

**VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT**  
**MCA (5<sup>th</sup> Semester)**  
**General Group**

**Course: 501: Cloud Computing**

Course Code	501
Course Title	<b>Cloud Computing</b>
Credit	4
Teaching per Week	4 Hrs.
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Review / Revision	June 2017
Purpose of Course	The purpose of the course is to make student capable of implementing the concepts, methods and tools of Cloud Computing
Course Objective	The objective of the course is to provide comprehensive and in-depth knowledge of Cloud Computing Concepts, technologies, architecture and applications and implementations.
Pre-requisite	Web Services, DBMS concepts, Networking
Course Outcome	After completion of this course, the students will be capable to work in various cloud environment like Salesforce, Azure, AWS.
Course Content	<p><b>Unit 1: Introduction</b></p> <ul style="list-style-type: none"> <li>1.1 Grid Computing</li> <li>1.2 Cluster Computing</li> <li>1.3 Cloud Computing (NIST Model) <ul style="list-style-type: none"> <li>1.3.1 Evolution</li> <li>1.3.2 History, Properties, characteristics &amp; Disadvantages</li> </ul> </li> </ul> <p><b>Unit 2: Cloud Computing Architecture</b></p> <ul style="list-style-type: none"> <li>2.1 Cloud Computing Stack <ul style="list-style-type: none"> <li>2.1.1 Comparison with traditional architecture</li> </ul> </li> <li>2.2 Service Models Introduction <ul style="list-style-type: none"> <li>2.2.1 Infrastructure as a Service (IaaS)</li> <li>2.2.2 Platform as a Service (PaaS)</li> <li>2.2.3 Software as a Service (SaaS)</li> </ul> </li> <li>2.3 Deployment Models <ul style="list-style-type: none"> <li>2.3.1 Public Cloud</li> <li>2.3.2 Private Cloud</li> <li>2.3.3 Hybrid Cloud</li> <li>2.3.4 Community Cloud</li> </ul> </li> </ul> <p><b>Unit 3: Service Models</b></p> <ul style="list-style-type: none"> <li>3.1. Infrastructure as a Service (IaaS) <ul style="list-style-type: none"> <li>3.1.1 Introduction to Virtualization <ul style="list-style-type: none"> <li>3.1.1.1 Hypervisors, Machine Image, Virtual Machine</li> </ul> </li> <li>3.1.2 Resource Virtualization <ul style="list-style-type: none"> <li>3.1.2.1 Server, Storage, Network</li> </ul> </li> <li>3.1.3 Amazon EC</li> <li>3.1.4 Eucalyptus</li> </ul> </li> <li>3.2. Platform as a Service (PaaS) <ul style="list-style-type: none"> <li>3.2.1. Introduction to Service Oriented Architecture (SOA)</li> <li>3.2.2. Cloud Platform</li> </ul> </li> </ul>

	<p>3.2.2.1. Computation  3.2.2.2. Storage  3.2.3. Microsoft Azure  3.2.4. Salesforce.com's Force.com  3.3. Software as a Service (SaaS)  3.3.1. Web Services  3.3.2. Web OS</p> <p><b>Unit 4: Cloud Security</b>  4.1 Infrastructure Security  4.2 Data Security and Storage  4.3 Identity &amp; Access Management  4.4 Access Control  4.5 Authentication in Cloud</p> <p><b>Unit 5: Introduction to Cloud Databases (DbaaS)</b>  5.1 Amazon SimpleDB &amp; RDS  5.2 Azure Table Service &amp; SQL Azure  5.3 BigTable  5.4 Oracle Cloud</p>
Reference Books	<ol style="list-style-type: none"> <li>1. Cloud Computing Principles and Paradigms by Rajkumar Buyya, James Broberg, Andrzej M. Goscinski, Wiley, 2011</li> <li>2. Cloud Computing : Principles, Systems and Applications by Nikos Antonopoulos, Lee Gillam, Springer 2012</li> <li>3. Enterprise Cloud Computing : Technology, Architecture, Applications by Gautam Shroff Cambridge University Press 2010</li> <li>4. Cloud and Virtual Data Storage Networking by Greg Schulz Auerbach, 2011</li> <li>5. Cloud Security : A Comprehensive Guide to Secure Cloud Computing by Ronald L Krutz, Russel Dean Vines, John Wiley &amp; Sons, 2010</li> <li>6. Cloud Computing Bible by Barrie Sosinsky, Wiley India, 2011</li> <li>7. Cloud Computing by David Crookes, TMH Education 2012</li> <li>8. Cloud Computing : Implementation, Management and Security by James F Ransome, John W Rittinghouse, CRC Press, 2009</li> <li>9. Amazon Cloud Computing with Java by Aditya Yadav, Lulu.com, 2010</li> <li>10. Grid and Cloud Database Management by Fiore, SAndro, Aloisio, Giovanni, Springer, 2010</li> <li>11. Building a Database Cloud for Dummies by Michael Wessler, John Wiley &amp; Sons, 2012</li> </ol>
Teaching Methodology	Class work, Discussion, Self-Study, Seminars and/or Assignment
Evaluation Method	<p>30% Internal assessment is based on class attendance, participation, class test, quiz, assignment, seminar, internal examination etc.</p> <p>70% assessment is based on semester end University External examination</p>

## Course: 501: Internet of Things (IoT) & Embedded Systems

Course Code	501
Course Title	<b>Internet of Things (IoT) &amp; Embedded Systems</b>
Credit	4
Teaching per Week	4 Hrs.
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Review / Revision	June 2017
Purpose of Course	This course is an introduction for students to IoT. The course also gives students an idea about various components of IoT and explains the working of them. The course also explains the role of embedded systems in IoT ecosystem.
Course Objective	The objective of the course is - <ol style="list-style-type: none"> <li>1. To make students understand IoT</li> <li>2. To make student understand various component of Micro-Computer and their working</li> <li>3. To explain various types of Micro-Computer operating system</li> <li>4. To introduce students with Programming in IoT.</li> </ol>
Pre-requisite	C , .NET, Unix
Course Outcome	After studying this Student will be able to understand how Micro-Computer works and importance of various components of a Micro-Computer. This course will also help students to appreciate the role of embedded systems in IoT Environment. After successful completion students will be able to work with different types of Micro-Computers and operating systems for their IoT based application development.
Course Content	<p><b>Unit 1: Introduction to Embedded Systems</b></p> <ol style="list-style-type: none"> <li>1.1 What is a Microcontroller?</li> <li>1.2 Architecture of Microcontroller             <ol style="list-style-type: none"> <li>1.2.1 ARM</li> <li>1.2.2 8051</li> </ol> </li> <li>1.3 Introduction to Sensors</li> <li>1.4 Types of Sensors &amp; their work</li> <li>1.5 Wireless Sensor Network</li> <li>1.6 Role of Microcontrollers in IoT</li> </ol> <p><b>Unit 2: Internet of Things (IoT)</b></p> <ol style="list-style-type: none"> <li>2.1 Introduction to IoT             <ol style="list-style-type: none"> <li>2.1.1 IoT Today</li> <li>2.1.2 IoT Vision</li> </ol> </li> <li>2.2 IoT Architecture             <ol style="list-style-type: none"> <li>2.2.1 Elements of IOT Ecosystem</li> <li>2.2.2 Physical-Entity View and IoT Context View</li> <li>2.2.3 Requirement process and —other views</li> </ol> </li> <li>2.3 IoT Related Standards and Protocols</li> <li>2.4 Industrial Applications of IoT</li> <li>2.5 IoT Privacy, Security &amp; Governance             <ol style="list-style-type: none"> <li>2.5.1 Identification in Distributed Environment</li> <li>2.5.2 Anonymization of user’s Data in a Distributed and Mobile Environment</li> <li>2.5.3 Device Authentication</li> <li>2.5.4 Data Correlation and Information Retrieval</li> <li>2.5.5 Human IoT Trust Relationship</li> <li>2.5.6 Risks of Isolation and Confinement</li> </ol> </li> <li>2.6 IoT Botnet</li> </ol>

	<p><b>Unit 3: Micro-Computing Environment</b></p> <p>3.1 What is a Micro-Computer?  3.2 Micro-Computing Paradigm  3.3 Difference between Microcontroller and Micro-Computer  3.4 Micro-Computer OS      3.4.1 Raspbian OS      3.4.2 Windows IoT      3.4.3 Contiki OS      3.4.4 RIOT  3.5 Use of Micro-Computers in IoT  3.6 Interfacing with Micro-Computer</p> <p><b>Unit 4: Raspberry Pi : A platform for IoT</b></p> <p>4.1 Introduction to Pi family  4.2 OS in Pi  4.3 Configuring Pi for IoT  4.4 Interacting Pi with Ports &amp; Sensors</p> <p><b>Unit 5: IoT Application Development Using .NET</b></p> <p>5.1 Server side Development  5.2 Client side Development  5.3 Peer to Peer Interaction  5.4 IoT Interaction through Mobile Apps</p>
Reference Books	<ol style="list-style-type: none"> <li>1) Introduction to Embedded System – By Shibu K V , McGrawHill</li> <li>2) Microcontrollers – Architecture, Programming, Interfacing and system design – By Raj Kamal , Pearson</li> <li>3) Exploring C for Microcontrollers : A hands on approach, Springer</li> <li>4) 8051 Microcontrollers an Application based Introduction, Elsevier</li> <li>5) Getting Started with Internet of Things – By Cuno Pfister, O’Reilly</li> <li>6) Learning Internet of Things – By Peter Waher , Packt Publication</li> <li>7) Internet of Things : A Hands-on Approach – By Arshdip Bahga and Vijay Madisetti</li> <li>8) Raspberry Pi User Guide – By Eben Upton and Garath Halfacree, Wiley</li> <li>9) Raspberry Pi for Dummies , Wiley</li> <li>10) Microprocessor Architecture, Programming and Applications with the 8085 - By Ramesh Gaonkar , Penram International Publishing</li> <li>11) Raspberry Pi IoT in C – By Harry Fairhead, I/O Press</li> </ol>
Teaching Methodology	Class work, Discussion, Self-Study, Seminars and/or Assignment
Evaluation Method	30% Internal assessment is based on class attendance, participation, class test, quiz, assignment, seminar, internal examination etc. 70% assessment is based on semester end University External examination

## Course: 502: Artificial Intelligence and Knowledge Based Systems

Course Code	502
Course Title	<b>Artificial Intelligence and Knowledge Based Systems</b>
Credit	4
Teaching per Week	4 Hrs.
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Review / Revision	June 2017
Purpose of Course	The purpose of the course is to make student capable of implementing the concepts, methods and tools of Artificial Intelligence and learn their implementation in Knowledge Based Systems
Course Objective	To acquaint students with concepts of Artificial Intelligence and its applications.
Pre-requisite	Data Structures, Information Systems
Course Outcome	After completion of this course, the students will be capable to use various Artificial Intelligence techniques in various applications.
Course Content	<p><b>Unit 1: Introduction to Artificial Intelligence</b></p> <ol style="list-style-type: none"> <li>1.1. What is AI</li> <li>1.2. Applications of AI</li> <li>1.3. Introduction to Expert System</li> <li>1.4. Applications of expert systems</li> </ol> <p><b>Unit 2: Knowledge Overview</b></p> <ol style="list-style-type: none"> <li>2.1. Definition and importance of knowledge</li> <li>2.2. Overview knowledge representation</li> <li>2.3. Overview of knowledge organization</li> <li>2.4. Overview of knowledge Manipulation</li> <li>2.5. Overview of Knowledge Acquisition</li> </ol> <p><b>Unit 3: Representation and Search</b></p> <ol style="list-style-type: none"> <li>3.1. Structured Knowledge             <ol style="list-style-type: none"> <li>3.1.1. Associative networks</li> <li>3.1.2. Frame structures</li> <li>3.1.3. Conceptual dependencies and scripts</li> </ol> </li> <li>3.2. Object oriented representation</li> </ol> <p><b>Unit 4: Organization and Manipulation, Knowledge Acquisition</b></p> <ol style="list-style-type: none"> <li>4.1. Introduction to organization</li> <li>4.2. Search techniques             <ol style="list-style-type: none"> <li>4.2.1. Uninformed search</li> <li>4.2.2. Informed search</li> </ol> </li> <li>4.3. Introduction to matching Techniques</li> <li>4.3 Knowledge Acquisition             <ol style="list-style-type: none"> <li>4.3.1. Knowledge learning types</li> <li>4.3.2. General learning models</li> <li>4.3.3. Performance of learning models</li> </ol> </li> </ol> <p><b>Unit 5: Expert System</b></p> <ol style="list-style-type: none"> <li>5.1. Advantages of Expert Systems</li> <li>5.2. Characteristics of Expert Systems</li> <li>5.3. Design of Expert Systems             <ol style="list-style-type: none"> <li>5.3.1. Selecting Problem</li> <li>5.3.2. Stages in Expert systems development</li> <li>5.3.3. Errors in developments</li> </ol> </li> </ol>

	<p>5.3.4. Expert System Software Engineering</p> <p>5.3.5. Expert System Life Cycle</p>
Reference Books	<ol style="list-style-type: none"> <li>1. Introduction to Artificial Intelligence and Expert System by Dan W. Patterson, PHI (1999)</li> <li>2. Artificial Intelligence – A Modern Approach (2nd Edition 2004) by Stuart J. Russell and Peter Norvig, Pearson Education</li> <li>3. Artificial Intelligence - Structures and Strategies for Complex Problem Solving (4th Edition 2004) by George F. Luger, Pearson Education</li> <li>4. Foundation of Artificial Intelligence and Expert Systems by V.S. Janakiraman, K. Sarukesi, P. Gopalakrishnan, Mc Millan (2002)</li> <li>5. Expert Systems Principles and Programming (3rd Edition) by Giarratano &amp; Riley, Thomson (Vikas Publishing House)</li> <li>6. Introduction to Artificial Intelligence by Rajendra Akerkar, PHI</li> </ol>
Teaching Methodology	Class work, Discussion, Self-Study, Seminars and/or Assignment
Evaluation Method	<p>30% Internal assessment is based on class attendance, participation, class test, quiz, assignment, seminar, internal examination etc.</p> <p>70% assessment is based on semester end University External examination</p>

## Course: 503: **Network Essentials and its Security**

Course Code	503
Course Title	<b>Network Essentials and its Security</b>
Credit	4
Teaching per Week	4 Hrs.
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Review / Revision	June 2017
Purpose of Course	To make students learn Network essentials and various security measures for the challenges to which the IT industry is exposed
Course Objective	To understand Network Management and its security
Pre-requisite	Computer Network, TCP/IP
Course Outcome	Students will be able to solve and determine best solutions for the challenging area of Network Security
Course Content	<p><b>Unit 1: Network Essentials</b></p> <ul style="list-style-type: none"> <li>1.1 Repeaters &amp; Bridges <ul style="list-style-type: none"> <li>1.1.1 LAN Expansion</li> <li>1.1.2 Repeaters</li> <li>1.1.3 Bridges</li> <li>1.1.4 How Bridges Work</li> <li>1.1.5 Creating the routing table</li> <li>1.1.6 Segmenting Network Traffic</li> <li>1.1.7 Remote Bridges</li> <li>1.1.8 Differentiating between bridges and repeaters</li> </ul> </li> <li>1.2 Routers &amp; Gateways <ul style="list-style-type: none"> <li>1.2.1 Routers</li> <li>1.2.2 How routers work</li> <li>1.2.3 Routing benefits</li> <li>1.2.4 Routing protocols</li> <li>1.2.5 Routing V/S Bridging</li> <li>1.2.6 B Routers</li> <li>1.2.7 Gateways</li> <li>1.2.8 How Gateways work</li> </ul> </li> <li>1.3 Network Administration <ul style="list-style-type: none"> <li>1.3.1 Bottlenecks</li> <li>1.3.2 Simple Network Management Protocol</li> <li>1.3.3 Data Protection</li> <li>1.3.4 Backup Methods</li> <li>1.3.5 Testing and Storage</li> <li>1.3.6 Implementing a Backup System</li> <li>1.3.7 Uninterruptible Power Suppliers</li> <li>1.3.8 How Gateways work</li> <li>1.3.9 Implementing Fault Tolerant Systems</li> <li>1.3.10 RAID</li> <li>1.3.11 Sector Sparing</li> </ul> </li> <li>1.4 Advance WAN Transmission <ul style="list-style-type: none"> <li>1.4.1 Overview</li> <li>1.4.2 Multiplexing, Packet and Circuit Switching Networks</li> <li>1.4.3 X.25</li> <li>1.4.4 Asynchronous Transfer Mode (ATM)</li> <li>1.4.5 ISDN</li> <li>1.4.6 SONET</li> <li>1.4.7 SMDS</li> </ul> </li> </ul> <p><b>Unit 2: Introduction to Network Security</b></p>

	<p><b>Unit 3: Cryptography Techniques</b></p> <ul style="list-style-type: none"> <li>3.1 Classical Cryptography</li> <li>3.2 Conventional Cryptography <ul style="list-style-type: none"> <li>3.2.1 DES</li> </ul> </li> <li>3.3 Public – key Cryptography <ul style="list-style-type: none"> <li>3.3.1 RSA</li> </ul> </li> <li>3.4 Digital Signatures <ul style="list-style-type: none"> <li>3.4.1 DSA</li> </ul> </li> </ul> <p><b>Unit 4: Security Services</b></p> <ul style="list-style-type: none"> <li>4.1 Message Integrity</li> <li>4.2 Confidentiality and Authentication</li> <li>4.3 Certification and Key Management <ul style="list-style-type: none"> <li>4.3.1 PKI</li> </ul> </li> </ul> <p><b>Unit 5: Network Security Applications</b></p> <ul style="list-style-type: none"> <li>5.1 IP Security <ul style="list-style-type: none"> <li>5.1.1 IPsec</li> </ul> </li> <li>5.2 Web Security <ul style="list-style-type: none"> <li>5.2.1 SSL, TLS, SET</li> </ul> </li> <li>5.3 Electronic Mail Security <ul style="list-style-type: none"> <li>5.3.1 PGP, S/MIME</li> </ul> </li> <li>5.4 SNMP Security</li> </ul> <p><b>Unit 6: Access Control in Computer Networks</b></p> <ul style="list-style-type: none"> <li>6.1 Authentication Protocols and Services <ul style="list-style-type: none"> <li>6.1.1 Kerberos and X.509</li> </ul> </li> <li>6.2 Firewalls</li> <li>6.3 Virtual Private Networks (VPNs)</li> </ul> <p><b>Unit 7: System Security</b></p> <ul style="list-style-type: none"> <li>7.1 Intrusion detection</li> <li>7.2 Viruses</li> </ul> <p><b>Unit 8: Mobile System &amp; E-Commerce Securities</b></p> <ul style="list-style-type: none"> <li>8.1 3G Security</li> <li>8.2 E-Payment Systems</li> <li>8.3 Fair Data Exchange</li> </ul>
Reference Books	<ol style="list-style-type: none"> <li>1) Cryptography and Network Security, 2/e, ISBN: 0-13-869017-0 - W. Stallings - Pearson Education, 1999</li> <li>2) Network Security Essentials: Applications and Standards, 1/e, ISBN: 0-13-016093-8 - W. Stallings - Pearson Education, 2000</li> <li>3) SSL and TLS: designing and building secure systems, ISBN: 0-201-61598-3 - E. Rescorla - Addison-Wesley, 2001</li> <li>4) Implementing Secure Intranets and Extranets, ISBN: 0-89006-447-4 - K M Phaltankar - Artech House Publishers, 2000</li> <li>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</li> <li>6) Security in Computing, ISBN: 0-13-185794-0, 2/e - C. P. Pfleeger - Prentice Hall, 1997</li> <li>7) Building Internet Firewalls, 2/e, ISBN: 1-56592-871-7 - E. D. Zwicky, et al - O'Reilly, 2000</li> <li>8) CDMA Cellular Mobile Communications &amp; Network Security, ISBN: 0-13-598418-1 - M. Y. Rhee, - Prentice Hall, 1998</li> <li>9) Journal of Computer Security</li> </ol>

	<ul style="list-style-type: none"> <li>10) ACM Transactions on Information and System Security</li> <li>11) ACM Conference on Computer and Communications Security</li> <li>12) IEEE Symposium on Security and Privacy</li> <li>13) Internet documents - RFCs (Request for Comments)</li> <li>14) Guide to Networking Essentials, Fourth Edition - Greg Tomsho, et al</li> <li>15) Computer Networking Essentials - Debra Littlejohn Shinder</li> <li>16) Networking Essentials: Hands-On, Self-Paced Training for Supporting Local and Wide Area Networks - Microsoft Corporation (Corporate Author)</li> <li>17) Computer Network - A. S. Tanenbaum</li> </ul>
Teaching Methodology	Class work, Discussion, Self-Study, Seminars and/or Assignment
Evaluation Method	<p>30% Internal assessment is based on class attendance, participation, class test, quiz, assignment, seminar, internal examination etc.</p> <p>70% assessment is based on semester end University External examination</p>

## Course: 504: **Advanced Database Administration**

Course Code	504
Course Title	<b>Advanced Database Administration</b>
Credit	4
Teaching per Week	4 Hrs.
Minimum weeks/ Semester	15 (Including Class work, examination, preparation, holidays etc.)
Review / Revision	June 2017
Purpose of Course	Understanding advanced database administration
Course Objective	To learn advanced database administration, database tuning and maintenance
Pre-requisite	RDBMS
Course Out come	After studying the course, students will be able to perform Database Administration
Course Content	<p><b>Unit 1. Oracle10g Instance creation and management</b></p> <ol style="list-style-type: none"> <li>1.1 Oracle Instance</li> <li>1.2 Installing Oracle</li> <li>1.3 Oracle Optimal Flexible Architecture (OFA)</li> <li>1.4 Locating initialization, listener.ora &amp; sqlnet.ora files</li> <li>1.5 Finding the alert log</li> <li>1.6 Common environment variables</li> <li>1.7 Structures in an Oracle Instance</li> <li>1.8 Oracle Memory Structures, SGA and PGA</li> <li>1.9 Oracle Processes and their purposes</li> <li>1.10 Startup, nomount, mount and open database commands</li> </ol> <p><b>Unit 2. Oracle10g Database Architecture</b></p> <ol style="list-style-type: none"> <li>2.1 Oracle10g management framework</li> <li>2.1 Using the Database Creation Assistant (DBA)</li> <li>2.3 Creating and dropping a database</li> <li>2.4 Tablespaces</li> <li>2.5 Tables and Indexes</li> <li>2.6 Clusters</li> <li>2.7 Partitioning of Tables and Indexes</li> <li>2.8 Gathering and applying patches</li> </ol> <p><b>Unit 3. Concurrency Management</b></p> <ol style="list-style-type: none"> <li>3.1 Transactions, serialization, locks and latches</li> <li>3.2 Lock modes</li> <li>3.3 Detecting and resolving lock conflicts</li> <li>3.4 Managing deadlocks</li> </ol> <p><b>Unit 4. Interfacing with Oracle</b></p> <ol style="list-style-type: none"> <li>4.1 Oracle transaction management</li> <li>4.2 Using SQL*Plus and iSQL*Plus</li> <li>4.3 Using embedded Oracle with Pro*C &amp; Java</li> <li>4.4 PL/SQL &amp; Triggers</li> <li>4.5 Pining PL/SQL packages &amp; compiling PL/SQL</li> <li>4.6 System-level triggers – startup trigger, logon trigger, PL/SQL error trigger</li> </ol> <p><b>Unit 5. Oracle*Net</b></p> <ol style="list-style-type: none"> <li>5.1 Basic Network structure</li> <li>5.2 Oracle*Net Files</li> <li>5.3 Multi-threaded server</li> <li>5.4 Create additional listeners</li> </ol>

- 5.5 Create Oracle Net service aliases
- 5.6 Configure connect time failover
- 5.7 Oracle\*Net names resolution

**Unit 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

**Unit 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

**Unit 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

**Unit 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

**Unit 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

**Unit 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

	<p><b>Unit 12. Backup &amp; Recovery</b></p> <p>12.1 Oracle backup &amp; recovery planning</p> <p>12.2 Parallel instance recovery</p> <p>12.3 Basics of checkpoints, redo log files, and archived log files</p> <p>12.4 Using ARCHIVELOG mode</p> <p>12.5 Creating consistent Oracle backups</p> <p>12.6 Online hot backups</p> <p>12.7 Incremental Oracle backups</p> <p>12.8 Automating database backups with dbms_scheduler</p> <p>12.9 Monitor the flash recovery area</p> <p>12.10 Recovering from loss of a Control file</p> <p>12.11 Recovering from loss of a Redo log file</p> <p>12.12 Recovering from loss of a system-critical data file</p> <p>12.13 Recovering from loss of a non system-critical data file</p>
Reference Books	<ol style="list-style-type: none"> <li>1. Essentials : Oracle Database 10g by Rick Greenwald, Robert Stackowiak, Jonathan Stern, O'Reilly</li> <li>2. Oracle High Performance Tuning for 9i and 10g by Gavin Powell, Digital Press</li> <li>3. Oracle Database 10g, DBA Handbook by Loney, Kevin, Bryla, Bob, Oracle Press</li> <li>4. Oracle Database 10g - The Complete Reference by Loney, Kevin, Oracle Press</li> <li>5. Oracle Database 10g: A Beginner's Guide by Micheal Abbey, Ian Abramson Osborne, Oracle Press Series</li> </ol>
Teaching Methodology	Class work, Discussion, Self-Study, Seminars and/or Assignment
Evaluation Method	<p>30% Internal assessment is based on class attendance, participation, class test, quiz, assignment, seminar, internal examination etc.</p> <p>70% assessment is based on semester end University External examination</p>

## Course: 505: Open Source Web Based Programming (PHP/MySQL)

Course Code	505
Course Title	<b>Open Source Web Based Programming(PHP/MySQL)</b>
Credit	4
Teaching per Week	4 Hrs.
Minimum weeks/ Semester	15 (Including Class work, examination, preparation, holidays etc.)
Review / Revision	June 2017
Purpose of Course	This course helps students to understand fundamentals of Open Source web based Programming. The course also imparts students learning about Open source web based scripting language PHP and Mysql database. It also includes MVC or Three tier architecture of web based programming and Javascript technology like AngularJS and Node.js
Course Objective	Student will learn fundamentals and advance topics of Open source Web technology
Pre-requisite	Knowledge of HTML, Javascript and SQL
Course Out come	After studying the course, students will be able to understand how Open source web technology works. They will also be able to create database driven Websites.
Course Content	<p><b>Unit 1 : Introduction to Open source Web based Programming</b></p> <ul style="list-style-type: none"> <li>1.1 Introduction to PHP &amp; MySQL</li> <li>1.2 Installation of PHP and MySQL</li> <li>1.3 Language Characteristics &amp; Features</li> <li>1.4 Operators and Variables, Control Structures, Looping and Error handling</li> <li>1.5 PHP functions <ul style="list-style-type: none"> <li>1.5.1 String Functions</li> <li>1.5.2 Array Functions</li> <li>1.5.3 Mathematical Functions</li> <li>1.5.4 Graphics Library (GD Support)</li> <li>1.5.6 Date and Time Functions</li> <li>2.5.7 Misc. Function</li> </ul> </li> <li>1.6 State management Techniques</li> <li>1.7 Object Oriented Features of PHP <ul style="list-style-type: none"> <li>1.7.1 Classes and Objects</li> <li>1.7.2 Use of constructors</li> <li>1.7.3 Serialization</li> <li>1.7.4 Inheritance</li> </ul> </li> </ul> <p><b>Unit 2 : MySQL database server</b></p> <ul style="list-style-type: none"> <li>2.1 Configuring the MySQL Server</li> <li>2.2 MySQL Tables, Displaying MySQL Database , Adding and removing user access</li> <li>1.3 Database connection and data processing functions</li> </ul> <p><b>Unit 3 : Advance PHP</b></p> <ul style="list-style-type: none"> <li>3.1 Ajax Basics <ul style="list-style-type: none"> <li>3.1.1HTTP Request and Response Fundamentals</li> <li>3.1.2 The XMLHttpRequest Object XMLHttpRequest Methods</li> <li>3.1.3 XMLHttpRequest Properties</li> <li>3.1.4 Cross-Browser Usage Sending a Request to the Server</li> <li>3.1.5 PHP and Ajax Client-Driven Communication</li> <li>3.1.6 Server-Side Processing Expanding and Contracting Content</li> <li>3.1.7 Form Validation</li> </ul> </li> </ul>

	<p>3.1.8 Ajax-Based Database Querying</p> <p>3.2 XML</p> <p>3.3 Web services</p> <p><b>Unit 4 : MVC</b></p> <p>4.1 Introduction to MVC</p> <p>4.2 CodeIgniter: Introduction, Features and Application Flow Chart</p> <p>4.3 Controller</p> <p>4.4 Views</p> <p>4.5 Models</p> <p>4.6 Helpers</p> <p>4.7 Creating and Usage of Libraries and Helpers</p> <p>4.8 URL Routing</p> <p>4.9 Error Handling</p> <p>4.10 Profiling Application</p> <p><b>Unit 5 : AngularJS and Node.js</b></p> <p>5.1 Introduction to Angular JS</p> <p>5.1.1 Introduction to JavaScript</p> <p>5.1.2 Introduction to Angularjs</p> <p>5.1.3 Directives, Expressions, Controllers, Filters, Tables, Html DOM</p> <p>5.1.4 Modules, Forms, Includes, Views</p> <p>5.1.5 Angular SQL</p> <p>5.1.6 AngularJs Applications</p> <p>5.2 Introduction to Node.js</p> <p>5.2.1 Node.js framework</p> <p>5.2.2 Callback</p> <p>5.2.3 Responses</p> <p>5.2.4 Syntax, Variables, Classes</p> <p>5.2.5 Mysql Access</p> <p>5.2.6 Miscellaneous functions like Array,time, date etc.</p>
Reference Books	<ol style="list-style-type: none"> <li>1. Beginning PHP, Apache, MySQL Web Development - Elizabeth Narmore, Jason Gerner , Yann Le Scouarnec,Jeremy Stolz,Michael K. Glass, Gary Mailer – Wrox Publication</li> <li>2. Professional PHP Programming - Jesus Castagnetto ,Wrox Press Ltd</li> <li>3. Beginning PHP and MySQL: From Novice to Professional - W. Jason Gilmore, Apress</li> <li>4. Php: The Complete Reference - Steven Holzner, Tata Mcgraw Hill Education Private Limited</li> <li>5. AJAX and PHP: Building Responsive Web Applications - Bogdan Brinzarea, Cristian Darie packtpub</li> <li>6. CodeIgniter for Rapid PHP Application Development - David Upton ,packtpub</li> <li>7. Professional CodeIgniter- Thomas Myer, Wrox Press Ltd</li> <li>8. Node JS for PHP developers – Danial Howard, O’Reilly</li> <li>9. Beginning AngularJS - Andrew Grant,Apress</li> <li>10. Php manual – www. Php.com</li> </ol>
Teaching Methodology	Class work, Discussion, Self Study, Seminars and/or Assignment
Evaluation Method	<p>30% Internal assessment is based on class attendance, participation, class test, quiz, assignment, seminar, internal examination etc.</p> <p>70% assessment is based on semester end University External examination</p>

### Course: 506: Programming Skills XI

Course Code	506
Course Title	<b>Programming Skills XI</b>
Credit	2
Teaching per Week	2 Hrs.
Minimum weeks/ Semester	15 (Including Lab. work, examination, preparation, holidays etc.)
Review / Revision	June 2017
Purpose of Course	This course helps students to implement the Cloud Computing/IOT practically.
Course Objective	Learning to implement fundamentals and advanced topics of Cloud Computing/IOT practically
Pre-requisite	Practical programming in desktop environment / Embedded Technology
Course Outcome	After studying the course, students will be able to practically work on advanced technology platforms of Cloud Computing/IOT.
Course Content	Practical based on paper no 501. Separate journal to be prepared for this subject 501.
Reference Books	-----
Teaching Methodology	Lab work, Practical Programming Exercises (to be documented in a separate journal), Self-study, and/or Assignment
Evaluation Method	30% Internal assessment is based on Lab attendance, practical test, practical internal examination etc. 70% assessment is based on semester end University External practical examination

### Course: 507: Programming Skills XII

Course Code	507
Course Title	<b>Programming Skills XII</b>
Credit	3
Teaching per Week	3 Hrs.
Minimum weeks/ Semester	15 (Including Lab. work, examination, preparation, holidays etc.)
Review / Revision	June 2017
Purpose of Course	This course helps students to understand the Networking and its security practically
Course Objective	Learning to implement Network and its security practically.
Pre-requisite	Network fundamentals
Course Outcome	After studying the course, students will be able to practically implement network and its security
Course Content	Practical based on paper no 503. Separate journal to be prepared for this subject 503.
Reference Books	-----
Teaching Methodology	Lab work, Practical Exercises (to be documented in a separate journal), Self-study, and/or Assignment
Evaluation Method	30% Internal assessment is based on Lab attendance, practical test, practical internal examination etc. 70% assessment is based on semester end University External practical examination

### Course: 508: Programming Skills XIII

Course Code	508
Course Title	<b>Programming Skills XIII</b>
Credit	2
Teaching per Week	2 Hrs.
Minimum weeks/ Semester	15 (Including Lab. work, examination, preparation, holidays etc.)
Review / Revision	June 2017
Purpose of Course	This course helps students to handle advanced database administration activities
Course Objective	Advanced database administration
Pre-requisite	Practically learning advanced database administration
Course Outcome	After studying the course, students will be able to handle database administration, tuning and maintenance in various fields
Course Content	Practical based on paper no 504. Separate journal to be prepared for this subject 504.
Reference Books	-----
Teaching Methodology	Lab work, Practical Programming Exercises (to be documented in a separate journal), Self-study, and/or Assignment
Evaluation Method	30% Internal assessment is based on Lab attendance, practical test, practical internal examination etc. 70% assessment is based on semester end University External practical examination

### Course: 509: Programming Skills XIV

Course Code	509
Course Title	<b>Programming Skills XIV</b>
Credit	3
Teaching per Week	3 Hrs.
Minimum weeks/ Semester	15 (Including Lab. work, examination, preparation, holidays etc.)
Review / Revision	June 2017
Purpose of Course	This course helps students to implement the basic and advanced concepts of PHP/MySQL practically.
Course Objective	Learning to develop and deploy websites using PHP/MySQL practically.
Pre-requisite	Basic scripting, programming, html.
Course Outcome	After studying the course, students will be able to practically develop dynamic websites using PHP/MySQL.
Course Content	Practical based on paper no 505. Separate journal to be prepared for this subject 505.
Reference Books	-----
Teaching Methodology	Lab work, Practical Programming Exercises (to be documented in a separate journal), Self-study, and/or Assignment
Evaluation Method	30% Internal assessment is based on Lab attendance, practical test, practical internal examination etc. 70% assessment is based on semester end University External practical examination