IBM Innovation Center for Education

B.Tech. Computer Science & Engineering
With specialization in

Business Analytics

Curriculum & Course Outline Book

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October 2014 edition

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	INTRODUCTION TO OPEN SOURCE SOFTWARE AND OPEN STANDARDS	L T P C 2 0 0 2
Goal	**To provide wide knowledge on Open Source Software**	

OBJECTIVES	**OUTCOMES**
The course should enable the students to • **Understand the Open Source Software** • **To learn the Open Source Adoption History, Evolution**	**The student should be able to** • **Gain knowledge of Open Source Software.** • **Learn the Open Source Evolution along with case studies**

UNIT 1 INTRODUCTION TO OPEN SOURCE

Introduction to Open Source Software - History of Open Source Software, Initiation of Open Source project start; Open Source Software examples : The Origins, The GNU projects, The Operating System GNU/Linux, The Graphical User Interface KDE/GNOME, Apache Web Server, Application Software; Strengths and Advantages of Open Source Software - Network effects, Lower cost, Availability, Maintainability. Drivers for Adoption - Lower cost of ownership, Quality, Innovation reuse, Technical competence; Open Source Software Assessment, Examples of Open Source Adoption in the World, Open Source Challenges.

UNIT 2 History of Open Source

History, evolution and benefits of Open Source. History of Open Source - Evolution of UNIX, GNU General Public License - Genesis of GNU, Copyleft- All Rights reserved; Benefits of Open Source.

UNIT 3 OPEN SOURCE COMMUNITIES AND DEVELOPMENT PROCESS

Open Source Initiative (OSI); Open Source definition; Free Software foundation; Open source development process – Call for Contributions, MythBuster, Brook's law; Open Source Community; Apache Web Server; Apache Software Foundation (ASF); How to contribute to open source projects.

UNIT 4 Adoption of Open Source

Introduction; Drivers for Open Source adoption; Adoption Methods and Process; examples of Open Standard Adoptions in the World; Open Source Challenges;

UNIT 5 CASE STUDIES ON OPEN STANDARDS

Introduction; Case Study 1 - Mozilla, Open Standards Case Study 2 - Linux ; The Operating System – an Overview, Linux Basics, Various Linux distributions available, Working with the System, Shells and Utilities, An Introduction to Linux, Booting – Building the Linux kernel image, Overview, booting BIOS POST, Bootsector and setup, Using LILO as a boot loader, High level initialization, SMP bootup on x86, freeing initialization data and code, Processing kernel command line, Run levels, Changing RUNLEVELS, Init scripts, Creating your own init scripts, Stopping the System- Shutdown(reboot, halt), Preparing for Installation – Installation Checklist, Hardware Requirements, Partitioning, Installation problems.

TEXT BOOKS

- **Introduction to Open Source Software & Open Standards** (IBM ICE Publication)

REFERENCE BOOKS

- Handbook of Research on Open Source Software: Technological, Economic, and Social Perspectives by Kirk St. Amant and Brian Still - IGI Global © 2007.
- Open Source: Technology and Policy by Fadi P. Deek and James A. M. McHugh - Cambridge University Press © 2008.
- Perspectives on Free and Open Source Software by Joseph Feller, Brian Fitzgerald, Scott A. Hissam and Karim R. Lakhani (eds) The MIT Press © 2005

Web Programming through PHP & HTML		L T P C 3 0 2 4
Goal	**To learn web programming through PHP**	

OBJECTIVES	OUTCOMES
The course enables students to	**The students will be able to**
• Understand PHP Basics. • Learn operators, structures and functions in PHP. • Learn arrays and PHP file handling • Object Oriented programming features of PHP. • Learn advanced PHP programming	• Write basic PHP programming • Embed PHP in HTML • Have learnt Javascript • Have understood advanced concepts in PHP programming.

Unit 1 - PHP BASICS

Introduction to PHP , Support for Database, PHP Installation, Working with PHP, Why PHP?, Basic Syntax of PHP, PHP statement terminator and case insensitivity, Embedding PHP in HTML, Comments, Variables, Assigning value to a variable, Constants, Managing Variables

Unit 2 - OPERATORS, CONTROLS STRUCTURES AND FUNCTIONS IN PHP

Arithmetic Operators, Bit-wise Operators, Comparison Operators, Logical Operators, Concatenation Operator, Incrementing/Decrementing Operator, Ternary Operator, Operator Precedence, String Manipulation: strtoupper(), strtolower(), ucfirst(), ucwords(), strcmp(), strlen(), substr(), trim(), Conditional Control Structures: If statement, If- else statement, If- else if statement, Nested If, Switch statement, Looping Control Structures: For loop, While loop, Do- While loop, For-each, Loop control: Break and Continue. Functions, User-Defined function, Function Definition, Function Call, Function with arguments, Function with return value, Call by value and call by references, Understanding variable scope, Global Variables, Static Variables, Include and Require, Built-in functions in PHP.

Unit 3 - ARRAYS AND PHP FILE HANDLING

Introduction to Array, Array in PHP, Creating an Array, Accessing Elements of an Array, Modifying Elements of an Array, Finding the Size of an Array, Printing an Array in the readable Way, Iterating Array Elements, Modifying Array while iteration, Iterating Array with Numeric index, Removing Element from an Array, Converting an Array to String, Converting String to an Array, Array Sorting, Multidimensional Array, Accessing elements of a Multidimensional Array, Iterating Multidimensional Array. Introduction, File Open, File Creation, Writing to files, Reading from File, Searching a record from a file, closing a File, Using PHP with HTML Forms.

Unit 4 - CLASS, OBJECT AND EXCEPTION HANDLING, JAVA SCRIPT

Introduction, Object, Class, Defining Class in PHP, Object in PHP, Usage of $this variable, Constructor, Constructor with Parameters. Introduction to Exception, Exception Handling mechanisms, Creating Custom Exceptions, Multiple Catch Blocks, Exception Propagation, Error Handling in PHP. Java Introduction, JavaScript Basics,

Unit 5 - Advanced PHP-Form Handling, Session Management, Database and MYSQL, XML, PHP Development using Eclipse

Creating Forms in HTML, GET and POST, Accessing form data, File Upload, Session Management, Starting a Session, Manipulating with Existing Session. What is a Database? MYSQL, SQL, SQL Functions, PHP and MYSQL, Execute Queries.
XML, XML Syntax Rules, Creating a DOM Document. Eclipse Overview, Creating a PHP Project.

TEXT BOOKS

- **Web Programming through PHP and HTML** (IBM ICE Publication)
- PHP Bible - Tim Converse

REFERENCE BOOKS

- PHP A beginners guide - Bill McCarthy
- PHP and MySQL Web Development - Luke Welling
- Learning PHP - OReilly Press
- http://in.php.net/quickref.php
- http://www.w3schools.com/php/default.asp
- http://www.tizag.com/php/

Web Programming through PHP LAB

Basics Programming

- Exercise 1 – Branching Statements using character
- Exercise 2 - Branching Statements using number
- Exercise 3 – Looping Statement
- Exercise 4 – String Functions
- Exercise 5 – String Manipulation
- Exercise 6 - Calculator
- Exercise 7 - Strings

Practical using Functions

- Exercise 8 – Generate Employee ID
- Exercise 9 – Calculate Tax
- Exercise 10 – Reverse a string
- Exercise 11 – Call by value and Call by reference
- Exercise 12 – Find Grade

Practical using Arrays

- Exercise 13 – Sorting
- Exercise 14 – Find grade
- Exercise 15 – Sort Array
- Exercise 16 – Multidimensional Array
- Exercise 17 – Population Details

File Handling programs

- Exercise 18 – Writing into a existing file
- Exercise 19 – Read from a file
- Exercise 20 – Filter the contents from the file
- Exercise 21 – File Copy

PHP programming thru HTML

- Exercise 22 – PHP with HTML

Programs related with php Classes and Objects

- Exercise 23 – Student Registration
- Exercise 24 – Online Examination System
- Exercise 25 – Online Feedback System

Exception Handling in php

- Exercise 26 – User Defined Exception
- Exercise 27 – Exception Propagation
- Exercise 28 – Error Handling in PHP

Java Scripting

- Exercise 29 – Arithmetic Operation
- Exercise 30 – Html and java script

Laboratory Infrastructure Requirements

Software - Operating System -Windows 7 64-bit, Software – Open Source PHP Development Tools - Zend
Hardware - RAM: 2GB (Min), 4GB (Recommended) HDD: 250GB (min) free space, 500GB (Recommended) Processor: i3 or i5 (Recommended) or i7 or similar type of processor capabilities, internet connected system.

Advanced Statistical Analysis		L T P C 3 0 2 4
Goal	**To provide knowledge on Advanced Statistical Analysis**	
OBJECTIVES	**OUTCOMES**	
The course enables students to • **Learn how to analyze statistical data properly.** • **Understand the role of formal statistical theory and informal data analytic methods.**	**The students will be able to** • **Gain an understanding of statistical methods relevant to upper division interdisciplinary courses.** • **Sharpen students' statistical intuition and abstract reasoning as well as their reasoning from numerical data through community-based and other research.**	

Unit 1 Introduction to Statistical Analysis

Introduction, Meaning of Statistics, The Scietific Method, Basic Steps of the Research Process, Experimental Data and Survey Data, Populations and Samples, Census and Samling Method, Parameter and Statistic, Independent and Dependent Variables, Examining Relationships, Introduction to SPSS Statistics.

Unit 2 Describing Data

Introduction, Types of Data, Data Transformation, Summarizing Data: Graphical Methods, Summarizing Data: Measures of Central Tendency, Summarizing Data: Measures of Dispersion, Levels of Measurement, Randon Variables and Probability Distributions, Discrete and Continuous Random Variable, Making Inferences about Populations from samples, Estimator and Estimate, Confidence Interval for Population Mean (Large Sample).

Unit 3 Testing Hypothesis

Introduction, Null and Alternative Hypothesis, Type I and Type II Error, The Procedure of Hepothesis Testing, Hypothesis Testing of a Population Mean: Large Sample, Hypothesis Testing of a Population Mean: Small Sample, Hypothesis Test of a Proportion (One Sample), Hypothesis Test of Population Variance, Hypothesis Test of Population Mean: Two Independent Samples(), Hypothesis Test of Population Mean: Dependent Samples (Paired Samples), Hypothesis Test about Two Population Proportion, Hypothesis Teest about Two Population Variances, Analysis of Variance (ANOVA), Nonparametric Test, Sign Test for Paired Data, Wilcoxon Matched Pairs Signed Ranks Test (for n>10 pairs), Mann-Whitney U Test, Kruskal-wallis Tests (H Test).

Unit 4 Examining Relationships

Introduction, Types of Correlation, Karl Pearson Coefficient Correlation, Spearman's Rank Order Correlation, Partial Correlation, Residuals and Plots, Simple Linear Regression, Multiple Regression Model, Repeated Measures, Non-linear Regression, Polynomial Regression Models, Weighted Least Squares, Two Stage Least Squares 1, Structural Equation Modeling.

Unit 5 Advanced Techniques

Identifying Groups: Classification, Probit Analysis, Discriminant Function Analysis, Proportional Odds Models, Decision Trees, Neural Networks, Cluster Analysis, Factor Analysis, Multidimensional Scaling.

Text Books

- **Advanced Statistical Analysis** (IBM ICE Publication)

Reference

- Statistical Data Analysis (Oxford Science Publications) by Glen Cowen
- Statistical Analysis : an Introduction using R.Wikibooks
- Multivariate Statistical Analysis A Conceptual Introduction, 2nd edition by Sam Kash Kachigan
- Handbook of Statistical Analysis and Data Mining Application by Robert Nisbet, John, IV Elder, Gary Miner

Advanced Statistical Analysis Lab Exercises

- Using the preexisting Drinks.sav data file
  Exercise 1: to create standardized (Z-) scores for several variables
- Using the preexisting Census.sav data file
  Exercise 2: To run Frequencies to explore the distributions of several variables.
- Using the preexisting Drinks.sav data file
  Exercise 3: To obtain summary statistics for scale variables
- Using the preexisting Census.sav data file
  Exercise 4: To create two and three-way cross tabulations to explore the relationship between several variables and to use the Chart Builder to visualize the relationship.
- Using the preexisting Census.sav data file
  Exercise 5: To run the Independent-Samples T Test, to interpret the output and visualize the results with an error bar chart.
- Using the preexisting data file Census.sav.
  Exercise 6: To use One-Way ANOVA with post hoc tests to explore the relationship between several variables. You will use the PASW Statistics.
- Using the preexisting data file Bank.sav.
  Exercise 7: To visualize the relationship between two scale variables creating scatterplots and to quantify this relationship with the correlation coefficient.
- Using the preexisting PASW Statistics data file Census.sav.
  Exercise 8: To run linear regressions and to interpret the output
- Using the preexisting data file SPSS_CUST.SAV
  Exercise 9: To use nonparametric tests to explore the relationship between several

Data Warehouse & Multidimensional Modeling		L T P C 3 0 2 4
Goal	**To impart in depth knowledge in Data Warehouse & Multidimentional modelling**	

OBJECTIVES	OUTCOMES
The course enables students to • **Understand the fundamentals of Data Warehousing** • **Learn modelling of datawarehousing** • **Understand the concepts of Multi-Dimensional Modeling and learn the Methodology** • **Learn Non-Temporal Design of R-OLAP** • **Learn Non-Temporal Design of M-OLAP.**	**The students will be able to** • **Have understood the fundamental concepts of data warehousing** • **Develop a model for datawarehousing** • **Do multidimensional modelling of datawarehousing.** • **Design R-OLAP** • **Design M-OLAP**

Unit 1 Introduction to Data Warehousing
Data Warehouse Architectures, A perspective on decision support applications.

Unit 2 Data Warehousing and Modeling
An Introduction to Data Warehouse Modeling, Differentiating the Warehousing model from the OLTP model, Warehouse Modeling Approaches, OLAP – OnLine Analytical Processing, Basic OLAP Operations.

Unit 3 Multi-Dimensional Modeling – Methodology
Requirement Analysis, Requirements modeling, Terminologies in a Multi-dimension Model, Multi-Dimensional Model Structures, Solution Validation Techniques, Detailed Dimension Modeling.

Unit 4 Non-Temporal Design - R-OLAP
R-OLAP and its design techniques, Design techniques of an R-OLAP System, Dimension-Oriented Design techniques, Fact-oriented Design Techniques, Utilize Cubing Services to improve R-OLAP and M-OLAP performance, Cubing Services performance and scalability, Scalability, Cubing Services security, Role-based security in Cubing Services.

Unit 5 Non-Temporal Design - M-OLAP
IBM Cognos Architecture, Sparse and Dense Dimensions – with Hyperion Essbase, MOLAP characteristics, Online Data Analysis MOLAP and ROLAP.

Text Books

- **Data Warehouse & Multidimensional Modeling** (IBM ICE Publication)

References & URLs

- Data Warehousing and Mining :Concepts, Methodologies, Toolls and Applications (Vol I to VI) by John Wang
- The Data Warehouse Toolkit: The Definitive Guide to Dimensional Modeling, 3rd Edition by Ralph Kimball and Margy Ross
- Open Source Data Warehousing and Business Intelligence by Lakshman Bulusu Auerach Pulications
- Data Mining and Data Warehousing by Bharat Bhushan Agarwal and Sumit Prakash ,Tayal Laxmi Publications.

Data Warehouse & Multidimensional Modeling Lab Exercises

- Exercise 1: Introduction to the Case Study
- Exercise 2: Business Requirements for Rental and Sales Analysis
- Exercise 3: Business Requirements for Working Shifts
- Exercise 4: Business Requirements for Customers
- Exercise 4A. Build a snowflake model for the Customer dimension.
- Exercise 4B. Build a Customer dimension table with the same information content as the previously developed snowflake model.
- Exercise 4C. Using any design techniques you know, build an optimum model for the Customer dimension, taking all the available statistics and association properties into account.

Data Mining and Predictive Modeling		L T P C 3 0 2 4
Goal	To provide an in-depth knowledge in data mining and predictive modelling	

OBJECTIVES	OUTCOMES
The course enables students to • To learn, how to develop models to predict categorical and continuous outcomes, using such techniques as neural networks, decision trees, logistic regression, support vector machines and Bayesian network models. • To know the use of the binary classifier and numeric predictor nodes to automate model selection. • To advice on when and how to use each model. Also learn how to combine two or more models to improve prediction	The students will be able to • Understand the process of formulating business objectives, data selection/collection, preparation and process to successfully design, build, evaluate and implement predictive models for a various business applications. • Compare and contrast the underlying predictive modeling techniques. • Select appropriate predictive modeling approaches to identify particular cases to progress with. • Apply predictive modeling approaches using a suitable package such as SPSS Modeler

Unit 1 Introduction to Data Mining

Introduction, What is Data Mining?, Concepts of Data mining, Technologies Used, Data Mining Process, KDD Process Model, CRISP – DM, Mining on different kinds of data, Applications of Data Mining, Challenges of Data Mining.

Unit 2 Data Understanding and Preparation

Introduction, Reading data from various sources, Data visualization, Distributions and summary statistics, Relationships among variables, Extent of Missing Data. Segmentation, Outlier detection, Automated Data Preparation, Combining data files, Aggregate Data, Duplicate Removal, Sampling DATA, Data Caching, Partitioning data, Missing Values.

Unit 3 Model development & techniques

Data Partitioning, Model selection, Model Development Techniques, Neural networks, Decision trees, Logistic regression, Discriminant analysis, Support vector machine, Bayesian Networks, Linear Regression, Cox Regression, Association rules.

Unit 4 Model Evaluation and Deployment

Introduction, Model Validation, Rule Induction Using CHAID, Automating Models for Categorical and Continuous targets, Comparing and Combining Models, Evaluation Charts for Model Comparison, Meta-Level Modeling, Deploying Model, Assessing Model Performance, Updating a Model.

Text Books:

Data Mining and Predictive Modeling (IBM ICE Publication)

References and URLs

- Bruce Ratner, Statistical and Machine-Learning Data Mining, CRC Press, 2011
- Eric Siegel & Thomas H. Davenport, Predictive Analytics, Wiley Publications, 2013
- James Wu and Stephen Coggeshall, Foundations of Predictive Analytics, CRC Press, 2012

Data Mining and Predictive Modeling Lab Exercises

- Exercise 1: Introduction to the Case Study
- Exercise 2: Data Understanding and Preparation
- Exercise 3: Partitioning Data

Descriptive Analytics (Business Intelligence)		L T P C 3 0 2 4
Goal	The course describes the business intelligence concepts and the development of BI us	

OBJECTIVES	OUTCOMES
The course should enable the students to • **Learn the basics of Business Intelligence.** • **Learn dashboards design by utilizing key performance indicators that managers can use to improve day-to-day business operations.** • **To learn how to plan and implement BI development projects.** • **To know the administrative and deployment scenarios & issues in BI space.**	**The student should be able to** • **Understand & appreciate the use of analytical skills and business principles in operational and strategic decision-making by means of BI.** • **Design and develop dashboards.** • **Learn the best practices to work on BI projects.** • **Use IBM Cognos BI tool to develop, implement and administrate wide range of BI artifacts.**

Unit 1 Introduction to Business Intelligence

Business Intelligence (BI), Scope of BI solutions and their fitting into existing infrastructure, BI Components and architecture, BI Components, Future of Business Intelligence, SaaS and Cloud computing techniques, Functional areas of BI tools, End user assumptions, Setting up data for BI, Data warehouse, OLAP and advanced analytics, Supporting the requirements of senior executives including performance management, Glossary of terms and their definitions specific to the field of BI and BI systems.

Unit 2 Elements of Business Intelligence Solutions

Business Query and Reporting, Reporting, Dashboards and Scorecards Development, Development, Scorecards, Metadata models, Automated Tasks and Events, Mobile Business Intelligence, Software development kit (SDK).

Unit 3 Building BI Project

Stages of Business Intelligence Projects, Project Tasks, Risk Management and Mitigation, Cost justifying BI solutions and measuring success, BI Design and Development.

Unit 4 Report Authoring

Building Reports, Building a Report, Drill-up, Drill-down Capabilities.

Unit 5 BI Deployment, Administration and Security

Centralized versus Decentralized Architecture, Phased and Incremental BI road map, Setting early expectations and measuring the results, EPM (Enterprise performance Management), End-User Provisos, OLAP Implementation, Implementation, Data Warehouse Architecture, Predictive Analysis, Text Mining, Authentication, Authorization, Access Permissions, Group and Roles, Single Sign-on (SSO), Data Backup and Restoring.

Text Books

- **Descriptive Analytics (Business Intelligence)** (IBM ICE Publication)

References

- Rajiv Sabherwal and Irma Becerra-Fernandez, Business Intelligence, Wiley Publications (2010)
- Swain Scheps, Business Intelligence For Dummies, Wiley Publications (2011)
- Arshad Khan, Business Intelligence & Data Warehousing Simplified, Mercury learning & information LLC (2012)

Business Intelligence Lab Exercises

- Overview of BI Tool – Cognos Report Studio
- Authoring Reports
- List, Crosstab and Chart Reports
- Grouping and Summarizing data
- Filter, Sort and Calculation

Social, Web and Mobile Analytics		L	T	P	C
Goal	The course is to know the Mobile Analytics, Social and Web analytics	3	0	2	4

OBJECTIVES	OUTCOMES
The course should enable the students to • **Understand Web & Social Analytics and Mobile Analytics** • **Understand KPIs/Metrics** • **Understand management of Social, Web and Mobile Analytics.**	**The student should be able to** • **Learn Social, Web and Mobile analyitcs, and management of Social and Web analytics.**

Unit No. 1 Introduction to Web & Social Analytics
Overview of web & social media. Need of using analytics, Web analytics technical requirements. Social media environment, Impact of social media on business, How to leverage social media for better services, current analytics platforms, Open source vs licensed platform, choosing right specifications & optimal solution

Unit No. 2 Relevant Data & its collection
Participating with people centric approach, organizing for social media, Choosing focused Data sources & Social networks, collecting and understanding social media data, leverage qualitative data by understanding what, why and how much, usability alternatives, web enabled emerging user research, online surveys

Unit No. 3 KPIs/ metrics
Understand the discipline of social analytics, Aligning social objectives with business goals, Identify common social business objectives, developing KPIs; Standard vs Critical metrics. Bounce rate, exit rate, conversion rate, engagement, strategically aligned KPIs, Tactics to find out best web and social media metrics; moving from strategy to execution, build scorecards & dashboards to track KPIs. Measuring Macro & micro conversions, Quantify Economic value, measuring success for non-ecommerce and B2B websites.

Unit No. 4 Manage Web & Social media with Analytics
Explore & evaluate - Dashboard, Relationships, Sentiments, Evolving Topics, Reports, Content creation & tracking, Competitive Intelligence analysis, website traffic analysis, search & keyword analysis, audience identification & segment analysis, Optimizing social media strategy, Social media enablement audit, Understand signals and potential

Unit No. 5 Future of Social Media Analytics and Monitoring
Mashing Up Data from Disparate Sources; Integrate solution to share outcome with others

Unit No. 6 Introduction to Mobile Analytics
Overview, Web Analytics Vs Mobile Analytics, Social media Analytics Vs Mobile analytics, Need of mobile analytics, Basics of mobile computing – Smart phones, mobile browsers, Mobile applications, Bandwidth, transactions, sessions, handset types & operating systems, mobile operators & their services, WAP gateway or GGSN support, APNs or regional POPs support, Architecture components, mobile web-services, overview of mobile cloud

Unit No. 7 Mobile Customer Experience Management
Mobile as next customer experience frontier, Customers expectations, business impact & criticality, Core metrics for deeper behavior analysis, Integration of different channels – SMS, Instant messaging, chatting, apps, HTML5 enabled sites on browsers for unique experience, Multi-chennal campaning optimization, considerations for best mobile services, Location based media & support

Unit No. 8 Mobile Analytics for Content Publishers & Operators
Mobile Handset Analysis, Mobile Handset Screen Resolution - supported screen resolutions of mobile handsets browsing site in terms of page views, visits and visitors, Mobile Operator Analysis - operator names and countries of subscribers browsing your site in terms of page views, visits and visitors. The types of statistics & reports --Bandwidth (total, average per visit, total per file type), Transactions (average per visit, number of downloads, page view breakdown), Sessions (entry page, average duration, click paths, referring search engine), Subscribers (browser type, user agent, operating system), Operating system (iOS, Android, Blackberry, etc), Mobile applications (YouTube, Facebook, Twitter, etc), Content categorisation (Adult, Video, Social, Ad Networks, etc), Handsets (make, model, screen resolution), Mobile Operator (country of origin, operator name), Geo Location (Visitor location tracking, country of origin, RDNS lookup) Referrer tracking, Search term performance, Specific visitor behaviour, Page views per visit by referrer/advert, Time spent on site by referrer/advert,

Unit No. 9 Email marketing
Logs users email address, Cold callers report

Unit No. 10 Data Functionalities

Page views per annum, Data recording timeframe, Data archiving timeframe, Historic comparison, Integration to client platforms through API, HTTPS Support

Text Books:

- **Social, Web and Mobile Analytics** by IBM ICE Publication

Big Data Analytics & Hadoop		L T P C 3 0 2 4
Goal	**The course is to introduces Big Data Analytics & Hadoop**	

OBJECTIVES	OUTCOMES
The course should enable the students to • **To work with unconventional & unstructured data sources like Web server logs, Internet click stream data, social media activity reports, mobile-phone call detail records and information captured by sensors to produce analytics.** • **To understand and use the technologies associated with big data analytics including NoSQL databases, Hadoop and MapReduce.** • **To practice big data operations on IBM Big Insight platform.**	**The student should be able to** • **Understand and appreciate the use-cases & architectural considerations for big data analytics implementation.** • **Learn best practices to extend data warehousing with Hadoop and other big data technologies across business operations and industries to enable big data analytics.**

Unit No. 1 Big Data Concepts

What Is Big Data, Volume, Velocity, and Variety; Why It's Important, Risks Of Big Data, Need Of Big Data, Structure Of Big Data; Exploring Big Data, Filtering Big Data, The Need For Standards; Big Data and Analytics, Adoption Architecture, Benefits & Barriers, Trends for Big Data Analytics

Unit No. 2 Hadoop Fundamentals

Hadoop Architecture, Hadoop File System (HDFS); HDFS Administration ; Map / Reduce concepts; Setup of an Hadoop Cluster ; Managing Job Execution ; move data into Hadoop using Flume, Data Loading ; Overview of workflow engine

Unit No. 3 Query languages for Hadoop

Jaql basics, Jaql data types, Input/output with Jaql, Working with operators and expressions, Use of Pig & Hive

Unit No. 4 Hadoop Reporting and Analysis

Approaches to Big Data reporting and analysis, Big Data Access Technologies for Reporting and Analysis, Business Intelligence and Hadoop Architecture, Direct Batch Reporting on Hadoop, Live Exploration of Big Data, Indirect Batch Analysis on Hadoop

Unit No. 5 Analytics for Big Data at Rest & in Motion

Data Stream overview; Streams Processing Language Basics ;Streams Processing Language Development ; SPL Programming Introduction ; Adapter Operators ; Relational and Utility Operators - The Journey Begins ; Relational and Utility Operators (continued) ; Windowing and Joins ; Punctuation, aggregation and Sorting ; Timing and Coordination ; Lists, Sets, and Maps ; Nodes and Partitions ; Debugging; Adapters and Toolkits.

Text Book:

- **Big Data Analytics** by IBM ICE Publications