

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

MCA (5th Semester)

Paper: 501/ Subject: Cloud Computing

Effective From: June, 2014

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| Credits | 4 | Total Hrs: | 4 |
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| Objective: | To provide comprehensive and in-depth knowledge of Cloud Computing Concepts, technologies, architecture, applications and implementations. |
| Prerequisite: | Web Services, DBMS concepts, Networking |

1. Introduction
 - 1.1 Grid Computing
 - 1.2 Cluster Computing
 - 1.3 Cloud Computing (NIST Model)
 - 1.3.1 Evolution
 - 1.3.2 History, Properties, characteristics & Disadvantages
2. Cloud Computing Architecture
 - 2.1 Cloud Computing Stack
 - 2.1.1 Comparison with traditional architecture
 - 2.2 Service Models
 - 2.2.1 Infrastructure as a Service (IaaS)
 - 2.2.2 Platform as a Service (PaaS)
 - 2.2.3 Software as a Service (SaaS)
 - 2.3 Deployment Models
 - 2.3.1 Public Cloud
 - 2.3.2 Private Cloud
 - 2.3.3 Hybrid Cloud
 - 2.3.4 Community Cloud
3. Infrastructure as a Service (IaaS)
 - 3.1 Introduction to Virtualization
 - 3.1.1 Hypervisors, Machine Image, Virtual Machine
 - 3.2 Resource Virtualization
 - 3.2.1 Server, Storage, Network
 - 3.3 Amazon EC
 - 3.4 Eucalyptus
4. Platform as a Service (PaaS)
 - 4.1 Introduction to Service Oriented Architecture (SOA)
 - 4.2 Cloud Platform
 - 4.2.1 Computation
 - 4.2.2 Storage
 - 4.3 Microsoft Azure
 - 4.4 Salesforce.com's Force.com
5. Software as a Service (SaaS)
 - 5.1 Web Services
 - 5.2 Web OS

6. Cloud Security
 - 6.1 Infrastructure Security
 - 6.2 Data Security and Storage
 - 6.3 Identity & Access Management
 - 6.4 Access Control
 - 6.5 Authentication in Cloud

7. Cloud Databases (DbaaS)
 - 7.1 Amazon SimpleDB & RDS
 - 7.2 Azure Table Service & SQL Azure
 - 7.3 BigTable
 - 7.4 Oracle Cloud

References:

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|-----|---|---|---------------------------------|
| 1 | Cloud Computing Principles and Paradigms | Rajkumar Buyya, James Broberg, Andrzej M. Goscinski | Wiley, 2011 |
| 2 | Cloud Computing : Principles, Systems and Applications | Nikos Antonopoulos, Lee Gillam | Springer 2012 |
| 3 | Enterprise Cloud Computing : Technology, Architecture, Applications | Gautam Shroff | Cambridge University Press 2010 |
| 4. | Cloud and Virtual Data Storage Networking | Greg Schulz | Auerbach, 2011 |
| 5. | Cloud Security : A Comprehensive Guide to Secure Cloud Computing | Ronald L Krutz, Russel Dean Vines | John Wiley & Sons, 2010 |
| 6. | Cloud Computing Bible | Barrie Sosinsky | Wiley India, 2011 |
| 7. | Cloud Computing | David Crookes | TMH Education 2012 |
| 8. | Cloud Computing : Implementation, Management and Security | James F RAnsome, John W Rittinghouse | CRC Press, 2009 |
| 9. | Amazon Cloud Computing with Java | Aditya Yadav | Lulu.com, 2010 |
| 10. | Grid and Cloud Database Management | Fiore, SAndro, Aloisio, Giovanni | Springer, 2010 |
| 11. | Building a Database Cloud for Dummies | Michael Wessler | John Wiley & Sons, 2012 |

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

MCA (5th Semester)

Paper: 502 / Subject: Artificial Intelligence and Knowledge Based Systems

Effective From: June, 2014

| | | | |
|----------------|----------|-------------------|----------|
| Credits | 4 | Total Hrs: | 4 |
|----------------|----------|-------------------|----------|

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| Objective: | To acquaint students with concepts of Artificial Intelligence and its applications. |
| Prerequisite: | Data Structures, Information Systems |

1. Introduction to Artificial Intelligence
 - 1.1. What is AI
 - 1.2. Applications of AI
 - 1.3. Introduction to Expert System
 - 1.4. Applications of expert systems
2. Knowledge Overview
 - 2.1. Definition and importance of knowledge
 - 2.2. Overview knowledge representation
 - 2.3. Overview of knowledge organization
 - 2.4. Overview of knowledge Manipulation
 - 2.5. Overview of Knowledge Acquisition
3. Representation and Search
 - 3.1. Structured Knowledge
 - 3.1.1. Associative networks
 - 3.1.2. Frame structures
 - 3.1.3. Conceptual dependencies and scripts
 - 3.2. Object oriented representation
4. Organization and Manipulation
 - 4.1. Introduction to organization
 - 4.2. Search techniques
 - 4.2.1. Uninformed search
 - 4.2.2. Informed search
 - 4.3. Introduction to matching Techniques
5. Knowledge Acquisition
 - 5.1. Knowledge learning types
 - 5.2. General learning models
 - 5.3. Performance of learning models
6. Expert System
 - 6.1. Advantages of Expert Systems
 - 6.2. Characteristics of Expert Systems
 - 6.3. Design of Expert Systems
 - 6.3.1. Selecting Problem
 - 6.3.2. Stages in Expert systems development

- 6.3.3. Errors in developments
- 6.3.4. Expert System Software Engineering
- 6.3.5. Expert System Life Cycle

Reference Books

References:

| | | | |
|---|--|--|----------------------------------|
| 1 | Introduction to Artificial Intelligence and Expert System | Dan W. Patterson | PHI (1999) |
| 2 | Artificial Intelligence – A Modern Approach (2 nd Edition 2004) | Stuart J. Russell and Peter Norvig | Pearson Education |
| 3 | Artificial Intelligence Structures and Strategies for Complex Problem Solving (4 th Edition 2004) | George F. Luger | Pearson Education |
| 4 | Foundation of Artificial Intelligence and Expert Systems | V.S. Janakiraman, K. Sarukesi, P. Gopalakrishnan | Mc Millan (2002) |
| 5 | Expert Systems Principles and Programming (3 rd Edition) | Giarratano & Riley | Thomson (Vikas Publishing House) |
| 6 | Introduction to Artificial Intelligence | Rajendra Akerkar | PHI |

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

MCA (5th Semester)

Paper: 503/ Subject: Open Source Web Based Programming

Effective From: June, 2014

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|-----------------|----------|-------------------|----------|
| Credits: | 4 | Total Hrs: | 4 |
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| Objective: | To provide basics of open source web based dynamic scripting language |
| Prerequisite: | Knowledge of C language, HTML and SQL |

- 1 Introduction to Web Based Programming
 - 1.1 Introduction to PHP & MySql
 - 1.2 Installation of PHP and MySql
 - 1.3 Language Characteristics & Features
 - 1.4 Operators and Variables, Control Structures, Looping and Error handling

- 2 PHP functions
 - 2.1 String Functions
 - 2.2 Array Functions
 - 2.3 Mathematical Functions
 - 2.4 Graphics Library (GD Support)
 - 2.5 File System Functions
 - 2.6 Date and Time Functions
 - 2.7 Misc. Function

- 3 Object Oriented Features of PHP
 - 3.1 Classes and Objects
 - 3.2 Use of constructors
 - 3.3 Serialization
 - 3.4 Inheritance

- 4 MySQL Database Server
 - 4.1 Configuring the MySQL Server
 - 4.2 MySQL Tables, Displaying MySQL Database , Adding and removing user access
 - 4.3 Database connection and data processing functions

- 5 Ajax Basics
 - 5.1 HTTP Request and Response Fundamentals
 - 5.2 The XMLHttpRequest Object XMLHttpRequest Methods
 - 5.3 XMLHttpRequest Properties
 - 5.4 Cross-Browser Usage Sending a Request to the Server
 - 5.5 PHP and Ajax Client-Driven Communication
 - 5.6 Server-Side Processing Expanding and Contracting Content
 - 5.7 Form Validation
 - 5.8 Ajax-Based Database Querying

- 6 Templates : Smarty
 - 6.1 Installation
 - 6.2 Smarty Loops
 - 6.3 Variables Modifiers

- 6.4 Caching
- 7 MVC
 - 7.1 Introduction to MVC
 - 7.2 CodeIgniter: Introduction, Features and Application Flow Chart
 - 7.3 Controller
 - 7.4 Views
 - 7.5 Models
 - 7.6 Helpers
 - 7.7 Creating and Usage of Libraries and Drivers
 - 7.8 **URL** Routing
 - 7.9 Error Handling
 - 7.10 Profiling Application
- 8 Advance PHP programming
 - 8.1 XML
 - 8.2 PHP-generated Adobe Acrobat documents
 - 8.3 Web services
- 9 Self Study
 - 9.1 Content Management System: Joomla!

References:

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| 1 | Beginning PHP, Apache, MySQL Web Development | Elizabeth Naramore, Jason Gerner , Yann Le Scouarnec, Jeremy Stolz,Michael K. Glass, Gary Mailer | Wrox Publication |
| 2 | Professional PHP Programming | Jesus Castagnetto | Wrox Press Ltd |
| 3 | Beginning PHP and MySQL: From Novice to Professional | W. Jason Gilmore | Apress |
| 4 | Beginning Ajax with PHP | Lee Babin | Apress |
| 5 | PHP and MySQL Bible | Tim Converse and Joyce Park with Clark Morgam | Wiley INDIA |
| 6 | Php: The Complete Reference | Steven Holzner | Tata Mcgraw Hill Education Private Limited |
| 7 | AJAX and PHP: Building Responsive Web Applications | Bogdan Brinzarea, <u>Cristian Darie</u> | packtpub |
| 8 | CodeIgniter for Rapid PHP Application Development | David Upton | packtpub |
| 9 | Professional CodeIgniter | Thomas Myer | Wrox Press Ltd |
| 10 | PHP manual | www.php.net | |

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

MCA (5th Semester)

Paper: 504 / Subject: Advanced Database Administration

Effective From: June, 2014

| | | | |
|---------|---|------------|---|
| Credits | 4 | Total Hrs: | 4 |
|---------|---|------------|---|

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| Objective: | To learn advanced database administration, database tuning and maintenance |
| Prerequisite: | RDBMS |

1. Oracle11g Instance creation and management
 - 1.1 Oracle Instance
 - 1.2 Installing Oracle
 - 1.3 Oracle Optimal Flexible Architecture (OFA)
 - 1.4 Locating initialization, listener.ora & sqlnet.ora files
 - 1.5 Finding the alert log
 - 1.6 Common environment variables
 - 1.7 Structures in an Oracle Instance
 - 1.8 Oracle Memory Structures, SGA and PGA
 - 1.9 Oracle Processes and their purposes
 - 1.10 Startup nomount, mount and open database commands
2. Oracle11g Database Architecture
 - 2.1 Oracle10g management framework
 - 2.1 Using the Database Creation Assistant (DBA)
 - 2.3 Creating and dropping a database
 - 2.4 Tablespaces
 - 2.5 Tables and Indexes
 - 2.6 Clusters
 - 2.7 Partitioning of Tables and Indexes
 - 2.8 Gathering and applying patches
3. Concurrency Management
 - 3.1 Transactions, serialization, locks and latches
 - 3.2 Lock modes
 - 3.3 Detecting and resolving lock conflicts
 - 3.4 Managing deadlocks
4. Interfacing with Oracle
 - 4.1 Oracle transaction management
 - 4.2 Using SQL*Plus and iSQL*Plus
 - 4.3 Using embedded Oracle with Pro*C & Java
 - 4.4 PL/SQL & Triggers
 - 4.5 Pining PL/SQL packages & compiling PL/SQL
 - 4.6 System-level triggers – startup trigger, logon trigger, PL/SQL error trigger
5. Oracle*Net
 - 5.1 Basic Network structure
 - 5.2 Oracle*Net Files
 - 5.3 Multi-threaded server
 - 5.4 Create additional listeners

- 5.5 Create Oracle Net service aliases
- 5.6 Configure connect time failover
- 5.7 Oracle*Net names resolution
- 6. Tablespace Management Overview
 - 6.1 Dictionary Managed Tablespaces
 - 6.2 Locally Managed Tablespaces
 - 6.3 Automatic Segment Space Management
 - 6.4 Moving tablespaces online and offline
- 7. UNDO Tablespace Management
 - 7.1 Use of undo segments
 - 7.2 Creating an undo tablespace
 - 7.3 User managed undo tablespaces
 - 7.4 Automatic undo management
 - 7.5 Monitor & Configure undo retention
 - 7.6 Use the Undo Advisor
 - 7.7 Size the undo tablespace
- 8. Oracle Utilities
 - 8.1 Datapump - Import/export
 - 8.2 SQL*Loader
 - 8.3 Oracle Streams
 - 8.4 Automatic Database Diagnostic Monitor
 - 8.5 Automatic Tuning Optimizer
 - 8.6 Automatic Shared Memory Tuning
- 9. Oracle Performance Tuning
 - 9.1 Locate invalid and unusable objects
 - 9.2 Gather SQL optimizer statistics with dbms_stats
 - 9.3 Basic Oracle performance metrics
 - 9.4 Use OEM and dbms_alert to set warning and critical alert thresholds
 - 9.5 The SQL Tuning Advisor
 - 9.6 The SQL Access Advisor
 - 9.6 Interpreting server generated alerts
 - 9.7 Oracle advisory utilities v\$db_cache_advice, v\$shared_pool_advice
v\$pga_aggregate_target_advice
 - 9.8 Using OEM performance screens
 - 9.9 Fixing performance issues
- 10. User Management
 - 10.1 Creating Users
 - 10.2 Altering users
 - 10.3 User Profiles
 - 10.4 User resource groups
 - 10.5 Granting privileges & roles
 - 10.6 Auditing user activity with dbms_audit
- 11. Oracle Security
 - 11.1 Password use in Oracle
 - Password encryption and password aging
 - External authentication
 - Using Single sign-on (SSO)
 - 11.2 Object security
 - 11.3 Virtual Private Databases (VPD) in Oracle
 - 11.4 Oracle “grant execute” security
 - 11.5 Use of Roles in Oracle
 - 11.6 Register for security updates
- 12. Backup & Recovery
 - 12.1 Oracle backup & recovery planning
 - 12.2 Parallel instance recovery
 - 12.3 Basics of checkpoints, redo log files, and archived log files

- 12.4 Using ARCHIVELOG mode
- 12.5 Creating consistent Oracle backups
- 12.6 Online hot backups
- 12.7 Incremental Oracle backups
- 12.8 Automating database backups with dbms_scheduler
- 12.9 Monitor the flash recovery area
- 12.10 Recovering from loss of a Control file
- 12.11 Recovering from loss of a Redo log file
- 12.12 Recovering from loss of a system-critical data file
- 12.13 Recovering from loss of a non system-critical data file

References:

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|----|---|---|-----------------------------|
| 1. | Essentials : Oracle Database 10g | Rick Greenwald, Robert Stackowiak, Jonathan Stern | O'Reilly |
| 2. | Oracle High Performance Tuning for 9i and 10g | Gavin Powell | Digital Press |
| 3. | Oracle Database 10g, DBA Handbook | Loney, Kevin, Bryla, Bob | Oracle Press |
| 4. | Oracle Database 10g The Complete Reference | Loney, Kevin | Oracle Press |
| 5. | Oracle Database 10g: A Beginner's Guide | Micheal Abbey, Ian Abramson | Osborne Oracle Press Series |

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

MCA (5th Semester)

Paper: 505 / Subject: Network Essentials and its Security

Effective From: June , 2014

| | | | |
|---------|---|------------|---|
| Credits | 4 | Total Hrs: | 4 |
|---------|---|------------|---|

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|---------------|---|
| Objective: | To understand network management and its security |
| Prerequisite: | Computer Network, TCP/IP |

- 1 Networking Essentials
 - 1.1 Repeaters & Bridges
 - 1.1.1 LAN expansion
 - 1.1.2 Repeaters
 - 1.1.3 Bridges
 - 1.1.4 How Bridges work
 - 1.1.5 Creating the routing table
 - 1.1.6 Segmenting network traffic
 - 1.1.7 Remote bridges
 - 1.1.8 Differentiating between bridges and repeaters
 - 1.2 Routers & Gateways
 - 1.2.1 Routers
 - 1.2.2 How routers work
 - 1.2.3 Routing benefits
 - 1.2.4 Routing protocols
 - 1.2.5 Routing V/s Bridging
 - 1.2.6 Brouters
 - 1.2.7 Gateways
 - 1.2.8 How Gateways work
 - 1.3 Network Administration
 - 1.3.1 Bottlenecks
 - 1.3.2 Simple Network Management Protocol
 - 1.3.3 Data Protection
 - 1.3.4 Backup Methods
 - 1.3.5 Testing & storage
 - 1.3.6 Implementing a backup System
 - 1.3.7 Uninterruptible power supplies
 - 1.3.8 How Gateways work
 - 1.3.9 Implementing fault tolerant systems
 - 1.3.9 RAID
 - 1.3.9 Sector Sparing
 - 1.4 Advance WAN Transmission
 - 1.4.1 Overview
 - 1.4.2 Multiplexing, packet and circuit switching networks
 - 1.4.3 X.25
 - 1.4.4 Asynchronous Transfer Mode (ATM)
 - 1.4.5 ISDN
 - 1.4.6 SONET

1.4.7. SMDS

- 2 Introduction to network security
- 3 Cryptography Techniques
 - 3.1. Classical cryptography
 - 3.2. Conventional cryptography
 - 3.2.1. DES
 - 3.3. Public-key cryptography
 - 3.3.1. RSA
 - 3.4. Digital signatures
 - 3.4.1. DSA
- 4 Security services
 - 4.1. Message integrity
 - 4.2. Confidentiality and authentication
 - 4.3. Certification and key management
 - 4.3.1. PKI
- 5 Network security applications
 - 5.1. IP security
 - 5.1.1. IPsec
 - 5.2. Web security
 - 5.2.1. SSL, TLS, SET
 - 5.3. Electronic mail security
 - 5.3.1. PGP, S/MIME)
 - 5.4. SNMP security
- 6 Access control in computer networks
 - 6.1. authentication protocols and services
 - 6.1.1. Kerberos and X.509
 - 6.2. Firewalls
 - 6.3. Virtual Private Networks (VPNs).
- 7 System security
 - 7.1. Intrusion detection
 - 7.2. Viruses
- 8 Mobile system & E-commerce securities
 - 8.1. 3G security
 - 8.2. e-payment systems
 - 8.3. fair data exchange

References:

1. Cryptography and Network Security, 2/e, ISBN: 0-13-869017-0 W. Stallings Pearson Education, 1999
2. Network Security Essentials: Applications and Standards, 1/e, ISBN: 0-13-016093-8 W. Stallings Pearson Education, 2000
3. SSL and TLS: designing and building secure systems, ISBN: 0-201-61598-3 E. Rescorla Addison-Wesley, 2001
4. Implementing Secure Intranets and Extranets, ISBN: 0-89006-447-4 K M Phaltankar Artech House Publishers, 2000
5. Secure Electronic Commerce: Building the Infrastructure for Digital Signature and Encryption, ISBN: 0-13-027276-0 W. Ford, and M. Baum Prentice Hall, 2001
6. Security in Computing, ISBN: 0-13-185794-0, 2/e C. P. Pfleeger Prentice Hall, 1997
7. Building Internet Firewalls, 2/e, ISBN: 1-56592-871-7 E. D. Zwicky, et al O'Reilly, 2000
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9. Journal of Computer Security
10. ACM Transactions on Information and System Security
11. ACM Conference on Computer and Communications Security
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13. Internet documents - RFCs (Request for Comments)
14. Guide to Networking Essentials, Fourth Edition
15. Computer Networking Essentials Greg Tomsho, et al Debra Littlejohn Shinder Microsoft Corporation (Corporate Author) A. S. Tanenbaum
16. Networking Essentials: Hands-On, Self-Paced Training for Supporting Local and Wide Area Networks
17. Computer Network

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

MCA (5th Semester)

Paper: 506/ Subject: Programming Skills XI

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Practical based on paper no 501.
Separate journal to be prepared for this subject 501.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

MCA (5th Semester)

Paper: 507/ Subject: Programming Skills XII

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VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

MCA (5th Semester)

Paper: 508/ Subject: Programming Skills XIII

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VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

MCA (5th Semester)

Paper: 509/ Subject: Programming Skills XIV

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Practical based on paper no 505.
Separate journal to be prepared for this subject 505.