 80

UNIT I

Evolution and Emergence of Web Services – Evolution of distributed computing. Core distributed Computing technologies – client/server, CORBA, JAVA RMI, Micro Soft DCOM, MOM, Challenges in Distributed Computing, role of J2EE and XML in distributed computing, emergence of Web Services and Service Oriented Architecture (SOA). Introduction to Web Services – The definition of web Services, basic operational model of web services, tools and technologies enabling web services, Benefits and challenges of using web services.

UNIT II

Web Service Architecture – Web services Architecture and its characteristics, core building blocks of Web services, standards and technologies available for implementing web services, web services Communication, basic steps of implementing web services.

Describing Web Services – WSDL introduction, nonfunctional service description, WSDL1.1 Vs. WSDL 2.0, WSDL document, WSDL elements, WSDL binding, WSDL tools, WSDL port type, limitations of WSDL.

Brief Over View of XML – XML Document structure, XML namespaces, Defining structure in XML Documents, Reuse of XML schemes, Document navigation and transformation.

UNIT III

SOAP : Simple Object Access Protocol, Inter-application communication and wire protocols, SOAP as a messaging protocol, Structure of a SOAP message, SOAP envelope, Encoding, Service Oriented Architectures, SOA revisited, Service roles in a SOA, Reliable messaging, The enterprise Service Bus, SOA Development Lifecycle, SOAP HTTP binding, SOAP communication model, Error handling in SOAP.

Registering and Discovering Services: The role of service registries, Service discovery, Universal Description, Discovery, and Integration, UDDI Architecture, UDDI Data Model, Interfaces, UDDI Implementation, UDDI with WSDL, UDDI specification, Service addressing and Notification, Referencing and addressing Web Services, Web Services Notification.

UNIT IV

SOA and web services security considerations, Network-level security mechanisms, Application-level security topologies, XML security standards, Semantics and Web Services, The semantic
Interoperability problem, The role of metadata, Service metadata, Overview of .NET and J2EE, SOA and Web Service Management, Managing Distributed System, Enterprise management Framework, Standard distributed management frameworks, Web service management, Richer schema languages, WS-Metadata Exchange.

TEXT BOOKS:

1. Web Services & SOA Principles and Technology, Second Edition, Michael P. Papazoglou.
2. Developing Java Web Services, R. Nagappan, R. Skoczylas, R.P. Sriganesh, Wiley India.
3. Developing Enterprise Web Services, S. Chatterjee, J. Webber, Pearson Education.

REFERENCE BOOKS:

1. XML, Web Services, and the Data Revolution, F.P.Coyle, Pearson Education.
2. Building web Services with Java, 2nd Edition, S. Graham and others, Pearson Education.
3. Java Web Services, D.A. Chappell & T. Jewell, O'Reilly, SPD.
4. McGovern, et al., "Java web Services Architecture", Morgan Kaufmann Publishers, 2005.

5. J2EE Wer Services, Richard Monson-Haefel, Pearson Education.

MCA – III
SEMESTER – V
PAPER-IV: Electives III: SOFT COMPUTING TECHNIQUES
(5MCA5.3) [Marks: 80

Unit- I: Soft Computing
Introduction of Soft Computing, Soft Computing Vs. Hard Computing, Various Types of Soft Computing Techniques, Applications of Soft Computing.

Unit-II: Neural Network
Structure and Function of a Single Neuron, Synaptic Integration and Neural Models, Essential Vector Operations, Lateral Inhibition and Sensory Processing, Introduction to Artificial Neural Network (ANN), Computational Capabilities of ANN.

Unit- III: Pervasive Computing
Introduction, Architecture, Device Technology, Sensor Networks and RFIDS Protocols and Applications.

Unit-IV: Genetic Algorithm
Fundamentals, Basic Concepts, Working Principle, Evolutionary Computations, Terminologies and Operations of Genetic Algorithms, Classification of Genetic Algorithms, Genetic Algorithm Optimization Problem.

Books:

1) L. Fortuna, G. Rozzotto, M. Lavorgna, "Soft Computing: New Trends and Applications", Springer, 2001
2) James A Anderson , " An Introduction to Neural Networks"- The MIT press
3) Burkhardt, Henn, Hepper, Rintdorff, Schaeck. "Pervasive Computing", Addison Wesley, 2002.
4) S.N. Sivanandam, S.N. Deepa, "Introduction to Genetic Algorithms", Springer Publication 2007

References:

1) F. Adelstein, S.K.S. Gupta, "Fundamentals of Mobile and Pervasive Computing",TMH, 2005.
2) Jochen Burkhardt, Horst Henn, Stefan Hepper, Klaus Rindtorff, Thomas Schack, "Pervasive Computing: Technology and Architecture of Mobile Internet Applications", Addison-Wesley, 2002, ISBN: 0201722151.
3) Mohamad H. Hassoum, " Fundamentals of Artificial Neural Network" The MIT Press,