Course Objectives

CMR Institute of Technology, Bangalore		
Department(s): Master of Computer Applications		
Semester: 04	Section(s): A&B	Lectures/week: 04
Subject: Advanced Java Programming		Code: 16MCA41
Course Instructor(s): Varsha P		
Course duration: 01 Jan 2018 – 25 May 2018		
Course Site:		

This course aims at imparting expertise in Web Application Development using J2EE tools. Students will learn to write applications using the various IDE's and mostly Eclipse and Netbeans. As part of the course, students will build GUI applications and connect to JDBC, create Web applications using server side programming languages –servlets, jsp and Enterprise applications using Session Bean, Entity Bean and Message Driven Bean

Prerequisites

- Object Oriented Programming Concepts
- Core Java

Lesson Plan

Lecture #	Book & Sections	Topics	Portions coverage: Teaching Aids	Portions coverage: % of Syllabus Covered
1-10	TB1: Part I : 3-10	**Unit-1 :Servlet** Servlet Structure, Servlet packaging, HTML building utilities, Lifecycle,SingleThreadModel interface, Handling Client Request: Form Data, Handling Client Request: HTTP Request Headers. Generating server Response: HTTP Status codes, Generating server Response: HTTP Response Headers, Handling Cookies, Session Tracking. Overview of JSP: JSP Technology, Need of JSP, Benefits of JSP, Advantages of JSP,Basic syntax,	Chalk and Talk Video Lectures for some topics	15
Links to some useful online lectures: ➢ https://www.youtube.com/watch?v=YxuCG0f14hM ➢ https://www.youtube.com/watch?v=32UGARg8AzU				
11-20	TB1 11-14	**UNIT-2 -JSP and Controlling the Structure of generated servlets :** Invoking java code with JSP scripting elements, creating Template Text, Invoking java code from JSP, Limiting java code in JSP, using jsp expressions, comparing servlets and jsp, writing scriptlets. For example Using Scriptlets to make parts of jsp conditional, using declarations, declaration example. Controlling the Structure of generated servlets: The JSP page directive, import attribute, session attribute, isElignore attribute, buffer and autoflush attributes, info attribute, errorPage and iserrorPage attributes, isThreadSafe Attribute, extends attribute, language attribute,Including files and applets in jsp Pages, using java beans components in JSP	Chalk and Talk Video Lectures for some topics	15

		documents		
Links to some useful online lectures: ➢ https://www.youtube.com/watch?v=Xkb3LJVLNC0&t=2s ➢ https://www.youtube.com/watch?v=Q0WyiOfOGCc				
21-30	TB2 27 - 28	**UNIT 3- Annotations and Java Beans :** Creating Packages, Interfaces, JAR files and Annotations. The core java API package,New java.Lang Sub package, Built-in Annotations with examples. Working with Java Beans. Introspection, Customizers, creating java bean, manifest file, Bean Jar file,new bean, adding controls, Bean properties, Simple properties, Design Pattern events, creating bound properties, Bean Methods, Bean an Icon, Bean info class,Persistence, Java Beans API.	Chalk and Talk	10
Links to some useful online lectures: ➢ https://www.youtube.com/watch?v=lA1n_HBrFwY ➢ https://www.youtube.com/watch?v=JV0atjBcUv4 ➢ https://www.youtube.com/watch?v=rWlHQnvrZcw				
31-40	TB2 29-30 TB3 1-2	**UNIT4- Working with JDBC:** Talking to Database, Immediate Solutions, Essential JDBC program, using prepared Statement Object, Interactive SQL tool. JDBC in Action Result sets, Batch updates, Mapping, Basic JDBC data types, Advanced JDBC data types, immediate solutions. Introduction to EJB: The Problem domain, Breakup responsibilities, Code Smart not hard, the Enterprise java bean specification. Components Types.	Chalk and Talk Video Lectures for some topics	20
Links to some useful online lectures: ➢ https://www.youtube.com/watch?v=bo62AqckwHc ➢ https://www.youtube.com/watch?v=5vzCjvUwMXg				
41-50	TB3 3-11	**UNIT 5 -EJB and Server Side Component Models :** Server Side Component Types, Session Beans, Message Driven Beans, Entity Beans,The Java Persistence Model. Container services. Dependency Injection, Concurrency, Instance pooling n caching, Transactions, security, Timers, Naming and object stores,Interoperability, Life Cycle Callbacks, Interceptors, platform integration. Developing your first EJB. Preparation, Definitions, naming conventions, convention for theExamples, coding the EJB, the contract, the bean Implementation class, out of Container Testing, Integration Testing. Models: The Stateless Session Bean, the Stateful Session Bean, the Singleton SessionBean, Message-Driven Beans. EJB and PERSISTENCE. Persistence Entity manager Mapping Persistence objects, Entity Relationships	Chalk and Talk	10
Links to some useful online lectures: ➢ https://www.youtube.com/watch?v=jhcoCVWyQDs ➢ https://www.youtube.com/watch?v=E5tUJlLZk_8&t=149s ➢ https://www.youtube.com/watch?v=TNXn5jW95MU				

Text Books	
1.	Marty Hall, Larry Brown. Core Servlets and Java Server Pages. Volume 1: Core Technologies. 2 Edition. (Chapter 3,4,5,6,7,8,9,10,11,12,13,14).
2.	Java 6 Programming Black Book, Dreamtech Press. 2012 (Chapter 17,18,19,20,21,22,27,28,29,30
3.	Andrew LeeRubinger, Bill Burke. Developing Enterprise Java Components. Enterprise JavaBeans 3.1.O'reilly. (Chapter 1,2,3,4,5,6,7,8,9,10,11).
Reference Books	
1.	Michael Sikora, EJB 3 Developer Guide, A practical guide for developers and architects to the Enterprise Java Beans Standard, Shroff Publishers & Distributors PVT LTD. July 2008.
2.	Herbert Schildt, Java The Complete Reference, 8th Edition. Comprehensive coverage of the Java Language. Tata McGraw-Hill Edition – 2011.

Syllabus for Internal Assessment Tests (IAT*)

IAT #	Syllabus
IAT-1	Class # 01 – 18
IAT-2	Class # 19–37
IAT-3	Class # 38–52

*See calendar of events for IAT schedule.

Course Outcomes
By the end of this course, students will be able to
1. Learn the concept of Servlet and its life cycle
2. Understand JSP tags and its services
3. Create packages and interfaces
4. Build Database connection
5. Develop Java Server Pages applications using JSP Tags.
6. Develop Enterprise Java Bean Applications

**Based on table 01, 02, 03 in appendix, following are the Course outcomes.

Course Outcomes		Modules covered	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Learn the concept of Servlet and its life cycle.	**1**	1	-	-	-	-	-	2	-	1	-	1	-
CO2	Understand JSP tags and its services	**2**	1	-	-	-	-	-	2	-	1	-	1	-
CO3	Create packages and interfaces	**3**	2	1	2	-	1	-	2	-	1	-	1	-
CO4	Build Database connection	**4**	2	1	2	-	1	-	2	-	1	-	1	-
CO5	Develop Java Server Pages applications using JSP Tags.	**2**	2	1	2	-	1	-	2	-	1	-	1	-
CO6	Develop Enterprise Java Bean Applications	**5**	2	1	2	-	1	-	2	-	1	-	1	-

Note: Assignments, study material, Question bank and other course related content would be posted on site mentioned above.

Signature with date:	**Course Instructor**	**Program Coordinator**	**Head-MCA**

Appendix

Table 01: Cognitive Levels

Cognitive Levels	
Cognitive level	**Revised Blooms Taxonomy Keywords**
L1	List, define, tell, describe, identify, show, label, collect, examine, tabulate, quote, name, who, when, where, etc.
L2	summarize, describe, interpret, contrast, predict, associate, distinguish, estimate, differentiate, discuss, extend
L3	Apply, demonstrate, calculate, complete, illustrate, show, solve, examine, modify, relate, change, classify, experiment, discover.
L4	Analyze, separate, order, explain, connect, classify, arrange, divide, compare, select, explain, infer.
L5	Assess, decide, rank, grade, test, measure, recommend, convince, select, judge, explain, discriminate, support, conclude, compare, summarize.

Table 02: Program Outcomes (PO) and Program Specific Outcomes (PSO)

PROGRAM OUTCOMES (PO)				CORRELATION LEVELS	
PO1	Computational Knowledge	PO7	Life-long learning	0	No Correlation
PO2	Problem Analysis	PO8	Project management and finance	1	Slight/Low
PO3	Design/development of solutions	PO9	Communication Efficacy	2	Moderate/ Medium
PO4	Conduct investigations of complex problems	PO10	Societal and Environmental Concern	3	Substantial/ High
PO5	Modern tool usage	PO11	Individual and Team Work		
PO6	Professional Ethics	PO12	Innovation and Entrepreneurship		

Table 03: Correlation Levels

Correlation Levels	
0	No Correlation
1	Slight/Low
2	Moderate/ Medium
3	Substantial/ High

Course Objectives

CMR Institute of Technology, Bangalore		
Department(s): Master of Computer Applications		
Semester: 04	Section(s): A&B	Lectures/week: 05
Subject: Advanced Web Programming		Code: 16MCA42
Course Instructor(s): Uma B		
Course duration: 01 Feb 2018 – 25 May 2018		
Course Site: https://sites.google.com/a/cmrit.ac.in/uma-b681		

- Build the Web Applications using JQuery, PHP, Ruby and D3.js
- Understand Model View Controller Architecture
- Design Web Applications using Ruby, Rails and Layouts
- Apply the knowledge gained in building web portals.
- Evaluate website performance against user acceptance testing.

Pre requisites

- Good knowledge of HTML, CSS and Javascript
- Knowledge of SQLQueries

Lesson Plan				
Lecture #	**Book & Sections**	**Topics**	**Portions coverage**	
			Teaching Aids	% of Syllabus Covered
1-8	TB1: - 1.1, 2.1- 2.5	**Unit:1 Introduction to jQuery:** Introducing jQuery, jQuery fundamentals, jQuery fundamentals, Creating the wrapped element set Bringing pages to life with jQuery, Understanding the browser event models, Jquery event model, Sprucing up with animations and effects.	Chalk and Talk Video Lectures for some topics	15
Links to some useful online lectures: ➢ https://www.youtube.com/watch?v=hMxGhHNOkCU				
9-16	TB1 3.1 - 3.2 4.4- 4.5	**Unit 2: Introduction to PHP and building web applications with PHP** Origin and uses of PHP, Overview of PHP, General syntactic characteristics , Primitives, operations and expressions, Output, control statements, Arrays, functions, Pattern matching, form handling, files Tracking users, cookies sessions, Understanding database, handling xml	Chalk and Talk Video Lectures for some topics	15
Links to some useful online lectures: ➢ https://www.youtube.com/watch?v=UUQ-kDbhw_M ➢ https://www.youtube.com/watch?v=maH8ormsIeU				
17-21	TB1 5.1 - 5.6	**Unit-3: Introduction to Ruby and Rails**: Origin and uses of Ruby, scalar types and their operations, simple input and	Chalk and Talk	10

		output, Control statements, Arrays, Hashes, Methods, classes , Code blocks, iterators, Pattern matching, Overview of rails, document requests, Processing forms, Layouts, Rails applications with databases.		
Links to some useful online lectures:				
22-30	TB1 7.1- 7.4 8.1 -8.3	**Unit – 4 : Web 2.0 and Web services**: Introduction to web 2.0, Folksonomies and web 2.0, SAAS, Convergence and iterative development, Rich user experience, Multiple delivery channels, Social networking Web services: soap, rest, wsdl, Document style soap, rest services, Json formatting, what is json, Array and object literals, mixing literals, Json syntax, Json encoding and decoding , json verses xml	Chalk and Talk Video Lectures for some topics	20
Links to some useful online lectures: ➢ https://www.youtube.com/watch?v=iStkxcK6_vY				
31-36	TB1 9.1 - 9.7	**Unit -5 : D3.js(Data driven documents)**: Data visualization tool for web apps. Introduction to d3, Building a sample survey , Train status board, Graphing mean daily plaza traffic, Graphing turnstile traffic, Interaction and transitions, Subway connectivity, Scheduled wait time distribution	Chalk and Talk	10
Links to some useful online lectures: https://www.youtube.com/watch?v=K3FMuLT_3Ik				

Text Books	
1.	JQuery in Action: 3rd edition, BEAR BIBEAULT, YEHUDA KATZ, AURELIO DE ROSA,D reamtech india, 2008, 978-1-617292-07-1
2.	Getting started with D3, O'Reilly, 2009. 978-81-203-4326-9
3.	Programming the web , Robert sebesta, Tata McGraw-Hill, 2008 , 978-8173716720
Reference Books	
3.	Mashups, Francis Shanahan, Wiley India 2012,
4.	Internet and internet , world wide web, how to program, Pearson Education.

Syllabus for Internal Assessment Tests (IAT*)

IAT #	Syllabus
T1	Module 2,Module 4
T2	Module 1, Module 3
T3	Module 5 + Model test

*See calendar of events for IAT schedule.

Course Outcomes
By the end of this course, students will be able to

1.	Acquire knowledge of build the web applications using JQuery, PHP, Ruby and D3.js
2.	Acquire knowledge of MVC architecture
3.	Design the web pages using Ruby, Rails and Layouts
4.	Apply the knowledge gained in building a web portals
5.	Evaluate website performance against unit testing

**Based on table 01, 02, 03 in appendix, following are the Course outcomes.

Course Outcomes		Modules covered	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Acquire knowledge of build the web applications using JQuery, PHP, Ruby and D3.js	**1,2,3,5**	2	1	2	-	1	-	2	1	-	-	1	1
CO2	Acquire knowledge of MVC architecture	**3**	1	1	1	-	-	-	2	-	-	-	1	-
CO3	Design the web pages using Ruby, Rails and Layouts	**3,4**	2	1	2	-	1	-	1	-	-	-	2	1
CO4	Apply the knowledge gained in building a web portals	**2**	2	1	2	1	1	-	2	1	1	-	2	2
CO5	Evaluate website performance against unit testing	**2,3**	2	1	1	-	1	-	1	-	1	-	1	1

Note: Assignments, study material, Question bank and other course related content would be posted on site mentioned above.

Signature with date: | **Course Instructor** | **Program Coordinator** | **Head-CSE**

Appendix

Table 01: Cognitive Levels

Cognitive Levels	
Cognitive level	**Revised Blooms Taxonomy Keywords**
L1	List, define, tell, describe, identify, show, label, collect, examine, tabulate, quote, name, who, when, where, etc.
L2	summarize, describe, interpret, contrast, predict, associate, distinguish, estimate, differentiate, discuss, extend
L3	Apply, demonstrate, calculate, complete, illustrate, show, solve, examine, modify, relate, change, classify, experiment, discover.
L4	Analyze, separate, order, explain, connect, classify, arrange, divide, compare, select, explain,

	infer.
L5	Assess, decide, rank, grade, test, measure, recommend, convince, select, judge, explain, discriminate, support, conclude, compare, summarize.

Table 02: Program Outcomes (PO) and Program Specific Outcomes (PSO)

Program Outcomes (PO), Program Specific Outcomes (PSO)	
PO1	**Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	**Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	**Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	**Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	**Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
PO6	**The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	**Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	**Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	**Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	**Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	**Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Table 03: Correlation Levels

Correlation Levels	
0	No Correlation
1	Slight/Low
2	Moderate/ Medium
3	Substantial/ High

Course Objectives

CMR Institute of Technology, Bangalore		
Department(s): Master of Computer Applications		
Semester: 04	Section(s): A&B	Lectures/week: 04
Subject: Software Testing and Practices		Code: 16MCA43
Course Instructor(s): Moumita Roy		
Course duration: 05 Feb 2018 – 25 May 2018		
Course Site: https://sites.google.com/a/cmrit.ac.in/moumitaroy/home/software-testing-1		

To be able to evaluate a system or its component(s) with the intent of finding whether it satisfies the specified requirement or not.

Pre requisites

Student should know the basic concepts of Software Engineering

Lesson Plan

Lecture #	Book & Sections	Topics	Portions coverage: Teaching Aids	Portions coverage: % of Syllabus Covered
1-10	TB1: - 1.1, 2.1- 2.5	**Basics of Software Testing, Basic Principles, Test case selection and Adequacy** Humans, Errors and Testing, Software Quality; Requirements, Behaviour and Correctness, Correctness Vs Reliability; Testing and Debugging; Test Metrics; Software and Hardware Testing; Testing and Verification; Defect Management; Execution History; Test Generation Strategies; Static Testing; Test Generation from Predicates. Sensitivity, Redundancy, Restriction, Partition, Visibility and Feedback, Test Specification and cases, Adequacy Criteria, Comparing Criteria	Presentation and Chalk and Talk Video Lectures for some topics	20
Links to some useful online lectures:				
11-20	TB1 3.1 - 3.2 4.4- 4.5	**A perspective on Testing, Examples** Basic definitions, Test cases, Insights from a Venn diagram, Identifying test cases, Error and fault taxonomies, Level of testing, Examples: Generalized pseudo code, The triangle problem, the Next Date function, The commission problem, The SATM (Simple Automation Teller Machine) problem, The currency converter, Saturn windshield wiper	Chalk and Talk Video Lectures for some topics	20
Links to some useful online lectures:				
21-30	TB1 5.1 - 5.6	**Boundary value testing, Equivalence class testing, Decision table based testing** Boundary value analysis, Robustness testing, Worst-case testing, special value testing, Examples, Random testing, Equivalence classes, Equivalence test cases for triangle problem, Next Date function and commission problem,	Presentation and Chalk and Talk	20

		Guidelines and observations, Decision tables, Test cases for triangle problem		
Links to some useful online lectures:				
31-40	TB1 7.1- 7.4 8.1 -8.3	**Path Testing, Data flow testing, Levels of Testing, Integration Testing** DD Paths, Test coverage metrics, Basis path testing, guidelines and observations, Definition Use testing, Slice based testing, Guidelines and observations. Traditional view of testing levels, Alternative life cycle models, the SATM systems, separating integration and system testing, Guidelines and observations.	Presentation and Chalk and Talk	20
Links to some useful online lectures:				
41-50	TB1 9.1 - 9.7	**Fault Based Testing, Planning and Monitoring the Process, Documenting Analysis and Test** Assumptions in fault-based testing, Mutation Analysis, Fault-based Adequacy Criteria; Variations on mutation Analysis; From Test case specification to Test Cases, Scaffolding, Generic vs. specific Scaffolding, Test Oracles, Self checks as oracles, Capture and Replay. Quality and Process, Test and Analysis strategies and plans, Risk Planning, Monitoring the Process, Improving the process, The quality team, Organizing documents, Test strategy document, Analysis and test plan, Test design specifications documents, Test and analysis reports.	Presentation and Chalk and Talk Video Lectures for some topics	20
Links to some useful online lectures:				

Text Books	
1.	Adithya P. Mathur " Foundations of Software Testing – Fundamental Algorithms and Techniques", Pearson Education India, 2011
2.	Mauro Pezze, Michael Young, Software testing and Analysis- Process, Principles and Techniques, Wiley India, 2012
Reference Books	
1.	KshirasagaraNaik, PriyadarshiTripathy: Software Testing and Quality Assurance, Wiley India 2012
2.	M.G.Limaye: Software Testing-Principles, Techniques and Tools – McGraw Hill, 2009

Syllabus for Internal Assessment Tests (IAT*)

IAT #	Syllabus
IAT-1	Class # 01 – 20
IAT-2	Class # 21– 40
IAT-3	Class # 41– 50

*See calendar of events for IAT schedule.

Course Outcomes
By the end of this course, students will be able to
CO1: Acquire knowledge of basic principles and knowledge of software testing and debugging and test cases.

CO2: Will be able to understand the perceptions on testing like levels of testing, generalized pseudo code and with related examples
CO3: To study the various types of testing.
CO4: Will be able to understand analyses the difference between functional testing and structural testing.
CO5: Analyze the performance of fault based testing, planning and Monitoring the process, Documentation testing.

**Based on table 01, 02, 03 in appendix, following are the Course outcomes.

Course Outcomes		Modules covered	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Acquire knowledge of basic principles and knowledge of software testing and debugging and test cases.	**1**	2	2	1	1	-	1	-	-	-	-	-	1
CO2	Will be able to understand the perceptions on testing like levels of testing, generalized pseudo code and with related examples	**1,2**	2	3	-	1	-	1	2	1	2	-	-	2
CO3	To study the various types of testing.	**2,3,4**	2	3	2	2	2	2	1	-	1	-	-	1
CO4	Will be able to understand analyses the difference between functional testing and structural testing.	**5,6**	1	2	1	-	2	1	-	-	-	-	-	1
CO5	Analyze the performance of fault based testing, planning and Monitoring the process, Documentation testing.	**7**	2	2	-	-	2	-	-	-	-	-	-	2

Note: Assignments, study material, Question bank and other course related content would be posted on site mentioned above.

Signature with date:	**Course Instructor**	**Program Coordinator**	**Head-MCA**

Appendix

Table 01: Cognitive Levels

Cognitive Levels	
Cognitive level	**Revised Blooms Taxonomy Keywords**
L1	List, define, tell, describe, identify, show, label, collect, examine, tabulate, quote, name, who, when, where, etc.
L2	summarize, describe, interpret, contrast, predict, associate, distinguish, estimate, differentiate, discuss, extend
L3	Apply, demonstrate, calculate, complete, illustrate, show, solve, examine, modify, relate, change, classify, experiment, discover.
L4	Analyze, separate, order, explain, connect, classify, arrange, divide, compare, select, explain, infer.
L5	Assess, decide, rank, grade, test, measure, recommend, convince, select, judge, explain, discriminate, support, conclude, compare, summarize.

Table 02: Program Outcomes (PO) and Program Specific Outcomes (PSO)

Program Outcomes (PO), Program Specific Outcomes (PSO)	
PO1	**Computational Knowledge :** Ability to apply knowledge of mathematics, computing fundamentals and specialization

PO2	**Problem Analysis** Ability to identify, formulate and analyze complex computing problems
PO3	**Design /Development of Solutions :** Ability to design, solve and evaluate solution for complex computing problems.
PO4	**Conduct investigations of complex Computing problems :** Ability to conduct systematic investigations of systems and data during design & development to derive valid conclusion.
PO5	**Modern Tool Usage :** Ability to use the techniques, skills, and modern tools necessary for complex computing techniques.
PO6	**Professional Ethics :** Ability to apply and commit professional ethics and cyber regulations in a global economic environment.
PO7	**Life-long Learning :** Ability to engage in independent learning for continual development with proactive measures.
PO8	**Project management and finance :** Ability to understand financial and management principle in multidisciplinary environment.
PO9	**Communication Efficacy :** Ability to comprehend and write effective reports, design documentation and make effective presentation.
PO10	**Societal and Environmental Concern :** Ability to analyze the global and local impact of business solutions on individuals, organizations and the society.
PO11	**Individual and Team Work :** Ability to act as a member or leader in diverse teams in multidisciplinary environments.
PO12	**Innovation and Entrepreneurship :** Ability to use creativity and entrepreneurial vision to create value and wealth for betterment of individual and society at large.

Table 03: Correlation Levels

Correlation Levels	
0	No Correlation
1	Slight/Low
2	Moderate/ Medium
3	Substantial/ High

Course Objectives

CMR Institute of Technology, Bangalore		
Department(s): Master of Computer Applications		
Semester: 04	Section(s): A & B	Lectures/week: 04
Subject: Big Data Analytics		Code: 16MCA452
Course Instructor(s): Gomathi T		
Course duration: Jan 2018 – May 2018		
Course Site: https://sites.google.com/a/cmrit.ac.in/tgomathi/		

- This course will cover the basic concepts of big data and to analyze and manage big data using Hadoop.

Pre requisites

- Database Concepts
- File handling concepts

Lesson Plan

Lecture #	Book & Sections	Topics	Portions coverage: Teaching Aids	Portions coverage: % of Syllabus Covered
1-8	TB1: Chapter 1, Chapter 2	**UNIT -1 - Big Data and Analytics** Example Applications, Basic Nomenclatures, Analysis Process Model, Analytical Model Requirement, Types of Data Sources, Sampling, Types of Data Elements Data Exploration, Exploratory statistical analysis, Missing Values, Outlier Detection and treatment, Standardizing Data Labels and Categorization	Chalk and Talk Video Lectures for some topics	20
Links to some useful online lectures: Flip Class: Box Plot Reference: **https://www.youtube.com/watch?v=1HjLY1tc508** Flip Class: z-score Reference: **https://www.wikihow.com/Calculate-Z-Scores**				
9-16	TB2: Chapter 3	**UNIT-2 - Big Data Technology** Hadoop's Parallel World, Data Discovery, Open Source technology for Big data analytics, Cloud and Big data, Predictive Analytics, Mobile Business Intelligence and Big Data,Crowd Sourcing Analytics: Video Session:Inter and Trans – Firewall Analytics	Chalk and Talk Video Lectures for some topics	20
Links to some useful online lectures: Flip Class: **Hadoop History** : Story: **https://www.youtube.com/watch?v=h2LzEvPU4jY**				
17-24	TB3: Chapter 1	**UNIT 3- Meet Hadoop** Data, Data Storage and Analysis,Comparison with other system, RDBMS, Grid Computing and Volunteer Computing,A Brief history of hadoop,Hadoop ecosystem and Release Response: Video Session, Discussion on basic concepts and terms used in Big Data	Chalk and Talk, Video	20

		world : Video Session		
Links to some useful online lectures: Flip Class: Reference: **Hadoop HDFS History:** https://www.youtube.com/watch?v=-w1GvdTRNIY Flip Class: Reference: **Understanding HDFS through LEGOS:** https://www.youtube.com/watch?v=4Gfl0WuONMY				
24-32	TB3: Chapter 3	**UNIT 4- The Hadoop Distributed File System** The Design of HDFS, HDFS Concepts, Blocks Name nodes and data nodes, HDFS federation, HDFS high-availability, The Command Line Interface, Basic File System Operations,Hadoop File system interfaces, The Java Interface, Reading data from a Hadoop URL Reading data using the file system API, Writing data, Directories,Querying the file system, Deleting data, data flow anatomy of a file read and write Coherency model, Parallel copying with distcp, Hadoop Archives	Chalk and Talk	20
32-40	TB3: Chapter 2, 5	**UNIT 5- Map Reduce** A weather Dataset, Data Format, Analyzing data using Unix tools, Analyzing data using hadoop, Map and Reduce, Java Map reduce, Scaling Out,Data Flow combiner functions, Running a distributed map reduce job, Hadoop streaming, Hadoop Pipes, Compiling and running,Developing a map reduce application, The configuration API, Combing Resources, Varaible expansion, Configure the development environment,Managing configuration, GenericOptionsParser, Tool and Toolrunner, Writing a Unit Test, Mapper, Reducer Running locally on test data, Running job in a local job runner, Testing the driver,Running a cluster, Packaging, Launching a job, The map reduce web UI, Retrieving the results, debugging a job, Hadoop Logs, Remote debugging	Chalk and Talk	20

Text Books	
1.	Analytics in a Big data World : The essential guide to Data Science and Applications - Bart Baesens, Wiley, 9781119204183
2.	Big Data, Big Analytics: Emerging Business Intelligence and Analytical trends for Todays business - Micheal Minelli, Michele Chambers, Ambiga Dhiraj, 1st Edition, Wiley CIO Series, 2013, 978-1-118-14760-3
3.	Hadoop: The Definite Guide: Tom White, 3rd Edition, Oreilly, 2012, 9789350237564
Reference Books	
3.	Professional Hadoop Solutions – Boris Lublinsky, Kevin T. Smith, Alexey Yakubovich, Wiley, 2015, 9788126551071
4.	Understanding Big Data – Chris Eaton, Dirk deroos et al., McGraw Hill, 2012, 9780071790536

5.	Big Data Analytics with R and Hadoop – Vignesh Prajapati, Packet Publishing 2013, 978-1-78216-328-2
6.	Oracle Big Data Handbook – Tom Plunkett, Brain Macdonals et al, Oracle Press, 2014, 9780071827263

Syllabus for Internal Assessment Tests (IAT*)

IAT #	Syllabus
IAT 1	**Module 1, Module 2**
IAT 2	**Module 3, Module 4**
IAT 3	**Module 5 + Question Bank**

*See calendar of events for IAT schedule.

Course Outcomes
By the end of this course, students will be able to
1. Understand the concept of Big Data and various methods involved in data analysis..
2. Understand how Big Data can be analyzed to extract knowledge and various technologies used in Big Data
3. Understand history of Apache Hadoop and its ecosystem.
4. Understand HDFS (the Hadoop Distributed Filesytem), and use them from the command line and API for effectively loading and processing data in Hadoop using Java.
5. Design, develop and test a Map Reduce application for solving Big Data Problems.

**Based on table 01, 02, 03 in appendix, following are the Course outcomes.

Course Outcomes		Modules covered	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Understand the concept of Big Data and various methods involved in data analysis.	**1**	2	2	2	2	-	1	-	-	-	1	1	1
CO2	Understand how Big Data can be analyzed to extract knowledge and various technologies used in Big Data.	**1,2**	2	1	-	-	-	-	-	-	-	-	-	-
CO3	Understand history of Apache Hadoop and its ecosystem.	**2,3**	1	1	-	-	-	-	-	-	-	-	-	-
CO4	Understand HDFS (the Hadoop Distributed Filesytem), and use them from the command line and API for effectively loading and processing data in Hadoop using Java.	**3,4**	2	2	3	1	2	-	-	-	-	-	1	-
CO5	Design, develop and test a Map Reduce application for solving Big Data Problems.	**5**	2	2	2	1	2	-	1	1	-	-	1	1

Note: Assignments, study material, Question bank and other course related content would be posted on site mentioned above.

Signature with date: | **Course Instructor** | **Program Coordinator** | **Head-MCA**

Appendix

Table 01: Cognitive Levels

Cognitive Levels	
Cognitive level	**Revised Blooms Taxonomy Keywords**
L1	List, define, tell, describe, identify, show, label, collect, examine, tabulate, quote, name, who, when, where, etc.
L2	summarize, describe, interpret, contrast, predict, associate, distinguish, estimate, differentiate, discuss, extend
L3	Apply, demonstrate, calculate, complete, illustrate, show, solve, examine, modify, relate, change, classify, experiment, discover.
L4	Analyze, separate, order, explain, connect, classify, arrange, divide, compare, select, explain, infer.
L5	Assess, decide, rank, grade, test, measure, recommend, convince, select, judge, explain, discriminate, support, conclude, compare, summarize.

Table 02: Program Outcomes (PO)

Program Outcomes (PO)	
PO1	**Computational Knowledge :** Ability to apply knowledge of mathematics, computing fundamentals and specialization
PO2	**Problem Analysis** Ability to identify, formulate and analyze complex computing problems
PO3	**Design /Development of Solutions :** Ability to design, solve and evaluate solution for complex computing problems.
PO4	**Conduct investigations of complex Computing problems :** Ability to conduct systematic investigations of systems and data during design & development to derive valid conclusion.
PO5	**Modern Tool Usage :** Ability to use the techniques, skills, and modern tools necessary for complex computing techniques.
PO6	**Professional Ethics :** Ability to apply and commit professional ethics and cyber regulations in a global economic environment.
PO7	**Life-long Learning :** Ability to engage in independent learning for continual development with proactive measures.
PO8	**Project management and finance :** Ability to understand financial and management principle in multidisciplinary environment.
PO9	**Communication Efficacy :** Ability to comprehend and write effective reports, design documentation and make effective presentation.
PO10	**Societal and Environmental Concern :** Ability to analyze the global and local impact of business solutions on individuals, organizations and the society.

PO11	**Individual and Team Work :** Ability to act as a member or leader in diverse teams in multidisciplinary environments.
PO12	**Innovation and Entrepreneurship :** Ability to use creativity and entrepreneurial vision to create value and wealth for betterment of individual and society at large.

Table 03: Correlation Levels

Correlation Levels	
0	No Correlation
1	Slight/Low
2	Moderate/ Medium
3	Substantial/ High

Course Objectives

CMR Institute of Technology, Bangalore		
Department(s): Master of Computer Applications		
Semester: 04	Section(s): A	Lectures/week: 04
Subject: Data Ware Housing and Data Mining		Code: 16MCA442
Course Instructor(s): Ms. Neha Agrawal		
Course duration: Feb 2018 – May 2018		
Course Site: https://sites.google.com/a/cmrit.ac.in/data-mining-ware-housing/home		

- To introduce the basic concepts of Data Warehouse and Data Mining techniques.
- Examine the types of the data to be mined and apply preprocessing methods on raw data.
- Discover interesting patterns, analyze supervised and unsupervised models and estimate the accuracy of the algorithms.

Prerequisites

- Data Base Concepts and basic mathematical concepts.

Lesson Plan				
Lecture #	**Book & Sections**	**Topics**	**Portions coverage**	
			Teaching Aids	% of Syllabus Covered
1-8	RB2: -7,8	**Data warehousing and OLAP** Data Warehouse basic concepts, Data Warehouse Modeling, Data Cube and OLAP : Characteristics of OLAP systems, Multidimensional view and Data cube, Data Cube Implementations, Data Cube operations, Implementation of OLAP and overview on OLAP Softwares.	Chalk and Talk/ Video Session for some of the topic	20
Links to some useful online lectures: ➢ https://www.youtube.com/watch?v=0ZMndP_Y32U				
9-16	TB2:-1,2	**Data Mining and its Applications** Introduction, What is Data Mining, Motivating Challenges, Data Mining Tasks, Which technologies are used, which kinds of applications are targeted by Data Mining Which technologies are used, which kinds of applications are targeted by Data Mining , Types of Data, Data Mining Applications, Data Preprocessing	Chalk and Talk/ Video Session for some of the topic	20
Links to some useful online lectures: ➢ https://www.youtube.com/watch?v=8fh2zUNs22U				
17-24	TB2: 6	**Association Analysis: Basic Concepts and Algorithms** Frequent Item set Generation, Rule Generation, Compact Representation of Frequent Item sets, Alternative methods for generating Frequent Item sets, FP Growth Algorithm, Evaluation of Association Patterns	Chalk and Talk/ Video Session for some	20

			of the topic	
➢ Offline video will be given				
25-32	TB2:-4.1-4.3,5.1-5.3,5.8 RB2:3.10.3.11	**Classification : Methods, Improving accuracy of classification** Basics, General approach to solve classification problem, Decision Trees, Rule Based Classifiers, Nearest Neighbor Classifiers. Bayesian Classifiers, Estimating Predictive accuracy of classification methods, Improving accuracy of classification methods, Evaluation criteria for classification methods, Multiclass Problem.	Chalk and Talk/Flip Class	20
Links to some useful online lectures: ➢ https://www.youtube.com/watch?v=Kx9Z3B8rXSo ➢ https://www.youtube.com/watch?v=Kx9Z3B8rXSo				
33-40	TB2:8.1-8.4,10 RB2: 4.10	**Clustering Techniques and Outlier Analysis** Overview, Features of cluster analysis, Types of Data and Computing Distance, Types of Cluster Analysis Methods, Partitional Methods, Hierarchical Methods, Density Based Methods, Quality and Validity of Cluster Analysis, Outlier detection methods, Statistical Approaches, Clustering based applications, Classification based	Chalk and Talk/	20
➢ Offline video will be given				

Text Books	
1.	Jiawei Han and Micheline Kamber: Data Mining - Concepts and Techniques, 2nd Edition, Morgan Kaufmann Publisher, 2006.
2.	Pang-Ning Tan, Michael Steinbach, Vipin Kumar: Introduction to Data Mining, Addison- Wesley, 2005.
Reference Books	
7.	Arun K Pujari: Data Mining Techniques University Press, 2nd Edition, 2009.
8.	G. K. Gupta: Introduction to Data Mining with Case Studies, 3rd Edition, PHI, New Delhi, 2009.
9.	Alex Berson and Stephen J.Smith: Data Warehousing, Data Mining, and OLAP Computing McGrawHill Publisher, 1997.

Syllabus for Internal Assessment Tests (IAT*)

IAT #	Syllabus
IAT-1	Class # 01 – 16
IAT-2	Class # 17–32
IAT-3	Class # 32–40

*See calendar of events for IAT schedule.

Course Outcomes
By the end of this course, students will be able to
CO1: Learn the concept of Data warehousing and OLAP.
CO2: Understand storage and retrieval technique of data from DATA CUBE.
CO3: Analyze different types of data and different preprocessing techniques.
CO4: Evaluate various Association algorithms and its applications.

CO5: Apply different Classification technique.
CO6: Evaluate different type's classifiers.
CO7: Analyze different clustering techniques and their applications

**Based on table 01, 02, 03 in appendix, following are the Course outcomes.

Course Outcomes		Modules covered	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Learn the concept of Data warehousing and OLAP.	**1**	1	-	1	-	1	1	1	2	1	1	2	1
CO2	Understand storage and retrieval technique of data from DATA CUBE.	**1**	2	1	1	1	1	1	1	2	1	-	1	-
CO3	Analyze different types of data and different preprocessing techniques.	**2**	2	3	1	2	-	-	1	1	-	1	1	2
CO4	Evaluate various Association algorithms and its applications.	**3**	2	2	1	2	-	-	2	-	-	1	1	1
CO5	Apply different Classification technique.	**4**	2	2	-	2	-	-	2	-	-	1	1	1
CO6	Evaluate different type's classifiers.	**4**	2	1	-	2	-	-	1	-	-	-	2	1
CO7	Analyze different clustering techniques and their applications	**5**	2	3	1	3	-	1	2	-	-	1	2	1

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Table 02: Program Outcomes (PO)

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