Name of Program: BCA with Specialization in Big Data Analytics in Association with IBM

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	THEORY END SEM University Exam	THEORY Two Term Exam	THEORY Teachers Assessment*	PRACTICAL END SEM University Exam	PRACTICAL Teachers Assessment*
BCCA502	Compulsory	Operations Research	3	1	0	4	60	20	20	0	0

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical;   C - Credit;
Q/A – Quiz/Assignment/Attendance, MST - Mid Sem Test.
***Teacher Assessment** shall be based on following components: Quiz/Assignment/Project/Participation in class (Given that no component shall exceed 10 Marks)

Course Objective

- To introduce the students with the Fundamentals of the Operations Research.

Course Outcomes

After the successful completion of this course students will be able to

- Apply the methods of the OR and the LPP.
- Understand and design the graphical test of the LPP with conclusions.
- Know the fundamental principles of the simplex method and the duality.
- Solve the transportation problems.
- Find the solution of the assignment problems.

Unit-I

Introduction to Operations Research & Linear Programming: Introduction, Historical Background, Scope of Operations Research, Features of Operations Research, Phases of Operations Research, Types of Operations Research Models, Operations Research Methodology, Operations Research Techniques and Tools , Structure of the Mathematical Model, Limitations of Operations, Introduction, Linear Programming Problem, Requirements of LPP, Mathematical Formulation of LPP, Case Studies of LPP, Graphical Methods to Solve Linear Programming Problems, Applications, Advantages, Limitations.

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Name of Program: BCA with Specialization in Big Data Analytics in Association with IBM

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	THEORY END SEM University Exam	THEORY Two Term Exam	THEORY Teachers Assessment*	PRACTICAL END SEM University Exam	PRACTICAL Teachers Assessment*
							TEACHING & EVALUATION SCHEME				
BCCA502	Compulsory	Operations Research	3	1	0	4	60	20	20	0	0

Unit-II

Graphical Analysis of Linear Programming Problems: Introduction, Graphical Analysis, Some Basic Definitions, Graphical Methods to Solve LPP, Some Exceptional Cases, Important Geometric Properties of LPP

Unit-III

Simplex Method & Duality in Linear Programming Problem: Introduction, Standard Form of LPP, Fundamental theorem of LPP, Solution of LPP – Simplex Method, The Simplex Algorithm, Penalty Cost Method or Big M-method.

Unit-IV

Transportation Problem: Introduction, Formulation of Transportation Problem (TP), Transportation Algorithm (MODI Method), the Initial Basic Feasible Solution, Moving Towards

Unit-V

Assignment Problem: Introduction, Mathematical Formulation of the Problem, Hungarian Method Algorithm, Routing Problem, Travelling Salesman Problem

TEXT BOOKS:

1. Hillier FS and Liberman GJ; Introduction to Operations Research concept and cases; TMH

2. Srinivasan G; Quantitative Models In Operations and SCM; PHI Learning

3. Taha H; Operations research; PHI

4. Sen RP; Operations Research-Algorithms and Applications; PHI Learning

5. Sharma JK; Operations Research; Macmillan

6. Ravindran , Philips and Solberg; Operations research; Wiley India

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COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BCCA503	Compulsory	Web Designing	3	1	0	4	60	20	20	0	0

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical;   C - Credit;
Q/A – Quiz/Assignment/Attendance, MST - Mid Sem Test.
***Teacher Assessment** shall be based on following components: Quiz/Assignment/Project/Participation in class (Given that no component shall exceed 10 Marks)

Course Educational Objectives (CEOs):

- To provide an introduction to the fundamental concepts of HTML and PHP.
- To familiarize with web designing

Course Outcomes (COs): The student will be able to:

- Learn about basic Internet Knowledge.
- Understand how to develop static webpage.
- Develop static Website.
  Develop dynamic WebPages using PHP

Syllabus:

UNIT-I

Introduction to HTML

HTML, HTML document structure tags, HTML text formatting tags, Inserting Special characters, Anchor tag, List tag, Adding images and sound.

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							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BCCA503	Compulsory	Web Designing	3	1	0	4	60	20	20	0	0

UNIT-II

Advanced HTML

Tables, Frames and floating, developing forms.

UNIT-III

CSS (Cascading Style Sheet)

Introduction to CSS, Need of designing in HTML pages, Tag structure, various selectors (ID, class), various properties of font and div tag.

UNIT-IV

Introduction to PHP

Introduction to PHP, Data Types, Variables, Expressions and Operators, Flow-Control Statements, Including Code, Embedding PHP in Web Pages, Functions, Variable Functions, Anonymous Functions, Strings, String Manipulation, Regular Expressions, Arrays, Multidimensional Arrays,Traversing Arrays, Sorting, Acting on Entire Arrays.

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COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME					
							THEORY			PRACTICAL		
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*	
BCCA503	Compulsory	Web Designing	3	1	0	4	60	20	20	0	0	

UNIT-V

Data Access & Error Handing

Web Techniques, HTTP Basics, Server Information, Processing Forms, Setting Response Headers, Maintaining State, Databases, Using PHP to Access a Database, Security, Session Fixation, File Uploads, File Access, PHP Code, Handling Output, Error Handling.

Text Books:
1. Php, Mysql and Apache – Julie c. Meloni, Sams publishing,Fifth Edition,(8June 2012)
2. Introduction to Internet and HTML scripting – Bhaumik Shroff ,Ahmedabad Books India,Third Edition
3. Web Technology and design – C Xavier, New Age International,2007
4. Beginning HTML and CSS-Rob Larsen,2013
5. Learning PHP, MySQL, Javascript, CSS and HTML-Robin Nixon,Fourth Edition

Reference Books:
1. HTML & CSS Design and Build Websites -Jon Ducket,18 November 2011
2. The Essential Guide to CSS and HTML Web Design-Craig Grannell, Apress,Third Edition,9 March 2008
3. PHP: The Complete Reference-Steven Holzner, 1 July 2017.
4. HTML & CSS: The Complete Reference-Thomas A Powell, Mcgraw Hill, Fifth Edition
5. HTML 5 Black Book-DT Editorial Services, Second Edition,2016

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SEMESTER VII

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTIBMC7 01	DCC	Web Services	60	20	20	0	0	2	0	0	2

Legends: L - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
*Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):

1. To explain the importance of Web Services and Use of XML JAXB and using SOAP and REST Web Services
2. To learn the importance of Spring Boot and JAVA in Web Services
3. Be able to use POSTMAN accessing dummy URLs as well as self created URLs
4. Able to Secure Web Service using Transport layer and Application Level Security

Course Outcomes (COs):

After completion of this course the students are expected to be able to demonstrate following knowledge, skills and attitudes.
The students will be able to

1. Understand the use of SOAP and REST web services in Enterprises from a global context.

2. To understand and Write SOAP web services from industry perspective of Web Services.

3. Applying and analyzing Restful Web Services.

4. To evaluate the application of REST Web Services in university environment by Using JAX-RS and JAX-WS API's in java.

5. Creating and Securing Web Services by Using Transport and Application level Security. Creating projects and research activities based on SOAP & REST API.

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SEMESTER VII

SUBJECT CODE	Category	SUBJECT NAME	THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTIBMC701	DCC	Web Services	60	20	20	0	0	2	0	0	2

Legends: L - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
*Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Syllabus

Unit-I   **10HRS**
WEB SERVICES INTRODUCTION
Introduction to XMl what is Web Services? Why Web Services? Web Services Fundamentals Services Oriented Architecture; HTTP and XML and SOAP WSDL; UDDI; REST; SOAP vs REST JAXB Overview; JAXB Binding Process;

Unit-II   **9HRS**
INTRODUCTION TO SOAP
SOAP Overview; SOAP Message Exchange Model; Data Encoding, Installing and Configuring Apache SOAP; Server and Client Program; Deployment Descriptor, Describing Web Services with Example; Anatomy of a services; Defining Data types and structures with XML Schemas; Describing Web Services Interface and Implementation; Understanding Message patterns.

Unit-III   **8HRS**
JAVA API FOR RESTFUL SERVICES
Introduction to JAVA API; REST and HTTP; Resource URI; Collection URIs; Method Idempotence; What is JAX-RS Introduction to UDDI; UDDI Registry; Technical Architecture; Using UDDI with WSDL.
Dispatching Request to Methods
Creating a Resource; Returing XML Responses; Installing REST API Client; Building Services Stubs; Accessing Path Params; Returning JSON Response; Implementing POST Update and Delete Methods; Pagination and Filtering.

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SEMESTER VII

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTIBMC701	DCC	Web Services	60	20	20	0	0	2	0	0	2

Legends: L - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P –** Practical; **C** - Credit;

*Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Unit-IV   **7HRS**

REST API USING JAVA CLIENT JAX-RS
The Param Annotation; Sending Status codes and location Headers; Handling Exception; Using Web- Application Exception; Content Negotiation and Content Negotiation using HTTP Headers; Content Negotiation using URIs Patterns JAX-RS Client; Creating JAVA Client using JAX-RS; Sending GET/POST Request using JAVA Client.

Unit-V   **8HRS**

WRITING SOAP SERVICES
Initialize a Spring Web Service Application with Spring Boot; Overview of creating SOAP Web Service using Contract First Approach; Define Request and Response XML Structure; Define XSD for Request and Response; Introduction to JAXB and configuration. What are **Secure Web Services?**; Transport Level Security and Application Level Security. **Future of Web Development;** Future of SOAP WSDL and UDDI. PROJECT
Create and execute a SOAP project using WSDL. Following should be done on the project:
  I.   Creating SOAP project- adding WSDL during creation or after it is created.
  II. Request and Response verification.

Text Books:
  1. IBM Courseware
  2. IBM Knowledge Center
  3. RESTful Web Services by Leonard Richardson O'Reilly Media

References:
  1. Core Java, Collection Framework IBM Knowledge Center.

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							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BCCA504	Compulsory	IT Infrastructure Management	3	1	0	4	60	20	20	0	0

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***Teacher Assessment** shall be based on following components: Quiz/Assignment/Project/Participation in class (Given that no component shall be exceed 10 Marks)

Course Educational Objectives (CEOs):

- To understand basics of IT infrastructure and management and technical & management issues in current infrastructure.
- To pick up information technology, business administration, and electronic commerce management.
- To get acquainted knowledge about storage management and recovery.
- To demonstrate knowledge of data center technology and virtualization.
- To provide understanding of information security, ethical hacking, and computer forensics.

Course Outcomes (COs): After the successful completion of this course students will be able to:
- Acquire a wealth of information about IT infrastructures.
- Understand IT and management techniques and how to build more reliable, faster applications that are better manageable.
- Understand concepts and methods of storage management.
- Get more insight in to the data center technology.
- Get more understanding with security concepts and its management in IT.

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							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BCCA504	Compulsory	IT Infrastructure Management	3	1	0	4	60	20	20	0	0

Syllabus:

UNIT-I

IT infrastructure: introduction, infrastructure management activities, evolutions of systems and their management, growth of internet, information system design, IT service management process, current business demands and IT system issue, IT infrastructure management, attributes and benefits of IT service management

UNIT-II

Information Technology Infrastructure Library (ITIL), Introduction to the design process for information systems, IT service continuity management, capacity management, availability management, approaches for organization Management, Models in IT system design, IT management systems

UNIT-III

Introduction to storage, storage archive and retrieve, types of storage management, benefits of storage management, space management, hierarchical storage management, network attached storage, storage area network, disaster recovery, space management, database and application protection, Bare Machine Recovery (BMR), data retention, backup and recovery.

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BCCA504	Compulsory	IT Infrastructure Management	3	1	0	4	60	20	20	0	0

UNIT-IV

Data center infrastructure design and architecture, elements and functions of data center, data center design models, network management, data center security, packet filtering, access layer, security for multi-tier server farms, virtual data center, virtual data center management, remote management

UNIT-V

Security management, computer security, internet security, physical security, identity management, access control, intrusion detection, IT ethics, intellectual property, privacy and law, computer forensics, ethics and internet, cyber crimes

Text Books:

1. Phalguni Gupta, Surya Prakash, UmaraniJayaraman, "IT Infrastructure and Its Management", Tata McGraw Hill Education, 2010
2. SjaakLaan, "IT Infrastructure Architecture - Infrastructure Building Blocks and Concepts", Lulu Press Inc., 2nd Edition, 2013
3. Manoj Kumar Choubey, SaurabhSinghal, "IT Infrastructure and Management", Pearson Education, 1st Edition, 2012
4. Munesh Chandra Trivedi, Ashish N. Jani, Kamaljit I. Lakhtaria, Amit B. Kalyani, "Information Technology Infrastructure & Its Management", Khanna Publishing, 1st Edition, 2014
5. Anita Sengar, "IT Infrastructure Management", S.K. Kataria and Sons, 4th Edition, 2012

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COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BCCA515	Elective	Recent Information Technology Trends	3	1	0	4	60	20	20	0	0

Legends: L – Lecture; T – Tutorial/Teacher Guided Student Activity; P – Practical; Q/A – Quiz/Assignment/Attendance; MST – Mid Semester Test.

*Teacher Assessment shall be based on following components: Quiz/Assignment/Project/Participation in class activities, given that no component shall exceed more than 10 marks

Course Educational Objectives (CEOs):

Objective of the course is to help the students to acquire knowledge regarding the current trends in Information Technology.

Course Outcomes (Cos): Students will be able to

- Develop knowledge about the recent technologies, their applications and working.
- Enhance the knowledge about various technologies such as, Cloud Computing, Wireless Computing, e-Business, AI, robotic, virtual reality etc.
- Understand importance of green computing.

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							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BCCA515	Elective	Recent Information Technology Trends	3	1	0	4	60	20	20	0	0

Syllabus:

UNIT -I

Cloud Computing: Introduction, Components, Working of Cloud Computing and various models used in cloud computing.

Wireless Computing: Introduction, Wireless Computing Fundamentals and applications of Wireless Computing.

UNIT –II

E-Commerce: Fundamentals, Architecture and Models (B2B, B2C, C2C, C2B), Electronic Payment System: Types and Process, Introduction and advantage of Internet Advertising

UNIT -III

Artificial Intelligence - Introduction to AI and types of techniques involved into it, Robotics.
Virtual Reality: Introduction and its applications with examples.

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							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BCCA515	Elective	Recent Information Technology Trends	3	1	0	4	60	20	20	0	0

UNIT- IV
Green Computing: Introduction to Green Computing, Saving Energy on a Machine, Networking Components, Clusters and Data Centers,

UNIT-V

Major Green Initiatives: Sustainable IT, Green Business, Smarter Plant , Computing Technology for Energy Efficiency of other Physical Systems, Open Challenges, Major Players etc.

Text Books

- Denis Rothman, Artificial Intelligence By Example: Develop machine intelligence from scratch using real artificial intelligence use cases, Packt Publishing Limited (31 May 2018)
- Pankaj Arora, Raj Biyani, Salil Dave, To the Cloud: Cloud Powering an Enterprise, McGraw-Hill Education; 1 edition ,January 20, 2012.
- Bud E. Smith, Green Computing: Tools and Techniques for Saving Energy, Money, and Resources, Auerbach Publications1st Edition, September 18, 2018
- Gaurav Gupta, Sarika Gupta, E-Commerce, Khanna Publishing; Second edition (2015)
- Jim Blascovich And Jeremy Bailenson, Infinite Reality: The Hidden Blueprint of Our Virtual Lives , Harper Collins Publications, 2011
- Howard Rheingold , Virtual Reality: The Revolutionary Technology of Computer-Generated Artificial Worlds - and How It Promises to Transform, Touchstone, 2008

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							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BCCA525	Elective	Information Systems for Management	3	1	0	4	60	20	20	0	0

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Q/A – Quiz/Assignment/Attendance, MST - Mid Sem Test.
*Teacher Assessment shall be based on following components: Quiz/Assignment/Project/Participation in class (Given that no component shall exceed 10 Marks)

Course Educational Objectives (CEOs):

- To develop an understanding among the students about and the role of Information System with its importance and role in society and organizations

- To develop an understanding among the students about MIS, its architecture with importance and various stages involved in MIS development.

- To understand the concept of Systems development life cycle (SDLC), BPR and ERP.

- To introduce about virtual organization concept, information security and cyber law.

- Make the students capable to identify, conceptualize, and develop solutions as a group for successful information systems management and present them.

- Make the students aware about concept of data mining, Business Intelligence (BI), Data Warehousing, Online Analytical Processing (OLAP) and Online transaction processing (OLTP).

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							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BCCA525	Elective	Information Systems for Management	3	1	0	4	60	20	20	0	0

Course Outcomes (Cos): At the end of the course, it is expected that students will be able to

- Understand the activities that are undertaken in acquiring an Information System in an organization.
- Understand Management Information Systems (MIS) and their role in today's organizations.
- Identify how MIS shapes and controls current (or prospective) jobs and how to use this insight to improve your own job performance and satisfaction and enhance future career prospects.
- Become familiar with the concept of BPR and ERP.
- Identify importance of data mining, Business Intelligence (BI), Data Warehousing, Online Analytical Processing (OLAP) and Online transaction processing (OLTP).

Syllabus:

UNIT-I

Introduction to Information Systems: Introduction to basic system concepts and its types, Data Vs Information, definition and Concept of an information system, Characteristics and Value of Information, Information System Resources, Importance of Information system for decision making and strategy building, Role of Information Systems in Society and organization, Constraints and Limitations of Information System.

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							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BCCA525	Elective	Information Systems for Management	3	1	0	4	60	20	20	0	0

UNIT-II

Introduction to MIS: Management, Information, System, Concepts of management information system, MIS evolution, MIS architecture, Need for MIS, functions of MIS, Planning techniques of MIS, Limitations of MIS, Types of Information System: Transaction Processing Systems, Office Automation Systems, Decision Support Systems, Executive Information System.

UNIT-III

Development of Information System: Different steps in Systems development life cycle (SDLC) like Planning, Analysis, Design, Implementation, maintenance and review.

Management of Enterprise Resources: Enterprise Resource Planning (ERP): Introduction and Implementation of ERP. Business process reengineering (BPR): Introduction and Process of BPR.

UNIT-IV

Management Trends: Trends in management and organizations, movement towards flexible, virtual organizations with advantages and disadvantages, MIS and mobile computing, MIS and social media. Information security and cyber law: Introduction.

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COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BCCA525	Elective	Information Systems for Management	3	1	0	4	60	20	20	0	0

UNIT-V

Data Mining: Introductions and name of its applications. Business Intelligence (BI): introduction, features and name of tools used for decision making, Data Warehouse: Introduction, features and name of applications, Introduction of Online Analytical Processing (OLAP) and online transaction processing (OLTP).

Text Books:

1. Kenneth C. Laudon& Jane P. Laudon (2019), 'Essentials of Management Information Systems', Pearson Prentice-Hall, 13th Edition.
2. James, A. O'Brien (2017). "Introduction to Information Systems", Tata McGraw Hill , 1 2th Edition.
3. 3.Goyal, D.P. (2014). "Management Information Systems:Managerial Perspectives", Macmillan India Ltd.
4. 4. McNurlin, Sprague &Bui(2009), "Information Systems Management in Practice", Prentice Hall, 8 th Edition.
5. Jawadekar, W. S. (2004). "Management Information Systems", Tata McGraw Hill.

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SEMESTER VI

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	THEORY END SEM University Exam	THEORY Two Term Exam	PRACTICAL Teachers Assessment*	PRACTICAL END SEM University Exam	PRACTICAL Teachers Assessment*
BTIBM601	UG	Micro services Architecture and Implementation	3	0	2	4	60	20	20	30	20

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;
*Teacher Assessment shall be based on following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Objectives:
Students will acquire knowledge on:
1. Understand the importance of Microservices and describe its need as an Architecture Implementation.
2. Understand strengthen the understanding of basic concepts of Docker and Kubernetess.
3. Understand the Html and its Tags
4. Understand CSS and how we implement in html
5. Be able to Deploy application on docker and Access the Kubernetess

Course Outcomes:
At the end of the mobility period, students will be able to:
1. Make an application using nodejs
2. Run docker commands
3. Deploy container and pods on kubernets.

Syllabus:
UNIT–I
css and JavaScript:
Understand JavaScript and DOM and BOM , Understand Server side Application, Understand NoSQL (MongoDb), Deployment of Nodejs application

UNIT–II
Server side nodejs:-Key features of NodeJS, Installation and Configuration, NodeJS Command Line, Sample Project using Node Express command prompt, Nodeclipse plugin, Sample Project using Nodeclipse, Performing CRUD Operations,Key features of MongoDB, Connection Pooling using NodeJS Mongo driver,Dockerarchitecture,Virtual machines versus containers, about containers.

UNIT–III
Docker: A shipping container for code, Benefits of using containers, Docker basic concepts, Docker shared and layered file systems technology. Deployment of container, Learn the concept of kubernetes, Learn how to run Docker command, Understand pods and cluster Container ecosystem,

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Vishwavidyalaya, Indore	Vishwavidyalaya, Indore		

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UNIT–IV

Kubernetess, Container, orchestration, Kubernetess architecture, Master Node Components, Worker Node Components, Kubernetess Building Blocks, Images, Immutability, Pod, Config Maps & Secrets, Deploying Applications on Kubernetess, Pod Health Checking, Kubectl Commands

UNIT–V

Cloud Application Component Architecture, Benefits of using Kubernetess with IBM Containers, About Microservices ,monolithic application, microservice security, api management and gateways, the future of microservices, microservices governance

TEXT BOOKS:
1. Sam Newman ,‖Building Microservices‖, O'Reilly Media
2. Ajay Sharma,—Microservices Architecture‖, Kindle Edition
3. IBM Career education Microservices Architecture and Implementation

REFERENCES:
1. Eberhard Wolff ,—Microservices — A Practical Guide‖, Korean translation
2. Martin Kleppmann ,‖Designing Data-Intensive Applications‖, O'Reilly Media

Video Lectures
1. https://www.youtube.com/watch?v=dD2EISBDjWM&list=PLr6-GrHUIVf_ZNmuQSXdS197Oyr1L9sPB
2. https://www.youtube.com/watch?v=0afZj1G0BIE&t=38s
3. https://www.youtube.com/watch?v=Ukg_U3CnJWI&t=15s
4. https://www.youtube.com/watch?v=TlB_eWDSMt4
5. https://www.youtube.com/watch?v=voDummz1gO0
6. https://www.youtube.com/watch?v=lktzQrHQcYU
7. https://www.youtube.com/watch?v=I4zWlW93-V4

LIST OF EXPERIMENTS:
1. Design a static web application using html and CSS.
2. Wap program to define variable ,control structure in JavaScript
3. Define Function in JavaScript and understand message and link.
4. Wap for window in JavaScript and its objects. Create a gauge report and a pie chart repor
5. Design application using nodejs and configure node-eclipse.
6. Connectivity with mongo DB nodejs app
7. Docker Commands
   a. Listing Running Containers
   b. Restarting Stopped Containers
   c. Retrieving Log Outputs
   d. Container Isolation
   e. Creating Docker Images

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    f. Building a Dockerfile
    g.   Copying Build Files

8   Kubernetesss Cluster Demo

9   VM Creation in Google Cloud Platform – Demo

10 Minikube on local machine

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Name of Program: BCA with Specialization in Big Data Analytics in Association with IBM

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							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BCCA506	Compulsory	Lab-I (JAVA Lab)	0	0	4	2	0	0	0	30	20

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical;   C - Credit;
Q/A – Quiz/Assignment/Attendance, MST - Mid Sem Test.
*Teacher Assessment shall be based on following components: Quiz/Assignment/Project/Participation in class (Given that no component shall exceed 10 Marks)

Course Education Objectives (CEOs):

- Students must be able to understand fundamentals of programming such as variables, conditional and iterative execution, methods etc.
- Students must be able to understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries etc.
- Students must have the ability to write a computer program to solve specified problems.
- Students must be able to use the Java SDK environment to create, debug and run simple Java programs.

Course Outcomes (COs): After the successful completion of the course students will be able to perform the following tasks:

- Write, compile, and execute Java programs that may include basic data types and control flow constructs using Integrated Development Environments (IDEs) such as Eclipse, NetBeans, and JDeveloper.
- Write, compile and execute Java programs using object oriented class structures with parameters, constructors, utility and calculations methods including inheritance, test classes and exception handling.
- Write, compile and execute Java programs using arrays and recursion, manipulating Strings and text documents.
- Write, compile and execute Java programs that include GUIs and event driven programming.
- Write a final project that may be selected from among the following: applets for inclusion in web pages; applets to access enterprise data bases in robust, enterprise three level applications; secure communications over the internet; or an approved project chosen by the student.

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List of Experiments:

1. Write a Java program that prompts the user for an integer and then prints out all prime numbers up to that integer.
2. Write a Java program that checks whether a given string is a palindrome or not. Ex: MADAM is a palindrome.
3. Write a Java program for sorting a given list of names in ascending order.
4. Write a Java Program that reads a line of integers, and then displays each integer, and sum of all the integers (use StringTokenizer class).
5. Write a Java program that reads a file and displays the file on the screen, with a line number before each line.
6. Write a Java program that displays the number of characters, lines and words in a text file.
7. Write a Java program for creating multiple threads
   a) Using Thread class.
   b) Using Runnable interface.
8. Write a Java program that illustrates how run time polymorphism is achieved.
9. Write a java program that illustrates the following
   a) Creation of simple package.
   b) Accessing a package.
   c) Implementing interfaces.
10. Write a java program that illustrates the following
    a) Handling predefined exceptions.
    b) Handling user defined exceptions .
11. APPLETS
    a) Working with Frames and various controls.
    b) Working with Dialogs and Menus.
    c) Working with Panel and Layout.
    d) Incorporating Graphics.
    e) Working with colours and fonts.

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12. SWINGS

Jpanel- Jframe – Jtoolbar—JwindowFramework

Text Books:

1. Patrick Naughton and HerbertzSchildt, "Java-2: The Complete Reference", TMH, 5theditio, 2002.
2. Bill Venners, "Inside Java Virtual Machine", TMH, 2nd edition.
3. Rick Darnell, "HTML 4 unleashed", Techmedia Publication, 2000
4. Shelley Powers, "Dynamic Web Publishing", 2nd edition, Techmedia, 1998.
5. Paul Dietel and Harvey Deitel, "Java How to Program", PHI, 8th edition, 2010.

Reference Books:

1. E. Balagurusamy, "Programming with Java: A Primer", TMH, 1998.
2. Horstmann, "Computing Concepts with Java 2 Essentials", John Wiley.
3. Decker and Hirshfield, "Programming Java: A Introduction to Programming Using JAVA", Vikas Publication, 2000.
4. N.P. Gopalan and J. Akilandeswari, "Web Technology- A Developer's Perspective", PHI, 2nd edition
5. Eric Jendrock, Jennifer Ball, Debbei Carson, "The Java EE5 Tutorial", Pearson, 3rd edition, 2007.
6. Daniel Liang, "Introduction to Java Programming", Pearson, 7th edition, 2010.

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BCCA507	Compulsory	Lab-II (Web Designing Lab)	0	0	4	2	0	0	0	30	20

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(Given that no component shall exceed 10 Marks)

Course Educational Objectives (CEOs):
- To provide an introduction to the fundamental concepts of HTML and PHP.
- To familiarize with web designing

Course Outcomes (COs):: The student will be able to:

- learn about basic Internet Knowledge.
- understand how to develop static webpage.
- develop static Website.
- develop dynamic WebPages using PHP

List of Practical for HTML
1. How to develop a simple webpage.
2. Develop a webpage using different HTML tags.
3. Develop a webpage using Table tag.
4. Develop a webpage using Frame tag.
5. Develop a webpage using Form tag
6. Develop a static website using HTML tags.

List of Practical for PHP
1. Write PHP program to print "Hello World" on the screen.
2. Write PHP program to create a variable and assign value to the variable.
3. Write a program using string operator.
4. Write a program to find the length of string.

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5. Write a program using strops () function.
6. Make a program using operators in PHP.
7. Write a program using If…Else statement.
8. Write a program using Numeric array, Associate array and Multidimensional array
9. Write a program using While, for and do…while looping statement.
10. Write a program using switch statement.
11. Write a program that writes name when function is called.
12. Create a Form using PHP.
13. Create a connection to a MYSQL database.
14. Create an ODBC connection.
15. Make one application using PHP for select, Insert, Update and Delete from the Database.

Text Books:

1. Php, mysql and apache – Julie c. Meloni.
2. Introduction to Internet and HTML scripting – BhumikShroff.
3. Web Technology and design – C Xavier

Reference Books:

1..HTML& CSS Design and Build Websites Jon Ducket
2. The Essential Guide to CSS and HTML Web Design-Craig Grannell
3.PHP: The Complete Reference.

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