College of Computer, Science & Information Technology - Junagadh

AFFILIATED TO BHAKTA KAVI NARSINH MEHTA UNIVERSITY

✦ Syllabus ✦

Master of Science

in

[Information Technology & Computer Application]

[Semester – I & II]

Academic Year : 2020 – 21

(Effective from June – 2018)

◄ **ADDRESS : C.C.S.I.T. - JUNAGADH** ►

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(SEMESTER-I)					
Subject code	**Subject Name**	**Credit**	**Int. Marks**	**Ext. Marks**	**Total Mark**
CS-01	**Application Development Using Advance JAVA**	**5**	**30**	**70(14x5)**	**100**
CS-02	**Advance Web Development in Laravel**	**5**	**30**	**70(14x5)**	**100**
CS-03	**NoSQL Database : MongoDB**	**5**	**30**	**70(14x5)**	**100**
CS-04	**Practical – 1(Based on CS-01)**	**5**	**-**	**-**	**100**
CS-05	**Practical – 2(Based on CS-02 & CS-03)**	**5**	**-**	**-**	**100**
CS-06	**Project Development(In House)**	**5**	**-**	**-**	**100**
Total Credits		**30**	**Total Marks**		**600**

(SEMESTER-II)					
Subject code	**Subject Name**	**Credit**	**Int. Marks**	**Ext. Marks**	**Total Mark**
CS-07	**Application Development Using Advanced Android**	**5**	**30**	**70(14x5)**	**100**
CS-08	**Introduction To Big Data And Hadoop**	**5**	**30**	**70(14x5)**	**100**
CS-09	**Cloud Computing**	**5**	**30**	**70(14x5)**	**100**
CS-10	**Practical - 1 (Based on CS-07)**	**5**	**-**	**-**	**100**
CS-11	**Practical - 2 (Based on CS-08 & CS-09)**	**5**	**-**	**-**	**100**
CS-12	**Project Development (In House)**	**5**	**-**	**-**	**100**
Total Credits		**30**	**Total Marks**		**600**

General Instructions:

1. Time duration of each theory paper will be of Two and Half hours.
2. Total marks of each theory paper will be 70 marks.
3. There will be five questions.
4. All questions are compulsory.

Instructions to the candidates for Practical Examination:-

1. Practical Exam. would be conducted for 1 ½ days, All the students have to remain present at the examination center 15 minutes before the scheduled time for examination.
2. Students have to carry with them certified Journal, I – card, Examination Receipt, and other necessary requirements for examination.
3. Student should not leave the laboratory without the permission of examiner.
4. Use of calculator is allowed but the use of mobile phones is strictly prohibited.
5. The candidate has to leave the laboratory only after the submission of all the answer sheets of the exercises performed.

M.Sc.(IT & CA) Semester – I
CS – 01 : APPLICATION DEVELOPMENT USING ADVANCE JAVA

Objective:

- Learn how to download, setup and configure the Spring Framework
- Explore the Spring Container and Modules
- Understand dependency injection
- Learn aspect oriented programming and how it is used to provide cross cutting concerns
- Understand how Spring deals with transaction management and ORM
- Hibernate: Inheritance mapping collection mapping.
- Understand the HQL.

Pre-Requisites: Students must have strong background of Java programming knowledge and exposure to J2EE technology.

Unit-1 :

Basics of JDBC, JSP And MVC

- Introduction to JDBC
- JDBCArchitecture
- Connecting with Database
- Introduction to JSP
- JSP with JDBC
- Introduction to MVC

Basics of Spring, Spring with IDE And IOC container

- What is Spring
- Spring Modules
- Spring Application
- Spring in Myeclipse
- Spring in Eclipse

Dependency Injection

- Constructor Injection
- CI Dependent Object
- CI with collection
- CI with Map
- CI Inheriting Bean
- Setter Injection
- SI Dependent Object
- SI with Collection
- SI with Map
- CI vs SI
- Autowiring
- Factory Method

Unit-2

Spring JDBC

- JdbcTemplate Example
- PreparedStatement
- ResultSetExtractor
- RowMapper
- NamedParameter
- SimpleJdbcTemplate

Spring with Hibernate And SpEL

- Spring with JPA
- SpEL Examples
- Operators in SpEL
- variable in SpEL

Spring 3 MVC and Remoting with Spring

- Spring with RMI
- Http Invoker
- Hessian
- Burlap

Unit-3

OXM Frameworks, Spring Java Mail and Web Integration

- Spring with JAXB
- Spring with Xstream
- Spring with Castor
- Spring with Struts2
- Login and Logout Application

Basics of Hibernate and Hibernate with IDE

- Hibernate Introduction
- Hibernate Architecture
- Understanding First Hibernate application
- Hibernate in Eclipse
- Hibernate in MyEclipse

Hibernate Application and Hibernate Logging

- Hibernate with annotation
- Hibernate Web application
- Hibernate Generator classes
- Hibernate Dialects

Unit-4

Inheritance Mapping

- Table Per Hierarchy
- Table Per Hierarchy using Annotation
- Table Per Concrete
- Table Per Concreteusing Annotation
- Table Per Subclass
- Table Per Subclass using Annotation

Collection Mapping

- Mapping List
- One-to-many by List using XML
- One To Many by List using Annotation
- Mapping Bag
- One-to-many by Bag
- Mapping Set
- One-to-many by Set
- Mapping Map

- Many-to-many by Map
- Bidirectional
- Lazy Collection

Unit-5

Component Mapping, Association Mapping, Transaction Management, HQL & HCQL

- One-to-one using Primary Key
- One-to-one using Foreign Key

Named Query, Hibernate Caching and Integration

- First Level Cache
- Second Level Cache
- Hibernate and Struts
- Hibernate and Spring

References:

1. Spring and Hibernate Santosh Kumar K. - Tata McGraw-Hill Publishing
2. Spring persistence with Hibernate Paul Tepper Fisher and Brian D. Murphy - Apress
3. Spring 4 and Hibernate 4: Agile Java Design and Development McGraw-Hill Education, 2015
4. Pro Spring Chris Schaefer, Clarence Ho, and Rob Harrop Apress

Web site References : https://www.javatpoint.com/java-tutoria

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CS - 02: Advance Web Development in Laravel

Objective:

- Student should know OOP in PHP
- Student should be able to implement Laravel framework
- Student should be able to design and code responsive website
- Student should be able to meet current modern market requirement and create fruitful products

Pre-Requisites:

- Strong background and Knowledge of HTML, CSS, JavaScript and PHP is mandatory.

Unit-1

Object Oriented Programming in PHP

The Basics of Php, Properties, Class Constants, Autoloading Classes, Constructors and Destructors, Visibility, Object Inheritance, Scope Resolution Operator (::), Static Keyword, Object Interfaces, Anonymous classes, Overloading, Object Iteration, Magic Methods, Final Keyword, Object Cloning, Comparing Objects, Type Hinting, Late Static Bindings, Objects and references

Bootstrap Basics

Introduction: File Structure, Basic HTML Template, Global Styles, Default Grid System, Basic Grid HTML, Offsetting Columns, Nesting Columns, Fluid Grid System, Container Layouts, Responsive Design, What Is Responsive Design?

Implementation: Typography, Code, Tables, Forms, Buttons, Images, Icons, Glyphicons, Dropdown Menus, Button Groups, Button with Dropdowns, Navigations, Navbar, Breadcrumb, Pagination, label, badges, Typographic elements, thumbnails, alerts, progress bar, wells

Unit-2

Introduction to Laravel

What is Laravel, features, MVC architecture, structure of Laravel application (Laravel directory structure),

Installation

Basic requirements for Laravel, Using Laravel Installer, Using Composer, To create project using composer, how does Composer work? Installation, Linux & Windows, Finding and installing new packages

Configuration

Introduction, Environment configuration, Protecting sensitive configuration, Maintenance mode, database configuration (setting database connection parameter for laravel and artisan)

Unit-3

Basic to laravel

create namespace, create controller, how to use Request Response, Cookies , session, Define view, redirection

Artisan

create only model, create model with migration, create model with migration & controller, create controller, Artisan Command Line Tool, database creation, artisan migration, migration structure, creation migration, Database seeding

Routing in Laravel

Basic Routing, Route Parameters, Route Filters, Named Routes, Route Groups, Sub-Domain Routing, Route Prefixing, Route Model Binding, check used routes in whole project ,Throwing 404 Errors, Routing to Controllers

Better performance & Maintenance Mode

remove cache, remove compiled blade views, send project in Maintenance model, remove Maintenance model

Unit-4

Basic to forms

What is the use of forms , installation of forms , use the following controls (Opening a Form, Generating a Label Element, Generating a Text Input, Specifying a Default Value, Generating a Password Input, Generating a File Input, Generating a Checkbox Or Radio Input, Generating a Checkbox Or Radio Input That Is Checked, Generating a Drop-Down List, Generating A Submit Button), Localization feature

Blade Template

Template inheritance, Master layout, Extending the master layout, display variables, Blade conditional statements, Blade Loops, Executing PHP functions in blade

SQL Interaction

Introduction, Running Raw SQL Queries, Database Transactions

Unit-5

Eloquent ORM

Eloquent ORM Models: Naming conventions, table name & primary keys, timestamps
Basic Operations: Create, Retrieve, Update, Delete Using Models, displaying data from models in views.

Validation

Defining The Routes, Creating The Controller, Writing The Validation Logic, Displaying The Validation Errors, Array validations, creating new validators, Error messages & custom errors

Available Validators: Accepted, After (Date), Alpha, Alpha Dash, Alpha Numeric, Array, Before (Date), Between, Boolean, Date, Date Format, Different, Digits, Digits Between, E-Mail, Exists (Database), Image (File), In, Integer, Max, Min, Not In, Numeric, Regular Expression, Required, String Custom validation Rules.

References

1. Online Laravel 5.2 Documentation https://laravel.com/docs/5.2
2. Laravel 5 Essentials Martin Bean, Packet Publishing, ISBN 978-1-78528-301-7
3. Bootstrap Jake Spurlock, O'reilly, ISBN: 978-1-449-34391-0

Web site References :

- https://laravel.com/docs/4.2/introduction
- https://www.tutorialspoint.com/laravel/index.htm

CS - 03: NoSQL DATABASE: MongoDB

Objective:

- To develop proficiency in the specification, representation and various other types in MongoDB using PHP.
- To be able to perform various Analytical as well as to increase the programming skills in PHP using MongoDB.
- To get a good understanding regarding various styles in Programming.
- To develop a good base for No-SQL queries.

Pre-Requisites: Knowledge of PHP is mandatory.

Unit-1

Introduction to NoSQL Database

- Define NoSQL, its characteristics and history, and the primary benefits for using NoSQL databases.
- Define the major types of NoSQL databases including a primary use case and advantages / disadvantages of each type.

Introduction to MongoDB

- MongoDB concepts - Databases, collections, and documents
- Downloading Installing and running MongoDB, Installing PHP
- Driver for MongoDB on various OS Platforms
- The Data Model and Working with Data

Unit-2

Learning MongoDB by implementing web Application

- Inserting documents in MongoDB, Querying documents in collection.
- Doing advance queries in MongoDB, Updating documents MongoDB,
- Deleting documents in MongoDB, Managing relationships between documents

Using MongoDB with relational Databases

- MongoDB and RDBMS together
- Defining the relational model

Unit-3

Session Management

- Understanding HTTP sessions.
- Understanding PHP native session handling,
- Implementing session handling with MongoDB.
- Putting Session Manager.
- Building user authentication module, creating login, logout and user profile.

Unit-4

Aggregation Queries

- Generating Sample Data.
- Understanding MapReduce,
- Performing MapReduce in MongoDB and PHP, Aggregation using group()
- Listing distinct values for field
- counting documents with count()

Web Analytics using MongoDB

- Logging with MongoDB,
- Extracting analytics data with MapReduce
- Real-time analytics using MongoDB

Unit-5

Handling Files with GridFS

- What is Grid?
- Storing files in GridFS
- Serving files from GridFS
- Reading files in chunks

Database Management

- Database Administration
    - Optimization
    - Replication
    - Sharding

References book

1. MongoDB the definitive guide O'Reilly Kristina Chodorow & Michal Dirolf
2. MongoDB in Action Kyle Banker Manning Sheltar Island
3. The definitive guide to MongoDB NoSQL Database for cloud and desktop computing- Apress-Eelco Plugge, Peter membrey and Tim Hawkins
4. PHP and MongoDB Web Development Beginers guide Rubayeet Islam - Open Source

CS-04 : Practical-1 and Viva (Based on CS –01)	
Topic	**Marks**
Application Development Using JAVA	**100**

CS-05 : Practical-2 and Viva (Based on CS –02 & CS-03)	
Topic	**Marks**
• Advance Web Development In Laravel • NoSQL DATABASE: MongoDB	**100**

CS-06 : Project Development(In House)	
Topic	**Marks**
Project must be developed in the computer laboratory of concern institute under the supervision of faculties of concern institute on any subject of current semester. **(At the time of Project-Viva examination student must show Project Report (In Hard Copy) along with all the Workouts in workbook, implementation of project in SDLC, Documentation, Program codes and project in running mode)**	**100**

Note:

- Practical examination may be arranged before or after theory exam.
- Project must be submitted before two week of commencement of theory exam.
- Project viva examination may be arranged before or after theory exam.
- During the project viva examination project must be run.

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M.Sc.(IT & CA) Semester – II

CS–07 : APPLICATOIN DEVELOPMENT USING ADVANCED ANDROID

Objective:

- To be able to develop mobile applications using advanced android api based on
- Data storage in external and internal memory and database
- To develop app that supports animation, multimedia, camera, sensor
- To develop app that supports Network, Bluetooth-Wi-Fi
- Developing web service and retrieving data using JSON & xml
- Packaging and distributing android app

Pre-Requisites: OOPS concepts, Programming in core java, Basic Android Programming.

1. **Basics of Android & UI Design**
   Core building blocks, Android manifest.xml file, R.java file, Basic UI widgets, Activity, Layout, Intent
   Working with view and adaptor
   Adaptors : Array adaptor, Arraylist adaptor, Base adaptor, Views: GridView, ScrollView, WebView, SearchView, TabHost, DynamicListView, ExpandedListView

   Multimedia API
   - Wallpapaer, Live Wallpaper,
   - Audio – Recording audio, Playing audio
   - Video– Recording video, Playing video
   - Alarm Manager
   - Camera - Capturing pictures, configuring camera mode settings, camera parameters, zooming camera.

2. **Data Storage & SQLite**
   - Shared Preferences
   - Android File System
   - Internal storage, External storage
   - SQLite : Storing data using SQLite, Querying SQLite database, insert-update-delete operations, Persistent database using SQLiteOpenHelper and creating a database

   Content Provider, Intent & Notifications
   - Accessing built in content providers
   - Searching for content
   - Adding, changing, and removing content
   - Creating content provider
   - Sending & Receiving Broadcast
   - Notifying user, Notifying with status bar

3. **Device Connectivity**
   - Bluetooth Tutorial –existence of Bluetooth, enable Bluetooth, discover devices, List Paired Devices, establishing connection between devices.
   - Working with WiFi

   Working with Sensor
   - Sensor API,
   - Working with different sensors :Motion Sensor, Position Sensor, Environmental Sensor,
   - Sensor Values, SensorManager class, Sensor Class, SensorEvent class, SensorEventListener interface, Compass Acceslerometer and Orientation Sensors
   - Reading sensor data, calibrating sensors, determining device orientation

   Android Web Service
   - Introduction to web service,
   - Soap Vs Restful web service
   - Android Restful web service example with java servlet
   - Storing data into external database
   - Verifying data in android with external database

4. JSON & XML Parsing

- XML Parsing SAX
- XML Parsing DOM
- XML Pull Parser
- JSON Parsing
- Integrating Social Networking using HTTP

WiFi & Bluetooth

- Monitoring and managing Internet connectivity
- Managing active connections
- Managing WiFi networks
- Controlling local Bluetooth device
- Discovering and bonding with Bluetooth devices
- Managing Bluetooth connections
- Communicating with Bluetooth

5. Location Based Services and Google Maps

- Location Based Services - Finding current location and listening for changes in location, Proximity alerts, Working with Google Maps
- Showing google map in an Activity
- Map Overlays
- Itemized overlays
- Geocoder
- Displaying route on map

Drawing, Animation and Graphics programing

- Drawing on screen – using canvas and paint
- Working with bitmap, shapes
- 2D Animation - Drawable, View, Property animation

Packaging, Deploying and distributing/selling app

- Signing certificate
- Distributing android app via Google Play
- Obfuscating and optimizing with ProGuard

References Books:

1. Advanced Android Application Development – Joseph Annuzzi, Lauren darcey, Shane Conder – 4th Edition, Addision – Wesley.
2. Android cookbook - Ian F. Darwin Oreilly
3. The Android Developer's CookBook – Building Application with Android SDK – 2nd Edition, Addision – Wesley.

CS – 08 : INTRODUCTION TO BIG DATA AND HADOOP

Objective:

- Master the concepts of HDFS and MapReduce framework
- Understand Hadoop Architecture
- Setup Hadoop Cluster and write Complex MapReduce programs
- Learn data loading techniques using Sqoop and Flume
- Perform data analytics using Pig and Hive
- Implement HBase and MapReduce integration
- Implement Advanced Usage and Indexing
- Implement best practices for Hadoop development
- Work on a real life Project on Big Data Analytics

Pre-Requisites : Knowledge of Java, SQL and Linux commands is mandatory

1. Introduction to Big Data and Hadoop

Introduction/Installation of Virtual Box and the Big Data VM

Introduction to Linux
- Why Linux?
- Windows and the Linux equivalents
- Different flavors of Linux
- Unity Shell (Ubuntu UI)
- Basic Linux Commands (enough to get started with Hadoop)

Understanding Big Data

Understanding Big Data
- 3V (Volume-Variety-Velocity) characteristics
- Structured and Unstructured Data
- Application and use cases of Big Data

Limitations of traditional large Scale systems
How a distributed way of computing is superior (cost and scale)
Opportunities and challenges with Big Data

HDFS (The Hadoop Distributed File System)

HDFS Overview and Architecture
- Deployment Architecture
- Name Node, Data Node and Checkpoint Node (aka Secondary Name Node)
- Safe mode
- Configuration files
- HDFS Data Flows (Read vs Write)

How HDFS addresses fault tolerance?
- CRC Check Sum
- Data replication
- Rack awareness and Block placement policy
- Small files problem

HDFS Interfaces
- Command Line Interface
- File System
- Administrative
- Web Interface

Advanced HDFS features
- Load Balancer
- DistCp
- HDFS Federation
- HDFS High Availability
- Hadoop Archives

NoSQL Databases - 1 (Theoretical Concepts)

NoSQL Concepts
- Review of RDBMS
- Need for NoSQL
- Brewers CAP Theorem
- ACID vs BASE
- Schema on Read vs. Schema on Write
- Different levels of consistency
- Bloom filters

Different types of NoSQL databases
- Key Value
- Columnar
- Document
- Graph

Columnar Databases concepts

2. MapReduce – 1(Theoretical Concepts)

MapReduce overview
- Functional Programming paradigms
- How to think in a MapReduce way?

MapReduce Architecture
- Legacy MR vs Next Generation MapReduce (aka YARN/MRv2)
- Slots vs Containers
- Schedulers
- Shuffling, Sorting
- Hadoop Data Types

- Input and Output Formats
- Input Splits - Partitioning (Hash Partitioner vs Customer Partitioner)
- Configuration files
- Distributed Cache

MR Algorithm and Data Flow
- Word Count

Alternatives to MR - BSP (Bulk Synchronous Parallel)
- Adhoc querying
- Graph Computing Engines

Higher Level Abstractions for MR (Pig)

Introduction and Architecture
Different Modes of executing Pig constructs
Data Types
Dynamic invokers
Pig streaming
Macros
Pig Latin language Constructs (LOAD, STORE, DUMP, SPLIT etc)
User Defined Functions
Use Cases

3. MapReduce – 2(Practical)

Developing, debugging and deploying MR programs
- Stand alone mode (in Eclipse)
- Pseudo distributed mode (as in the Big Data VM)
- Fully distributed mode (as in Production)

MR API
- Old and the new MR API
- Java Client API
- Hadoop data types and custom Writables/WritableComparables
- Different input and output formats
- Saving Binary Data using SequenceFiles and Avro Files

Hadoop Streaming (developing and debugging non Java MR programs - Ruby and Python)
Optimization techniques
- Speculative execution
- Combiners
- JVM Reuse
- Compression

MR algorithms (Non-graph)
- Sorting
- Term Frequency
- Inverse Document Frequency
- Student Data Base
- Max Temperature
- Different ways of joining data
- Word Co-Occurrence

MR algorithms (Graph)
- PageRank
- Inverted Index

Higher Level Abstractions for MR (Hive)

Introduction and Architecture
Different Modes of executing Hive queries
Metastore Implementations
HiveQL(DDL & DML Operations)
External vs Managed Tables
Views
Partitions & Buckets
User Defined Functions
Transformations using Non Java
Use Cases
Comparison of Pig and Hive

4. NoSQL Databases - 2 (Practical)

HBase Architecture

- Master and the Region Server
- Catalog tables (ROOT and META)
- Major and Minor compaction
- Configuration files
- HBase vs Cassandra

Interfaces to HBase (for DDL and DML operations)

- Java API
- Client API
- Filters
- Scan Caching and Batching
- Command Line Interface
- REST API

Advance HBase Features

- HBase Data Modeling
- Bulk loading data in HBase
- HBase Coprocessors - EndPoints (similar to Stored Procedures in RDBMS)
- HBase Coprocessors - Observers (similar to Triggers in RDBMS)

5. Spark

- Introduction to RDD
- Installation and Configuration of Spark
- Spark Architecture
- Different interfaces to Spark
- Sample Python programs in Spark

Setting up a Hadoop Cluster using Apache Hadoop

Cloudera Hadoop cluster on the Amazon Cloud (Practice)

- Using EMR (Elastic Map Reduce)
- Using EC2 (Elastic Compute Cloud)

SSH Configuration

Stand alone mode (Theory)

Distributed mode (Theory)

- Pseudo distributed
- Fully distributed

Hadoop Ecosystem and Use Cases

Hadoop industry solutions
Importing/exporting data across RDBMS and HDFS using Sqoop
Getting real-time events into HDFS using Flume
Creating workflows in Oozie
Introduction to Graph processing
Graph processing with Neo4J
Processing data in real time using Storm
Interactive Adhoc querying with Impala

References Books

1. MapReduce Design Patterns Building Effective Algorithms and Analytics for Hadoop and Other Systems By Donald Miner, Adam Shook Publisher: O'Reilly Media
2. Professional Hadoop Solutions By Boris Lublinsky, Kevin T. Smith, Alexey Yakubovich
3. Hadoop The Definitive Guide by Tom White
4. Hadoop Operations, Eric Sammer
5. Hadoop for Dummies by Dirk Deroos
6. Programming Pig Dataflow Scripting with Hadoop By Alan Gates
7. Programming Hive Book by Dean Wampler, Edward Capriolo, and Jason Rutherglen

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CS – 09 : CLOUD COMPUTING

Objective:

- To describe cloud computing architecture and services
- To identify cloud platforms and services
- To identify design issues of cloud computing
- To analyze the security factors of implementing cloud environment
- To understand the server virtualization and its implementation
- To review real time applications of cloud computing

Pre-Requisites : Knowledge of Advance Computer Networks is mandatory

1. **Overview of Computing Paradigm**
   - Recent trends in Computing: Grid Computing, Cluster Computing, Distributed Computing, Utility Computing, Cloud Computing
   - Evolution of cloud computing: Business driver for adopting cloud computing

   Introduction to Cloud Computing
   - Cloud Computing (NIST Model): Introduction to Cloud Computing, History of Cloud Computing, Cloud service providers
   - Properties, Characteristics & Disadvantages: Pros and Cons of Cloud Computing, Benefits of Cloud Computing, Cloud computing vs. Cluster computing vs. Grid computing
   - Role of Open Standards

   Cloud Computing Architecture
   - Cloud computing stack: Comparison with traditional computing architecture (client/server), Services provided at various levels, How Cloud Computing Works, Role of Networks in Cloud computing, protocols used, Role of Web service:
   - Service Models (XaaS): Infrastructure as a Service(IaaS),Platform as a Service(PaaS), Software as a Service(SaaS)
   - Deployment Models: Public cloud , Private cloud, Hybrid cloud, Community cloud

2. **Infrastructure as a Service(IaaS)**
   - Introduction to IaaS: IaaS definition, Introduction to virtualization, Different approaches to virtualization, Hypervisors, Machine Image, Virtual Machine(VM): Resource Virtualization: Server, Storage, Network, Virtual Machine(resource) provisioning and manageability, storage as a service, Data storage in cloud computing(storage as a service)
   - Examples: Amazon EC2, Renting, EC2 Compute Unit, Platform and Storage, pricing, customers, Eucalyptus

   Cloud Security
   - Infrastructure Security: Network level security, Host level security, Application level security
   - Data security and Storage: Data privacy and security Issues, Jurisdictional issues raised by Data location,Identity & Access Management, Access Control
   - Trust, Reputation, Risk
   - Authentication in cloud computing, Client access in cloud, Cloud contracting Model, Commercial and business considerations

3. **Platform as a Service(PaaS)**
   - Introduction to PaaS: What is PaaS, Service Oriented Architecture (SOA)
   - Cloud Platform and Management: Computation, Storage
   - Examples: Google App Engine, Microsoft Azure,SalesForce.com, Force.com platform

   Software as a Service(PaaS)
   - Introduction to SaaS
   - Web services
   - Web 2.0
   - Web OS
   - Case Study on SaaS

4. **Service Management in Cloud Computing**
   - Service Level Agreements(SLAs)
   - Billing & Accounting
   - Comparing Scaling Hardware: Traditional vs. Cloud
   - Economics of scaling: Benefitting enormously
   - Managing Data: Looking at Data, Scalability & Cloud Services, Database & Data Stores in Cloud, Large Scale Data Processing

   Virtualization
   - Virtualization objectives
   - Virtualization implementation
   - Virtual servers introduction
   - Xen server-Hyper V – I, Hyper V – II, VMWare – I, VMWare – II

5. **Case Study on Open Source & Commercial Clouds**
   - Eucalyptus
   - Microsoft Azure
   - Amazon EC2

Reference Books

1. Kenneth Hess, Amy NewMan – Practical Virtualization Solutions – Prentice Hall, 2010

2. Shahed Latif, Tim Mather, Subra Kumaraswamy – Cloud Security and Privacy : An Enterprise perspective on risks and compliance – O'Reilly Media Inc., 2009
3. Gautam Shroff – Enterprise Cloud Computing: Technology, Architecture, Applications – Cambridge University Press, 2010
4. Cloud Computing Bible, Barrie Sosinsky, Wiley-India, 2010
5. Cloud Computing: Principles and Paradigms, Editors: Rajkumar Buyya, James Broberg, Andrzej M. Goscinski, Wile, 2011
6. Cloud Computing: Principles, Systems and Applications, Editors: Nikos Antonopoulos, Lee Gillam, Springer, 2012
7. Cloud Security: A Comprehensive Guide to Secure Cloud Computing, Ronald L. Krutz, Russell Dean Vines, Wiley-India, 2010
8. George Reese – Cloud Application Architectures: Building Applications and Infrastructures
9. in the cloud – O'Reilly Media Inc., 2009
10. Anthony T. Velte, Toby J. Velte, Robert Elsenpeter – Cloud Computing A practical Approach McGraw Hill, 2010

CS-10 : Practical-1 and Viva (Based on CS –07)	
Topic	**Marks**
Application Development Using JAVA	**100**

CS-11 : Practical-2 and Viva (Based on CS –08 & CS-09)	
Topic	**Marks**
• Introduction To Big Data And Hadoop • Cloud Computing	**100**

CS-12 : Project Development(In House)	
Topic	**Marks**
Project must be developed in the computer laboratory of concern institute under the supervision of faculties of concern institute on any subject of current semester. **(At the time of Project-Viva examination student must show Project Report (In Hard Copy) along with all the Workouts in workbook, implementation of project in SDLC, Documentation, Program codes and project in running mode)**	**100**

Note:

- Practical examination may be arranged before or after theory exam.
- Project must be submitted before two week of commencement of theory exam.
- Project viva examination may be arranged before or after theory exam.
- During the project viva examination project must be run.

Computer Lab Rules

1. Operate the equipment with care.
2. For any hardware, software problem, please contact lab assistance.
3. Use of internet is strictly prohibited during the lab session.
4. Do not eat or drink in the lab.
5. Do not touch, connect or disconnect any plug or cable without your lecturer/laboratory technician's permission.
6. Keep your bags and shoes outside the lab.
7. Please turn off the computer properly.
8. After allocating the seat to the students. They are not supposed to change without prior permission.
9. Keep the noise level to a minimum.
10. During the lab session, student has to follow the time table and faculties instructions.
11. All students have to be presents with ICARD and subject books.