Name of the school: Faculty of Computer Technology
GLS (S. R. Parikh) Institute of Computer Technology (MCA)
Effective from the year 2016-17
Course Structure
MCA SEM III

Sr. No	Subject Code	Subjects	Subject Credit
1	0701301	Structured and object oriented analysis and design	4
2	0701302	Statistical methods	4
3	0701303	JAVA	4
4	0701304	Web Programming	4
5	0701305	Cloud computing	4
6	0701306	Practical based on 0701303 (JAVA)	2
7	0701307	Practical based on 0701304 (Web Programming)	3

MCA
SEM – III
0701301 Structured and Object Oriented Analysis and Design Methodology

1. Course Objective:
The core objective is to teach students the traditional (structured) approach and object oriented approach to analyze and design the systems. The student should be able to compare the two approaches and use it for the system development projects they take in the last year.

2. Course Duration:
The course will have sessions which are divided into five modules. Each module consists of ten sessions of 60 minutes each and carries a weightage of 20%.

3. Course Content:

Module No.	**Modules/Sub-Modules**	**No. of Sessions**	**Marks Weightage**
I	Information System Introduction, Information Systems in practice, general Systems Theory, Information and Information Systems, Strategies for success, What are the problems?, Why things go wrong?, The ethical dimension, Cost of Failure, Project Life Cycles, Managing Information System Development, User Involvement(1-2-3**)**	**10**	**20%**
II	Methodological Approaches, CASE, Role of Operation Specifications, Contracts, Describing Operation Logic Introduction of Human Computer Interface, The User Interface, Approaches to User Interface Design, Standards and Legal Requirements (3-3-11-16**)**	**10**	**20%**
III	Introduction of Object Orientation, Basic concepts, The origins of Object-Orientation, Current Object Oriented Languages, Models and Diagrams, Drawing Activity Diagrams, A development Process, User Requirements, Fact Finding Techniques, User Involvement, Documenting Requirements, Use Cases, Requirements Capture and Modeling (4-5-6**)**	**10**	**20%**
IV	What Must a Requirements Model Do?, Use Case Realization, The Class Diagram, Drawing a Class Diagram, CRC Cards, Assembling the Analysis Class Diagram,	**10**	**20%**

	Component-based Development, Adding Further Structure, Software Development Patterns, 7-8		
V	Object Interaction and Collaboration, Interaction sequence diagram, Collaboration Diagrams, Model Consistency, States and Events, Notations, Preparing State chart, Consistency Checking, Quality Guidelines 9-10	**10**	**20%**

Teaching Methods:

The following pedagogical tools will be used to teach this course:
(1) Lectures & Discussions
(2) Assignments & Presentations
(3) Case Studies

Evaluation:

The students will be evaluated on a continuous basis and broadly follow the scheme given below:

1.	Assignments / Presentations/ Quizzes / Class Participation etc.	30% (Internal Assessment)
2.	Internal Examination	20% (Internal Assessment)
3.	External Examination (University Exam)	50% (External Assessment)

Basic Text Books:

Sr. No.	**Author/s**	**Name of the Book**	**Publisher**	**Edition**
T1	Simin Bennett, Steve McRobb and Ray Farmer	Object Oriented Systems Analysis And Design Using UML	McGRawHill Education	Second Edition

Reference Books:

Sr. No.	**Author/s**	**Name of the Book**	**Publisher**	**Edition**
1	Kendall & Kendall	Systems Analysis and Design	PHI	Latest Edition
2	James A. Senn	Analysis &	McGrawHill	Latest Edition

		Design of Information Systems		
3	Grady Booch, James Rumbaugh, Ivar Jacobson	The Unified Modeling Language User Guide	Pearson	Latest Edition
4	Michael R Blaha, James R Rumbaugh	Object-Orient Modeling and Design with UML	Pearson	Latest Edition

E Resources:

1) http://www.nptel.ac.in/courses/108105057/Pdf/Lesson-37.pdf
2) http://www.nptel.ac.in/courses/106105087/pdf/m07L14.pdf
3) http://www.nptel.ac.in/courses/106105087/pdf/m07L15.pdf
4) http://www.nptel.ac.in/courses/106105087/pdf/m07L16.pdf
5) http://www.nptel.ac.in/courses/106105087/pdf/m07L17.pdf

Session Plan:

Session No.	Topics / Chapters
1-2	Information System Introduction, Information Systems in practice, general Systems Theory,
3-6	Information and Information Systems, Strategies for success, What are the problems?, Why things go wrong?, The ethical dimension, Cost of Failure
7-10	Project Life Cycles, Managing Information System Development, User Involvement
11-13	Methodological Approaches, CASE
14-16	Role of Operation Specifications, Contracts, Describing Operation Logic
17-20	Introduction of Human Computer Interface, The User Interface, Approaches to User Interface Design, Standards and Legal Requirements
21-22	Introduction of Object Orientation, Basic concepts, The origins of Object-Orientation, Current Object Oriented Languages,
23-25	Models and Diagrams, Drawing Activity Diagrams
26-28	A development Process, User Requirements, Fact Finding Techniques
29-30	User Involvement, Documenting Requirements, Use Cases, Requirements Capture and Modeling
31-33	What Must a Requirements Model Do?, Use Case Realization, The Class Diagram
34-37	Drawing a Class Diagram
38-39	CRC Cards, Assembling the Analysis Class Diagram,
40	Component-based Development,Adding Further Structure, Software

	Development Patterns
41-43	Object Interaction and Collaboration, Interaction sequence diagram
44-45	Collaboration Diagrams, Model Consistency
46-50	States and Events, Notations, Preparing State chart, Consistency Checking, Quality Guidelines

MCA SEM – III
0701302 Statistical Methods (Using R)

1. Course Objective:
The objective of this course is to introduce the students to statistical methods useful for data analysis and managerial decision-making. Emphasis is on applications through working examples and computer-assisted data analysis tools in lab sessions.

This course emphasizes more on practical and "hands on" than theory. In that sense, it is much more about data analysis than statistics. Students should learn performing statistical techniques using common software packages like R, interpreting results and conclude.

The core objective is to enable students to know the data analysis technique to apply, input data, get results, interpret and conclude.

2. Course Duration:
The course duration is of single semester with 38 theory sessions and 12 practical sessions. Each session will be of 60 minutes. Practical sessions will be using computer-assisted tool R.

3. Course Content:
The course content is divided into five modules as follows.

Module No.	Modules/Sub-Modules	No. of Sessions	Marks Weightage
I	**Introduction and Descriptive statistics** • Applications of Statistics • Data measurement • Numerical Descriptive Measures: mean, median, mode, variance, standard deviation, coefficient of variance, skewness, kurtosis	**Theory (7)** **Practical(3)**	**20%**
II	• Tabular and graphical representation of data • Linear simple correlation and regression	**Theory (7)** **Practical(3)**	**20%**
III	• Mathematical Expectation • Discrete probability distributions (Binomial, Poisson) • Continuous probability distributions (Uniform, Normal, Exponential)	**Theory (8)** **Practical(2)**	**20%**
IV	• Sampling • Estimating population mean and population proportion	**Theory (8)** **Practical(2)**	**20%**

	• Testing Hypothesis about single population parameters (mean, proportion, variance)		
V	Testing Hypothesis (2 or more populations) • Comparing parameters of two population (mean and proportion, variance) • 1-way and 2-way ANOVA to compare more than 2 population means • Non-parametric Chi-square test o Compare more than two proportions o Test for independence of attributes o Test for goodness of fit	**Theory (8) Practical(2)**	**20%**

Teaching Methods:

The following pedagogical tools will be used to teach this course:

(1) Lectures & Practical sessions using computer-assisted tool R

(2) Assignments, Presentations, Case study discussions

Evaluation:

Lengthy calculations may be expected in practical and not in theory exam.

Continuous evaluation may have more weightage of practical component.

Theory exam may involve problems that need simple calculations. The emphasis should be on applications of the acquired knowledge and interpretation based on results.

The students will be evaluated on a continuous basis and broadly follow the scheme given below:

1.	Assignments / Presentations/ Quizzes / Class Participation etc.	30% (Internal Assessment)
2.	Mid-Term Internal Examination	20% (Internal Assessment)
3.	Term-End Theory Exam (University Exam)	50% (External Assessment)

Text Books

Sr. No.	**Author/s**	**Name of the Book**	**Publisher**	**Edition**
T1	Anderson, Sweeney, Williams, Camm, Cochran	Statistics for business and economics	Cengage Learning	12th Edition

Reference Books:

Sr. No.	Author/s	Name of the Book	Publisher	Edition
1.	Ken Black	Applied Business Statistics	Wiley India	7th Edition, 2012
2.	Richard I. Levin, David S. Rubin	Statistics for Management	Pearson Education	Latest Edition (7^{th}, 2011)
3.	Aczel A.D. and Sounderpandian J.	Complete Business Statistics	Tata McGraw Hill	Latest Edition
4.	T N Srivatsava, Shailaja Rego	Statistics for Management	McGraw Hill	2nd Edition, 2012
5.	John Verzani	Using R for Introductory Statistics	Chapman & Hall/CRC	2004, https://cran.r-project.org/doc/contrib/Verzani-SimpleR.pdf

Web Sites for Statistical Analysis using R
http://www.r-tutor.com/elementary-statistics
http://www.r-statistics.com/2009/10/free-statistics-e-books-for-download/
http://www.r-project.org/doc/bib/R-books.html
http://nptel.ac.in/courses/111105041/

Session Plan:

Module	Sessions	Topics (Emphasis on applications and interpretations rather than computations; no proof, no mathematical deriavations)	Chapter
I	2	Applications, scales of measurement, qualitative and quanitative data, time series data	1.1, 1.2
	5	meaning and use of descriptive statistics (Uni-variate numerical measures): central tendency-mean,median,mode; positional measures-quartiles, percentiles; dispersion-range, inter-quartile range, variance, standard deviation; skewness and kurtosis; (computations using raw data)	3
	3	Using R: basic scalar data types, creating vector and data frame, computing descriptive statistics, interpretation of results	
II	3	Representing and Visualizing the data: tabular-frequency, relative frequency, cumulative frequency; graphs: bar, histogram, pie, ogive, box-plot	2, 3
	4	Simple linear correlation and regression (Paired observations, scatter diagram, prediction)	14.1 to 14.2

	3	Using R: Tabular-frequency distribution; Graphs-Box plot with 5-number summary, outliers; bar, histogram, pie; scatter diagram, adding lines; computing frequencies	
III	4	Discrete probability distributions, mathematical expectation (Binomial, Poisson)	5.1-5.6
	4	Continuous probability distributions (Uniform, Normal and Exponential), Approximating Binomial and Poisson to Normal	6
	2	Using R: probability, cumulative probability, quantile for given probability, generating random numbers from the given distribution, plotting density function	
IV	2	Sampling, sampling methods, sampling distribution of sample mean and sample proportion, point estimation	7
	3	Interval estimation, estimating mean and proportion (normal and student's t distribution)	8
	3	Hypothesis about single population parameters (mean, proportion, variance) (tests: Z, student's t, chi-square)	9, 11.1
	2	Using R: sampling with and without replacement; confidence interval; 1-sample tests for mean, proportion and variance	
V	3	Hypothesis about difference between two populations parameters (mean, proportion) (tests: Z, student's t, paired t)	10
	3	Variance-ratio test (Compare two variances), ANOVA (1-way, 2-way)	11.2, 13.1, 13.2
	2	Non-parametric chi-square test (comparing multiple proportions, test of independence, test for goodness of fit)	12
	2	Using R: 2-sample tests for mean, proportion and variance; ANOVA; contigency tables; chi-square test for independenace and goodness of fit	

MCA
Semester III
0701303 Java

Course Objective:

- **To understand the fundamentals of Object Orientdprogramming using Java.**
- **To understand the features like Multithreading, Exception Handling,**
- **To be able to develop GUI application using applets, AWT**

Course Content:

Module No.	**Topics / Chapters Name**	**No. of Sessions**	**% Weightage**
I	Introduction to OOP and Java. Basics of Classes • Need of OOP • Principles of OOP, comparing with POP • History of Java, Understanding JVM, Java features. • Java Programming constructs • Class and Object. • Methods, Constrcutors, Garbage Collector • Static, this • Arrays • Nested classes	**10**	**20**
II	Inheritance, Interface, Packages, Exception • Inheritance basics, use of super, final • Abstract class • Interface • Packages • Java.lang Package • Enumeration • Excpetion Handling	**10**	**20**
III	Multithreading, I/O. Generics, java.util and other API • Multithreading in Java • Java.io.File • Reading and writing Data • Randomly accessing files • Serialization • Cloning • Generics • Linked List • Set • Maps • Collections • Legacy Classes and Interfaces, Utility classes	**10**	**20**

IV	Applets and Event Handling in Java • Introduction of Applet • Applet Structure • Life Cycle of Applet • Common methods of applets • AppletContext Interface • Usage of Audio Clip, Images, Graphics, Color, Font tc in Applet • Introdunction of Event Handling • Event Dlegation Model • Adapter Classes • Inner Classes in Event Handling	**10**	**20**
V	AWT and Swings • Introdunction to AWT • Components and Containers in AWT • Layouts • Menu, Scrollbar • Introduction to Swings • Components in Swing • JList and JScrollPane • JTabbedPane	**10**	**20**

Basic Text Books:

Sr. No.	**Author/s**	**Title of Book**	**Publisher**	**Edition**
1	SachinMalhotra SaurabhChaudhary	Programming in JAVA	Oxford	Latest

Reference Books:

Sr. No.	**Author/s**	**Title of Book**	**Publisher**	**Edition**
1	Herbert Schildt	Java – The Complete Reference	McGraw Hill	Latest
2	Pravin Jain	The Class of Java	Pearson	Latest
3	C. Xavier	Java Programming, A Practical Approach	Mc. Graw Hill	Latest
4	Hortamann	Big Java	Wiley	Latest

Online Resources:

	http://nptel.ac.in/courses/106105084/28
	http://nptel.ac.in/courses/106105084/29
	http://onlinevideolecture.com/?course_id=2428
	http://www.learnerstv.com/Free-Computer-Science-Video-lectures-ltv162-Page1.htm

Chapter from Textbook1: 1 to 10, 12-15 (upto 15.9)

Session Plan:

Session No.	Topics / Chapters
1	Need of OOP Principles of OOP, comparing with POP
2	History of Java, Understanding JVM, Java features.
3	Java Programming constructs
4	Class and Object . Methods, Constrcutors
5,6	Garbage Collector Static, this
7,8	Arrays
9,10	Nested classes
11,12	Inheritance basics, use of super, final
13,14	Abstract class, Interface
15	Package
16,17	Java.lang Package, Enumeration
18-20	Excpetion Handling
21-24	Multithreading in Java
25-27	Java.io.File Reading and writing Data Randomly accessing files Serialization Cloning
28,29	Generics Linked List Set Maps Collections
30	Legacy Classes and Interfaces, Utility classes
31,32	Introduction of Applet Applet Structure Life Cycle of Applet
33-35	Common methods of applets AppletContext Interface Usage of Audio Clip, Images, Graphics, Color, Font in Applet
36	Introdunction of Event Handling
37	Event Dlegation Model

38-40	Adapter Classes Inner Classes in Event Handling
41	Introduction to AWT
42,43	Components and Containers in AWT
44	Layouts
45	Menu, Scrollbar
46-50	Introduction to Swings Components in Swing JList and JScrollPane, JTabbedPane

MCA
SEM – III
0701304 WEB Programming

1. Course Objective:

The main objective of this course is to acquaint the students with the core concepts of web programming using PHP, MySQL, JavaScript, AJAX, jQuery and JSON. The students will learn the concepts starting from the basics like class and objects and extending the knowledge to high-level concepts like file IO, web forms, event handling, session management, preferences management and database integration which are widely required when developing an entire application system. The course enables the students to visualize as well as synthesize a real world application scenario and makes them ready for development and implementation of such applications.

2. Course Duration:

The course is distributed amongst five units consisting of various sessions of sixty minutes each and carries a weightage as per the importance and complexity of the topics covered in the unit.

3. Course Content:

Unit	Topics / Sub – Topics	Sessions	Marks Weightage
I	**Setting up Apache Web Server, MySQL and PHP Basics** **Apache Installation and Configuration** Current and future versions of Apache, Choosing the Appropriate installation method, Installing apache on Linux platforms, Apache configuration file structure, Apache log files, Apache-related commands, Starting apache for the first time **PHP Installation and Configuration** Current and Future version of PHP/MySQL, Installing / Building PHP/MySQL on different platforms with apache, Php.ini Basics, The basics of PHP scripts **PHP Overview Flow control and building blocks** Variables, Data types, Operators and expressions, Constants, Switching flow, Loops, Code blocks and	**10**	**20%**

	browser Output. **Working with Functions, Arrays and Objects** What is a function, Calling function, Defining a function, Returning values from User-defined functions, Variable scope, Saving state between function calls with the static Statement, More about arguments, Testing for the existence of a function, What are Arrays, Creating arrays, Some array related functions, Creating an Object, Object inheritance Formatting Strings with PHP, Investigating Strings in PHP, Manipulating Strings with PHP, Using Date and Time functions in PHP, Other String, Date and Time Functions		
II	**Working with Forms** Creating a Simple Input Form, Accessing Form Input with User-Defined Arrays, Combining HTML and PHP Code on a Single Page, Using Hidden Fields to Save State, Redirecting the User, Sending Mail on form Submission, Working with File Uploads **JavaScript** Understanding JavaScript, uses of JavaScript, attaching external JavaScript, validating form fields using JavaScript, extending functionalities of form fields using JavaScript	**10**	**20%**
III	**Interacting with MySQL** Learning the MySQL Data Types, Frequently used String functions in MySQL, Using Date and Time functions in MySQL, Using Transactions and Stored Procedures in MySQL. Interacting with MySQL using PHP, MySQL Versus MySQLi Functions, Connecting to MySQL with PHP, Working with MySQL Data	**10**	**20%**
IV	**Working with Cookies, User Sessions, Files, Directories and Images** Introducing Cookies, Setting a Cookie with PHP, Deleting a Cookie with PHP Session Function(s) Overview, Starting a Session,	**10**	**20%**

	Working with Session Variables, Passing Session IDs in the Query String, Destroying Sessions and Unsetting Variables, Using Sessions in an Environment with Registered Users Including Files with include(), Validating Files, Creating and Deleting Files, Opening a File for Writing, Reading or Appending, Reading from files, Writing or Appending to a file, Working with Directories Opening Pipes to and from Processes Using popen(), Executing System Commands Understanding the Image Creation Process, Necessary Modifications to PHP, Drawing a New Image, Getting fancy with Pie Charts, Modifying Existing Images, Image Creation from User Input, Using Images Created by Scripts		
V	**AJAX, JQUERY and JSON** **AJAX** Exploring AJAX, AJAX web application model, and working of AJAX, creating a simple AJAX Application. Exploring interactions between AJAX and PHP, validating fields using AJAX and PHP, retrieving data from a Database using PHP and AJAX **jQuery** Exploring Fundamentals of jQuery, loading and using jQuery, describing call back functions, exploring jQuery Selectors, methods, manipulators, events and effects, exploring jQuery and AJAX **JSON** Overview, Syntax, Data Types, Objects, Schema, Serializing into JSON, Parsing JSON	**10**	**20%**

Teaching Methods:

The following pedagogical tools will be used to teach this course:

(1) Lectures and Discussions
(2) Assignments and Presentations
(3) Practical Implementations and projects

Evaluation:

The students will be evaluated on a continuous basis and broadly follow the scheme given below:

1.	Assignments / Presentations/ Quizzes / Class Participation etc.	30% (Internal Assessment)
2.	Internal Examination	20% (Internal Assessment)
3.	External Examination (University Exam)	50% (External Assessment)

Text Books:

Sr. No.	**Author/s**	**Name of the Book**	**Publisher**	**Edition**
1	Julie C Meloni	Teach Yourself PHP, MySQL and Apache All in One	Pearson Education	Latest Edition
2	Nicholas C. Zakas, Meremy McPeak, Joe Fawcett	Beginning AJAX	Wrox Publication	Latest Edition
3	Adam Freeman	Pro jQuery 2.0	Apress	Latest Edition
4	Jeremy McPeak	Beginning JavaScript	Wrox Publication	Latest Edition

Reference Books:

Sr. No.	Author(s)	Name of the Book	Publisher	Edition
1	James Lee and Brent Ware	Open source web development with LAMP	Pearson Education	Latest Edition
2	Jason Gerner, Morgan Owens, Elizabeth Naramore, Matt Warden	Professional LAMP: Linux, Apache, MySQL and PHP5 Web Development	Wrox Publication	Latest Edition
3	Steve Suehring, Tim Converse and Joyce Park	PHP6 and MySQL Bible	Wiley India	Latest Edition
4	Lee Babin	Beginning Ajax with PHP From Novice to Professional	Apress	Latest Edition
5	Rebecca Riordan	Head First AJAX	O'Reilly	Latest Edition
6	Dane Cameron	HTML5, JavaScript and jQuery 24-Hour Trainer	Wrox Publication	Latest Edition
7	John Resig, Russ Ferguson, John Paxton	Pro JavaScript Techniques	Apress	Latest Edition

Tools to be used:

1. WAMP/LAMP/XAMPP
2. Aptana Studio [Latest Version]

Session Plan:

Session No.	Topics	Chapter No from textbook
	UNIT I	
1	Apache Installation and Configuration	Book 1–Ch-3
2	Apache Installation and Configuration	Book 1–Ch-3
3	PHP Installation and Configuration	Book 1–Ch-4
4	PHP Installation and Configuration	Book 1–Ch-4
5	PHP Overview Flow control and building blocks	Book 1–Ch-5 and Ch-6
6	Working with Functions	Book 1–Ch-7
7	Working with Arrays and Objects	Book 1–Ch-8
8	Working with Objects and Object Inheritance	Book 1–Ch-9
9	Working with Strings	Book 1–Ch-10
10	Working with Date and Time	Book 1–Ch-10
	UNIT II	
11	Creating a Simple Input Form	Book 1–Ch-11
12	Accessing Form Input with User-Defined Arrays	Book 1–Ch-11
13	Combining HTML and PHP Code on a Single Page	Book 1–Ch-11
14	Using Hidden Fields to Save State, Redirecting the User	Book 1–Ch-11
15	Sending Mail on form Submission	Book 1–Ch-11
16	Working with File Uploads	Book 1–Ch-11
17	Understanding JavaScript, uses of JavaScript	Book 4–Ch-1
18	Attaching external JavaScript	Book 4–Ch-1
19	Validation form fields using JavaScript	Book 4–Ch-10, 11
20	Extending functionalities of form fields using JavaScript	Book 4–Ch-10, 11
	UNIT III	
21	Connecting to MySQL with PHP	Book 1–Ch-18
22	Working with MySQL Data	Book 1–Ch-18
23	Learning the MySQL Data Types	Book 1–Ch-16
24	Using MySQL statements like INSERT, SELECT with PHP	Book 1–Ch-16
25	Using MySQL statements like UPDATE, REPLACE and DELETE with PHP	Book 1–Ch-16
26	Frequently used String functions in MySQL and using them with PHP	Book 1–Ch-16
27	Using Date functions in MySQL and using them with PHP	Book 1–Ch-16
28	Using Time functions in MySQL and using them with PHP	Book 1–Ch-16
29	Using Transactions and Stored Procedures in MySQL and using them with PHP	Book 1–Ch-17

30	MySQL Versus MySQLi Functions	Book 1–Ch-18
	UNIT IV	
31	Introducing cookies	Book 1–Ch-12
32	Setting a cookie with PHP. Deleting a cookie with PHP	Book 1–Ch-12
33	Sessions overview, Starting a session, working with session variables	Book 1–Ch-12
34	Passing session IDs in query string, destroying sessions and unsetting variables	Book 1–Ch-12
35	Using sessions in environment with registered users	Book 1–Ch-13
36	Including files, validating files, creating and deleting files, writing and appending to files	Book 1–Ch-13
37	Working with Directories	Book 1–Ch-13
38	Opening and working with Pipes. Executing system commands	Book 1–Ch-14
39	Understanding Image creating process, necessary modifications to PHP for image handling. Drawing a new image, getting pie charts	Book 1–Ch-14
40	Modifying existing Images, image creating from user input. Using images created by script	Book 1–Ch-14
	UNIT V	
41	Exploring AJAX, AJAX Web application model and working of AJAX	Book 2-Ch-1, 4
42	Creating a simple AJAX application. Exploring interactions between AJAX and PHP	Book 2-Ch-3, 4
43	Retrieving data from a database using PHP and AJAX	Book 2-Ch-3, 12
44	Exploring fundamentals of jQuery	Book 3-Ch-5
45	Loading and using jQuery	Book 3-Ch-5
46	Exploring jQuery selectors, methods, events and affects	Book 3-Ch-9, 10
47	Exploring jQuery and AJAX	Book 3-Ch-14, 15
48	JSON: Overview, Syntax, Data types	Book 4-Ch-12
49	JSON: Schema, serializing into JSON	Book 4-Ch-12
50	JSON: Parsing JSON	Book 4-Ch-12

Master of Computer Applications (Year IIrd)
Semester - III
0701305 Cloud Computing

1. Course Objective:

- To acquire comprehensive knowledge of cloud computing techniques.
- To Understand the current challenges in cloud computing.
- To understand how to design and implement cloud-based applications.

2. Course Duration:

The duration of course is a semester. The syllabus is divided in five modules. Total 50 theory lectures have been allocated for the same.

3. Course Content:

Module No.	Topics / Chapters Name	No. of Sessions	% Weightage
I	**Basics of Computing** **Principles of Computing:** Eras of Computing, Distributed Computing, Client Server Architecture, Cluster Computing, Grid Computing, Traditional Computing. Parallel vs Distributed Computing, Grid vs Cluster Computing. Parallel Processing, Hardware Architecture for parallel processing, Approaches to Parallel Programming, Level of Parallelism. Components of a Distributed System, Architectural styles for Distributed Computing, Model for Inter Process communication, Remote Procedure Call : A technology for distributed computing.	**10**	**20%**
II	**Cloud Virtualization Technology** Virtualization: Definition, Types of Virtualization, Virtualization Architecture and Software, Virtual Clustering, Application of Virtualization, Pitfalls of Virtualization, Virtualization in Grid and Cloud, Virtualization and cloud security, Virtual Infrastructure, CPU Virtualization, Network and Storage Virtualization.	**10**	**20%**

III	**Introduction To Cloud:** Vision of Cloud Computing, Defining a Cloud, Cloud Lifecycle Model, key Principles of Cloud Computing, Characteristics and Benefits of Cloud Computing, Pros and Cons of cloud computing, Historical developments, Examples of Cloud Platform and Technologies. **Cloud Technologies & Models:** Types of Cloud Computing: Public, Private, Hybrid, Community, Cloud Reference Model (XaaS), Open Challenges.	**10**	**20%**
IV	**Cloud Framework**: Introduction to Service Oriented Architecture, Life Cycle of Services in SOA, Integrating SOA and the Cloud, Cloud Framework, Workflow and co-ordination of Multiple Activities. **Data-Storage and Cloud Computing :** Introduction to Enterprise Data Storage, Data Storage Management, File System, Cloud Data Stores, Using Grids for Data Storage, Cloud Storage, Data management for cloud storage.	**10**	**20%**
V	**Practical Approach to Cloud Computing :** **Working with Google:** Google in cloud, Working with documents, Sharing a document, create a presentation, The Insert menu, Create an Animation, start a presentation, create a spreadsheet, change spreadsheet formats, Add a spreadsheet function, create a chart, create and share a form, creating tables, Setup Google Drive, Upload files to Google Drive, Share your Google drive files, save or publishing a document, set up offline Drive access, Set up Google Cloud Printing, Develop and Deploy a project on Google app engine. **Task Management using Cloud:** Working of Yandex and Remember the Milk	**10**	**20%**

Teaching Methods:

The following pedagogical tools will be used to teach this course (Sample tools):

1. Lectures & Discussions
2. Assignments & Quizzes
3. Exploring Cloud Applications

Evaluation:

The students will be evaluated on a continuous basis and broadly follow the scheme given below:

1.	CEC Component (Assignments/Quizzes)	20 % (Internal Assessment)
2.	Internal Examination (Mid Semester Exam)	30% (Internal Assessment)
3.	External Examination (University Exam / End Semester Exam)	50% (External Assessment)

Basic Text Book:

Sr. No.	**Author/s**	**Name of the Book**	**Publisher**	**Edition**
T1	Rajkumar Buyya. Christian Vecchiola, S. Thamarai Selvi	Mastering Cloud Computing	McGraw-Hill Education (India) Private Limited	2013
T2	A. Srinivasan and J. Suresh	Cloud Computing A Practical Approaches for learning and implementation	Pearson	2014
T3	Prasant Kumar Pattnaik, Manas Ranjan Kabat and Souvik Pal	Fundamentals of Cloud Computing	Vikas Publishing House Pvt. Ltd.	2015

Reference Books:

Sr. No.	**Author/s**	**Name of the Book**	**Publisher**	**Edition**
1	Dr. Kumar Saurabh	Cloud Computing Unleashing Next Gen Infrastructure to Application	Willey	Third

2	Barrie Sosinsky	Cloud Computing-Bible	Willey India Edition	2012
3	Ronald L. Krutz and Russell Dean Vines	Cloud Security A Comprehensive Guide to Secutre Cloud Computing	Willey	2010

E Resources:

1) http://www.thbs.com/downloads/Cloud-Computing-Overview.pdf
2) https://www.priv.gc.ca/resource/fs-fi/02_05_d_51_cc_e.pdf

Session Plan:

Session No.	Topics	Text Book. Chapter
1-2	Eras of Computing, Distributed Computing, Client Server Architecture	T1.2 + Reading Material
3-4	Cluster Computing, Grid Computing, Traditional Computing	T1.2 + Reading Material
5	Parallel vs Distributed Computing, Grid vs Cluster Computing	T1.2 + Reading Material
6-7	Parallel Processing, Hardware Architecture for parallel processing	T1.2
8	Approaches to Parallel Programming, Level of Parallelism	T1.2
9	Components of a Distributed System, Architectural styles for Distributed Computing	T1.2

10	Model for Inter Process communication, Remote Procedure Call : A technology for distributed computing	T1.2
11-12	Definition, Types of Virtualization	T2.8
13-14	Virtualization Architecture and Software	T2.8
15-16	Virtual Clustering, Application of Virtualization	T2.8
17-18	Pitfalls of Virtualization, Virtualization in Grid and Cloud	T2.8
19-20	Virtualization and cloud security, Virtual Infrastructure, CPU Virtualization, Network and Storage Virtualization	T2.9
21	Vision of Cloud Computing, Defining a Cloud	T1.1
22-23	Cloud Lifecycle Model, key Principles of Cloud Computing,	T2.5
24	Pros and Cons of cloud computing	T2.4
25-26	Characteristics and Benefits of Cloud Computing,	T1.1
27-28	Historical developments, Examples of Cloud Platform and Technologies	T1.1
29	Types of Cloud Computing: Public, Private, Hybrid, Community	T1.4
30	Cloud Reference Model (XaaS), Open Challenges	T1.4
31-32	Introduction to Service Oriented Architecture	T3.3
33	Life Cycle of Services in SOA	T3.3

34-35	Integrating SOA and the Cloud, Cloud Framework, Workflow and co-ordination of Multiple Activities.	T3.3
36-37	Introduction to Enterprise Data Storage, Data Storage Management	T2.11
38	File System, Cloud Data Stores, Using Grids for Data Storage	T2.11
39-40	Cloud Storage, Data management for cloud storage	T2.12
41-42	Google in cloud, Working with documents, Sharing a document, create a presentation, The Insert menu, Create an Animation, start a presentation	Reading Material
43-44	create a spreadsheet, change spreadsheet formats, Add a spreadsheet function, create a chart, create and share a form, creating tables	Reading Material
45-46	Setup Google Drive, Upload files to Google Drive, Share your Google drive files, save or publishing a document, set up offline Drive access	Reading Material
47-48	Set up Google Cloud Printing, Develop and Deploy a project on Google app engine	Reading Material
49-50	**Task Management using Cloud:** Working of Yandex and Remember the Milk	Reading Material

MCA – 2nd Year
Semester III
0701306 JavaPracticals

Course Objective:

- **To create console based and GUI basd application using the fundamental features of Java.**
- **To develop applications based on the features like Multithreading, Exception Handling,**
- **To be able to develop GUI application using applets, AWT and Swings**

Sample Programs:

Module No.	Topics / Chapters Name
I	**Introduction to OOP and Java. Basics of Classes** • Write a class, with main method, which declares floating point variables and observe the output of dividing the floating point values by a 0, also observe the effect of assigning a high integer value (8 digits and above) to a float and casting it back to int and printing. • Write a class called Statistics, which has a static method called average, which takes a one-dimensional array for double type, as parameter, and prints the average for the values in the array. Now write a class with the main method, which creates a two-dimensional array for the four weeks of a month, containing minimum temperatures for the days of the week(an array of 4 by 7), and uses the average method of the Statistics class to compute and print the average temperatures for the four weeks. • Define a class called Product, each product has a name, a product code and manufacturer name. Define variables, methods and constructors, for the Product class. Write a class called TestProduct, with the main method to test the methods and constructors of the Product class. • Write an application that defines a Sphere class with three constructors. The first form accepts no arguments. It assumes the sphere is centered at the origin and has a radius of one unit. The second form accepts one double value that represents the radius of the sphere. It assumes the sphere is centered at the origin. The third form accepts four double arguments. These specify the coordinates of the center and the radius. Provide two instance methods to this class. The first named move(), which takes three double parameters that are new values for the co-ordinates of the center. The second is named scale(),

	which takes one double parameter that is used to scale the radius. Demonstrate these methods.
II	**Inheritance, Interface, Packages, Exception** • Write a program that illustrates method overriding. Class Bond is extended by ConvertibleBond. Each of these classes defines a display() method that outputs the string "Bond" or "ConvertibleBond", respectively. Declare an array to hold six Bond objects. Initialize the elements of the array with a mix of Bond and ConvertibleBond objects. Execute a program loop to invoke the display() method of each object. • The abstract Airplane class has three subclasses named B747, B757 and B767. Each airplane type can transport a different number of passengers. Each airplane object has a unique serial number. Write an application that declares class hierarchy. Instantiate several types of airplanes and display them. Override the toString() method of Object to return a string with the type, serial number and capacity. • The abstract Monster class has three concrete subclasses named Vampire, Werewolf and Zombie. Create six different monsters of various types and store them in a one-dimensional array. Create a loop that displays the type of each monster. • The abstract Widget class has four concrete subclasses named Widget A, WidgetB, WidgetC and WidgetD. Each of these four classes has a different mass in kilograms. The mass of any WidgetA object is 4 kilograms. The masses for the WidgetB, WidgetC and WidgetD classes are 1, 5 and 17 kilograms, respectively. Each widget object has a string that identifies its color. Create six different Widgets and store them in a one-dimension array. Display the entries in the array and their total -mass. • The abstract class **Robot** has concrete subclasses named **RobotA**, **RobotB** and **RobotC**. Class **RobotA1** extends **RobotA**. Classes **RobotB1** and **RobotB2** extend **RobotB**. Class **RobotC1** extends **RobotC**. The **Locomotion** interface declares three methods named **forward**(), **reverse**() and **stop**(). It is implemented by classes **RobotB** and **RobotC**. The **Sound** interface declares one method named **beep**(). It is implemented by classes **RobotA1**, **RobotB1** and **RobotC**. Define all of these classes and implement the interfaces as specified. Create one instance of each class. Then invoke the **beep**() method of all objects that are of type **Sound**. Also invoke the **stop**() method of all objects that are of types **Locomotion**. • Define one class **E** in package **epack**. In class **E**, three variables are defined of access modifiers protected, private & public. Define class **F** in package **fpack** which extends **E** and write **display()** method which access variables of class **E**.

	Define class **G** in package **gpack** which has one method **display()** in that create one object of class **E** and display its variables. Define class **ProtectedDemo** in package **hpack** in which write main() method. Create objects of class **F** and **G** and class display method for both these objects. • Make the class **CartesianPoint**, belong to a package called **edu. gtu. geometry**, the classes **Polygon**, **Triangle** and **Rectangle** belong to the package **edu. gtu. geometry. shapes**and the classes **TestCartesianPoint**, **TestTriangle**, **TestRectangle** and **TestPolygon** belong to the package **edu. gtu.test**. Use appropriate access specifiers for the classes and the members of the classes and test the classes. • Write a program that accepts the fully qualified name of a class as its argument. Compute and display how many super classes exist for that class. (Hint : Use the forName() and getSuperclass() methods of Class.) If a ClassNotFound Exception occurs, catch it and provide an error message for the user. • Write a program that accepts two integer numbers thru command line arguments. Display the summation, subtraction, division and multiplication of them. Add Exception Handling code for different Exceptions like Array index out of bound for wrong no of arguments, Number format exception if an argument is not formatted as an integer, Arithmetic exception for division by zero error, etc. • Write a program that generates different custom exceptions if its command-line arguments are less than 5 or greater than 5.
III	**Multithreading, I/O. Generics, java.util and other API** • Write an application that creates and starts five threads. Each thread is instantiated from the same class. It executes a loop with ten iterations. Each iteration displays the character 'x' and sleeps between 300 and 800 milliseconds. The application waits for all threads to complete and then displays a message "Hello". • Write a program of threads showing inter-leaving of actions from two threads: t1 and t2 synchronizing on a shared object. Let t1 print message ping ---> and t2 print message <--- pong. Take the following inputs from user: o sleep interval for thread t1 o sleep interval for thread t2 • Write a program to define a class student. Give a menu to user to select the option of adding a record, searching a record the student or delete the record. If user wants to add the record, accept the data and write that data in the file. If

	the user wants to search a record, the user is asked for the search criteria, either the name or the class or the grade of the student. Accordingly the record should be searched from the file. If the user wants to delete the record, ask the name and the class to the user and delete the record. • Write a program to create a sequential file that could store details about employees. Details include Empid, name, basic, department name etc. and are provided thru the keyboard. • Write an application that displays a directory tree. The program should accept one command-line argument. If this represents a file, its name should be displayed. If this represents a directory, the program should recursively determine and display all files and directories that it contains. • Write a program for file copy using Byte Stream. Provide source and destination file name from command line arguments. • Define the following collections with some values o ArrayList o HashSet o HashMap o Hashtable o Iterate through all elements of collection using Enumeration and Iterator Interface and remove an element of each collection using these Interface.
IV	**Applets and Event Handling in Java** • Write an applet that draws an ellipse. Accept two parameters that are the sizes of the two axes in pixels. Centre the ellipse in the applet. (Hint: Take fixed Height and Width for applet) • Write an applet that shows a solid circle that moves from left to right across the applet display area. (Hint: use Thread class) • Write an applet to draw the following shapes: a. Cone b. Cylinder c. Cube d. Square inside a circle e. Circle inside a square • Write an applet that displays a dot at a random location in its display area every 200 milliseconds. (Hint: Use Math.random() function, Take fixed Height an Width for applet)

	• Develop an applet that displays 13 moving vertical color bars that fit into an applet dimensions. The flicker effect should not be noticeable. • Write an applet that shows a solid square that moves from top to bottom across the applet display area. (Hint: use Thread class) • Programs to try out event handling
V	AWT and Swings • Write an AWT program to create checkboxes for different courses belonging to a university such that the courses selected would be displayed. • Create a Frame having menu same as notepad menu which contains only first three menu options. • Create a List of vegetables. If you click on one of the items of the List, the item should be displayed in a Textbox. • Write a program using AWT to create a simple calculator. • Write a temperature conversion program that converts from Fahrenheit to Celsius. The Fahrenheit temperature should be entered from keyboard (via TextField). A Textfield should be used to display the converted temperature. Use the following formula for the conversion: Celsius = (5/9)*(Fahrenheit-32) • Design a Login form. After three trial of entering a password, window should automatically closed. • Design a registration form for new user. On clicking submit button, entered data should be display in on dialog box. • Above programs using Swing components.

MCA
SEM – III
0701307 WEB Programming

1. Course Objective:

The main objective of this course is to acquaint the students with the core concepts of web programming using PHP, MySQL, JavaScript, AJAX, jQuery and JSON. The students will learn the concepts starting from the basics like class and objects and extending the knowledge to high-level concepts like file IO, web forms, event handling, session management, preferences management and database integration which are widely required when developing an entire application system. The course enables the students to visualize as well as synthesize a real world application scenario and makes them ready for development and implementation of such applications.

The practical to be developed will majorly be related to the following topics:

1. Building blocks of PHP
2. Functions and arrays in PHP
3. String, Date and Time handling in PHP
4. Working with forms in PHP
5. Handling sessions and cookies in PHP
6. Working with files and directories in PHP
7. Working with images
8. Handling database with PHP

The practical would be in the following format

1. Develop a PHP application which performs the following tasks:
    a. The program should simulate a Shopping Store
    b. Create a menu that should be displayed same on all pages. The menu should consist of following options:
        i. Profile
            1. Edit Profile
            2. My Favorites
            3. My purchase history
            4. Log out
        ii. Products
            1. Categories
            2. All products
            3. Fresh Arrivals
        iii. Contact us
        iv. About Us
    c. The profile management like editing of personal and contact details of the user should be managed from database, while the log out mechanism should be handled using sessions. Favorites and purchase history should

be from database.

d. The products should be listed with the following information:
    i. The name of the product
    ii. The category where it belongs
    iii. The Image(s) of the product
    iv. The Price of the product
    v. An icon to signify whether it belongs to favorites or not
e. Contact us should provide a contact form to send the queries/suggestions to the pre-configured email id(s) of the store authorities
f. The about us page should display the information regarding the address, the contact numbers and location directions using a map

The above listed practical can be developed using other domains as listed below:

1. Address book
2. Online blogs
3. Online support management system
4. Online institute management system
5. 24X7 customer care system

Other such systems can also be thought and asked to be developed and are always in the authority of the teacher.

Reference Books:

Sr. No.	Author/s	Name of the Book	Publisher	Edition
1	Julie C Meloni	Teach Yourself PHP, MySQL and Apache All in One	Pearson Education	Latest Edition
2	Nicholas C. Zakas, Meremy McPeak, Joe Fawcett	Beginning AJAX	Wrox Publication	Latest Edition
3	Adam Freeman	Pro jQuery 2.0	Apress	Latest Edition
4	Jeremy McPeak	Beginning JavaScript	Wrox Publication	Latest Edition
5	James Lee and Brent Ware	Open source web development with LAMP	Pearson Education	Latest Edition
6	Jason Gerner, Morgan Owens,	Professional LAMP: Linux, Apache, MySQL and PHP5	Wrox Publication	Latest Edition

	Elizabeth Naramore, Matt Warden	Web Development		
7	Steve Suehring, Tim Converse and Joyce Park	PHP6 and MySQL Bible	Wiley India	Latest Edition
8	Lee Babin	Beginning Ajax with PHP From Novice to Professional	Apress	Latest Edition
9	Rebecca Riordan	Head First AJAX	O'Reilly	Latest Edition
10	Dane Cameron	HTML5, JavaScript and jQuery 24-Hour Trainer	Wrox Publication	Latest Edition
11	John Resig, Russ Ferguson, John Paxton	Pro JavaScript Techniques	Apress	Latest Edition

Tools to be used:

1. WAMP/LAMP/XAMPP
2. Aptana Studio [Latest Version]