Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Information Technology

B.Tech. (CSE-Big Data Analytics-IBM)

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SEMESTER VII

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BBAI501	**AECC**	**Human Values and Professional Ethics**	60	20	20	0	0	4	0	0	4

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):

The objective of the course is to disseminate the theory and practice of moral code of conduct and familiarize the students with the concepts of "right" and "good" in individual, social and professional context.

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. Help the learners to determine what action or life is best to do or live.
2. Right conduct and good life.
3. To equip students with understanding of the ethical philosophies, principles, models that directly and indirectly affect business.

Syllabus

Unit I Human Value 10HRS

1. Definition, Essence, Features and Sources
2. Sources and Classification
3. Hierarchy of Values
4. Values Across Culture

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Unit II **9HRS**

1. Definition, Moral Behavior and Systems
2. Characteristics of Moral Standards
3. Values Vs Ethics Vs Morality
4. Impression Formation and Management

Unit-III **8HRS**

1. Leadership, Characteristics
2. Leadership in Business (Styles), Types of Leadership (Scriptural, Political, Business and Charismatic)
3. Leadership Behaviour, Leadership Transformation in terms of Shastras (Upanihads, Smritis and Manu-smriti).

Unit-IV **7HRS**

1. Business Ethics its meaning and definition
2. Types, Objectives, Sources, Relevance in Business organisations.
3. Theories of Ethics, Codes of Ethics

Unit-V **8HRS**

1. Sources of Indian Ethos & its impact on human behavior
2. Corporate Citizenship and Social Responsibility – Concept (in Business),
3. Work Ethics and factors affecting work Ethics.

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Suggested Readings

1. Beteille, Andre (1991). ***Society and Politics in India***. AthlonePress:New Jersey.
2. Chakraborty, S. K. (1999). ***Values and Ethics for Organizations***. oxford university press
3. Fernando, A.C. (2009). ***Business Ethics - An Indian Perspective .***India: Pearson Education: India
4. Fleddermann, Charles D. (2012). ***Engineering Ethics***. New Jersey: Pearson Education / Prentice Hall.
5. Boatright, John R (2012). ***Ethics and the Conduct of Business.***Pearson. Education: New Delhi.
6. Crane, Andrew and Matten, Dirk (2015). ***Business Ethics***. Oxford University Press Inc:New York.
7. Murthy, C.S.V. (2016). Business ***Ethics – Text and Cases***. Himalaya Publishing House Pvt. Ltd:Mumbai

8. Naagrajan, R.R (2016). ***Professional Ethics and Human Values***. New Age International Publications:New Delhi.

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BTCSIBM601	DCC	Fundamental of Compiler Design	60	20	20	30	20	2	0	2	3

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 introduce the major concept areas of language translation and compiler design
2. To enrich the knowledge in various phases of compiler and its use
3. To provide practical programming skills necessary for constructing a compiler

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. Ability to apply the knowledge of lex tool &yacc tool to develop a scanner & parser
2. Ability to design and develop software system for backend of the compiler
3. Ability to comprehend and adapt to new tools and technologies in compiler design

Syllabus

Unit-I 10HRS

Introduction to Compiling: Compilers–Analysis of the source program**,** Phases of a compiler**,** Cousins of the Compiler, Grouping of Phases and Compiler construction tools, Lexical Analysis, Role of Lexical Analyzer, Input Buffering, Specification of Tokens.

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Unit-II **9HRS**

Syntax Analysis: Role of the parser, Writing Grammars, Context-Free Grammars, Top Downparsing, Recursive Descent Parsing, Predictive Parsing, Bottom-up parsing, Shift Reduce Parsing, Operator Precedent Parsing, LR Parsers, SLR Parser – Canonical LR Parser – LALR Parser.

Unit-III **8HRS**

Intermediate Code Generation: Intermediate languages**,** Declarations, Assignment Statements, Boolean Expressions, Case Statements, Back patching, Procedure calls.

Unit-IV **7HRS**

Code Optimization and Run Time Environments: Introduction, Principal Sources of Optimization, Optimization of basic Blocks, DAG representation of Basic Blocks - Introduction to Global Data Flow Analysis, Runtime Environments, Source Language issues, Storage Organization, Storage Allocation strategies, Access to non-local names, Parameter Passing, Error detection and recovery.

Unit-V **8HRS**

Code Generation: Issues in the design of code generator, The target machine, Runtime Storage management, Basic Blocks and Flow Graphs, Next-use Information, A simple Code generator, Peephole Optimization.

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Text Books:

1. Alfred V. Aho, Jeffrey D Ullman, “Compilers: Principles, Techniques and Tools”, Pearson
2. Education Asia, 2012
3. Jean Paul Tremblay, Paul G Serenson, "The Theory and Practice of Compiler Writing", BS Publications, 2005
4. Dhamdhere, D. M., "Compiler Construction Principles and Practice", 2nd edition, Macmillan India Ltd., New Delhi, 2008

References:

1. Allen I. Holub, “Compiler Design in C”, Prentice Hall of India, 2003
2. C. N. Fischer and R. J. LeBlanc, “Crafting a compiler with C”, Benjamin Cummings, 2003
3. HenkAlblas and Albert Nymeyer, “Practice and Principles of Compiler Building with C”, PHI, 2001
4. Kenneth C. Louden, “Compiler Construction: Principles and Practice”, Thompson Learning, 2003

List of Experiments:

1. To study the Lex Tool.
2. To study the Yacc Tool.
3. Write a program to implement Lexical Analyzer to recognize few patterns of C.
4. Write a program to implement the Recursive Descent Parser.
5. Write a program to implement the Computation of FIRST and FOLLOW of variables of grammar.

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6. Write a program to compute the leading and trailing symbols of grammar.
7. Write a program to implement Operator Precedence Parser.
8. Write a program to implement SLR parser.
9. Write a program to check the data types.
10. Write a program to implement the generation of three address code.
11. Write a program to implement the computation of postfix notation.
12. Write a program to implement the computation of Quadruple

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BTIBMB701	DCC	Planning Analytics	60	20	20	0	0	2	0	0	2

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Course Educational Objectives (CEOs):

1. To understand the role of planning analytics in decision-making processes.
2. To apply data cleansing, transformation, and validation techniques.
3. To create and optimize data models using planning analytics tools.
4. To build forecasting models using planning analytics tools.
5. To conduct scenario analysis to evaluate different planning scenarios.

Course Outcomes (COs):

The students will be able to

1. Utilize key features of the planning analytics software.
2. Applying exploratory data analysis and visualization techniques for insights generation
3. Incorporate predictive analytics for enhanced planning and decision-making.
4. Utilize optimization techniques to maximize resource allocation and efficiency.
5. Design performance monitoring dashboards and reports.

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BTIBMB701	DCC	Planning Analytics	60	20	20	0	0	2	0	0	2

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Syllabus

UNIT-I: Planning Analytics, Data Acquisition and Preparation: 12HRS

Introduction of Planning Analytics, Roles of Planning Analytics in Decision-Making Process, Key Features of the Planning Analytics Software, Benefits and Applications of Planning Analytics in Different Industries. Identify and Acquire Relevant Data Sources for Planning Analytics. Apply Data Cleansing, Transformation, and Validation Techniques to Ensure Data Integrity and Consistency for Effective Planning Analytics.

UNIT-II: Data Modeling and Analysis: 8HRS

Principles of Data Modeling for Planning Analytics. Create and Optimize Data Models using Planning Analytics Tools. Exploratory Data Analysis and Visualization Techniques to Generate Insights.

UNIT-III: Forecasting and Predictive Analytics 8HRS

Understanding Different Forecasting Methodologies and Techniques. Build Forecasting Models using Planning Analytics Tools. Application of Predictive Analytics in Enhancing Planning and Decision-Making.

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BTIBMB701	DCC	Planning Analytics	60	20	20	0	0	2	0	0	2

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UNIT-IV: Scenario Analysis and Optimization: **8HRS**

Conduct Scenario Analysis to Evaluate Different Planning Scenarios. Utilize Optimization Techniques to Maximize Resource Allocation and Efficiency. Interpret and Present Results to Support Decision-Making Processes.

UNIT-V: Performance Monitoring and Reporting: **8HRS**

Design Performance Monitoring Dashboards and Reports to Track Planning Analytics Outcomes. Leverage Key Performance Indicators for Tracking and Evaluation. Automate Reporting Processes for Timely and Accurate Insights Delivery.

Text Books:

1. IBM Courseware
2. IBM Knowledge Center

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BTIBMA702	DCC	Deep Learning	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 provide an overview of an exciting field of Deep Learning
2. Develop an understanding of the complete process of deep learning project and its near term future direction
3. To introduce the tools required to manage and analyse deep learning project like: Jupyter Notebook and tensor flow.
4. To teach the fundamental techniques and principles in achieving deep learning with scalability and streaming capability.
5. To enable students to have skills that will help them to solve complex real-world problems in for business decisions with neural networks.

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 concept of Deep Learning from a global context.
2. To understand and apply Neural Networks in Market perspective of Deep Learning Projects. Applying and analyzing architecture of Convolution Neural Networks to achieving data learning models.
3. Be able to design and implement recurrent neural network and LSTM systems.
4. Be able to design and implement RBM sand understand auto encoders concept in deep learning. Be able to design and implement various Neural Networks model in a range of real-world applications. Creating projects and research activities based on Neural Networks Deep Learning using Python.

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BTIBMA702	DCC	Deep Learning	60	20	20	0	0	2	0	0	2

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Syllabus

Unit-I **10HRS**

Introduction to Deep Learning

Why Deep Learning? Introduction to Neural Networks. Neural Network Architecture. Full-cycle of a Deep Learning Project. Activation Functions. Forward and Backward Propagation. Loss function and optimization functions.

Unit-II **9HRS**

Convolutional Networks

Introduction to convolutional networks. CNN Architecture. Understanding Convolutions. CNN for Classification.

Unit-III **8HRS**

Recurrent Neural Network

Introduction to RNN model. What is Sequential Problem? The LSTM model

Unit-IV **7HRS**

Restricted Boltzmann Machines and Auto encoders

Introduction to RBMs. Training RBMs. Introduction to auto encoders. Structures of auto encoders.

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Unit-V **8HRS**

PROJECT

Research Activities on Deep Learning with projects and research letters.

Text Books:

1. Deep Learning with Python by François Chollet
2. Hands-On Machine Learning with Scikit-Learn, Keras and Tensor Flow: Concepts, Tools and Techniques to Build Intelligent Systems by Aurelien Geron
3. Deep Learning (Adaptive Computation and Machine Learning series)by Ian Goodfellow

References:

1. Machine learning with Tensor Flow For Dummies by Matthew Scarpino
2. Machine Learning for Big Data: Hands-On for Developers and Technical Professionals" by Jason Bell.

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BTIBMC701	**DCC**	**Web Services**	60	20	20	0	0	2	0	0	2

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Course Educational Objectives (CEOs):

6. To explain the importance of Web Services and Use of XML JAXB and using SOAP and REST Web Services
7. To learn the importance of Spring Boot and JAVA in Web Services
8. Be able to use POSTMAN accessing dummy URLs as well as self created URLs
9. 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

6. Understand the use of SOAP and REST web services in Enterprises from a global context.
7. To understand and Write SOAP web services from industry perspective of Web Services.
8. Applying and analyzing Restful Web Services.
9. To evaluate the application of REST Web Services in university environment by Using JAX-RS and JAX-WS API's in java.

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BTIBMC701	DCC	Web Services	60	20	20	0	0	2	0	0	2

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

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

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BTIBMC701	DCC	Web Services	60	20	20	0	0	2	0	0	2

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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

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**

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SEMESTER VII

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	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.

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:

3. IBM Courseware
4. IBM Knowledge Center
5. RESTful Web Services by Leonard Richardson O'Reilly Media

References:

1. Core Java, Collection Framework IBM Knowledge Center.

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COURSE CODE	CATEGORY	COURSE 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*				
BTIBMCS707	**DCC**	**Computer Networking**	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):

The student will have ability to:

1. Understand the general overview of the concepts and fundamentals of computer networks.
2. Understand the various components required to build different networks.
3. Familiarize the students with the standard models for the layered approach to communicationbetween machines in a network and the protocols of the various layers.

Course Outcomes (COs):

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

1. Understanding basic computer network technology.
2. Understand the functions of each layer in the OSI and TCP/IP reference model.
3. Obtain the skills of sub netting and routing mechanisms
4. Familiarity with the essential protocols of computer networks, and how they can be applied innetwork design and implementation.

SYLLABUS

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BTIBMCS707	**DCC**	**Computer Networking**	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-I **10 HRS**

Introduction: Importance of Computer Networks, Classifications & Types. Layered Architecture: Protocol hierarchy, Interfaces and Services, Connection Oriented & Connection less Services, ISO- OSI Reference Model, TCP/IP model overview, comparison of TCP/IP and ISO-OSI reference model.

Unit-II 9 HRS

Data Link Layer &MAC Sublayer: Need, Services Provided, Design issues, Elementary data link protocols: simplex protocol, A simplex stop and wait protocol for an error-free channel, A simplex stop and wait protocol for noisy channel. Sliding Window protocols: A one-bit sliding window protocol, A protocol using Go-Back-N, A protocol using Selective Repeat, MAC Addressing, Binary Exponential Back-off (BEB) Algorithm, Distributed Random Access Schemes/Contention Schemes: for Data Services (ALOHA and Slotted- ALOHA), CSMA, CSMA/CA, CSMA/CD.

Unit-III 8 HRS

Network Layer: Need, Services Provided, Design Issues, Routing Algorithms, and types of Routing Algorithm, IPv4, IPv6, Classful and classless Addressing, Subnetting, Supernetting.

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BTIBMCS707	**DCC**	**Computer Networking**	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 7 HRS

Transport Layer: Need, Design Issues, Multiplexing and Demultiplexing, transport layer services, UDP,UDP Header Format, Principles of reliable data transfer, TCP,Connection Management, TCP Flow Control, TCP Congestion Control, TCP Header Format, TCP Timer Management, SCTP.

Unit-V 8 HRS

Session layer: Overview, Authentication, Session layer protocols, **Presentation layer:** Overview, Data conversion, Encryption and Decryption, Presentation layer protocols (LPP,Telnet, X.25 packet Assembler/Disassembler), **Application Layer:** Domain name system, SNMP, Electronic Mail; the World WEB, HTTP, FTP.

Text Books:

1. Andrew S Tanenbaum, Computer Networks, 6th Edition, Pearson Education, 2016.

References:

1. Behrouz A.Forouzan, TCP/IP-Protocol suite, 4th edition, McGraw-Hill, 2010.
2. William Stallings, Data and Computer Communication, 10th edition Pearson, 2014.
3. Comer, Internet working with TCP/IP Volume one, Addison-Wesley, 2015.
4. W. Richard Stevens, TCP/IP Illustrated, Volume 1, 2nd Edition Addison-WesleyProfessional Computing Series.

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BTIBMCS707	**DCC**	**Computer Networking**	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.

LIST OF EXPERIMENTS:

1. Demonstrate Different Types of Network Equipment's.
2. Color coding standard of CAT 5, 6, 7 and crimping of cable in RJ-45.
3. LAN installations and Configurations.
4. Experiment with basic Network configuration commands.
5. Write a program for error detection and correction technique.
6. Write a program for framing.
7. Write a program for routing algorithm.
8. Socket Programming.
9. Study about different network simulators.
10. Establish and simulate peer to peer network using packet tracer.
11. Simulate LAN using hub and switch and discuss pros and cons of hub.
12. Router configuration using packet tracer.

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BTIBM701	**DCC**	**MongoDB and NoSQL**	60	20	20	30	20	3	0	2	4

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):

This course will help the students in understanding:

1. The basics of NoSQL.
2. How it is different from RDBMS.
3. Overview on MongoDB.
4. Basic MongoDB operation and advanced concept in MongoDB.

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. Describe the key components of NoSQL & MongoDB and its role in Computer Science;
2. Identify and describe advantages of NoSQL and understand the difference between NoSQL and RDBMS.
3. How to done Installation of MongoDB and understand basics of MongoDB.
4. Understand the Advanced MongoDB Concepts and how these concepts help and solve the Big Data problems
5. Analyze and understand the computational trade-offs involved in applying different MongoDB query operations.

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BTIBM701	DCC	MongoDB and NoSQL	60	20	20	30	20	3	0	2	4

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**

Overview of NOSQL: Review of RDBMS, ACID properties, Introduction to NoSQL, CAP Theorem, different data models, Pros & Cons of using NoSQL, Comparison between SQL and NoSQL, Document Databases & it's Advantages.

Unit II **9HRS**

Introduction to MongoDB: Installation of MongoDB, Document and Collections, Data Model Design (Embedded Data Models and Normalized Data Model), MongoDB Use Cases.

Unit-III **8HRS**

Basic MongoDB Operations: Data Types in Mongo Shell, Operators in MongoDB: Comparison Query operators, Logical Query operators, Element Query operators, Evaluation Query operators, Query operator Array, Projection operator, Inserting and Saving Documents, Batch Insert, Removing & Updating Documents: Updating using update() method, Updating using save() method, Replace a document, Query Document, AND condition in MongoDB, OR condition in MongoDB, OR & AND condition in MongoDB.

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BTIBM701	**DCC**	**MongoDB and NoSQL**	60	20	20	30	20	3	0	2	4

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**

Query on Embedded/Nested Documents: Querying Nested field using equality match, Querying Nested field using dot (".") operator, Specify match using Query Operator, Specify AND condition, Query an Array: Querying array using equality match, Query an Array for an element, Query an array by filter condition, Query elements that Meets Multiple Criteria, Query for an element by Array by Index Position, Query an array by array length, Query an Array of Embedded Documents: Query a document nested in an array, Query Array Index to Query for a Field in the Embedded Document, Query embedded field in array using a query condition, Nested Documents Meets Multiple Query Conditions on Nested Fields, Project Fields to Return from Query, Return All the fields in documents, Return specific fields in documents, Suppress _id Field, Return all but excluded fields, Return Specific Fields in Embedded Documents, Suppress Specific fields in embedded document, Projection on Embedded documents on Array, Project Specific Array elements in the Returned Array, Query null or Missing fields, Equality Filter, Type Check, Existence Check.

Unit-V **8HRS**

Advanced MongoDB Operations: Map-Reduce, Data Aggregation, Indexing, Type of Indexes, Replication via Replica Sets, Setting replica set in MongoDB using Docker, Sharding, Shard key, Scalability, Vertical Scaling, Horizontal Scaling, MongoDB-Java/Python Exercise.

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BTIBM701	**DCC**	**MongoDB and NoSQL**	60	20	20	30	20	3	0	2	4

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.

Text Books:

1. Getting Started with Nosql Book by Gaurav Vaish
2. IBM Text Book.

References:

1. SQL & NoSQL Databases: Models, Languages, Consistency Options and Architectures for Big Data Management Book by Andreas Meier and Michael Kaufmann, July 2019.
2. MongoDB 4 Quick Start Guide: Learn the Skills You Need to Work with the World's Most Popular NoSQL Database Book by Doug Bierer, September 2018
3. NoSQL Data Models: Trends and Challenges, by Olivier Pivert, July 2018.
4. Sams Teach Yourself NoSQL with MongoDB in 24 Hours Book by Brad Dayley, August 2014.

List of Experiments:

1. Explain Mongo DB Comparison Query operators.
2. Write OR & AND condition in Mongo DB.
3. Write a program to Insert and Saving Documents in Mongo DB.
4. Write Query on Nested field using equality match, using dot (".") operator.
5. Write Query for an array element by filter condition and Query for elements that Meets Multiple Criteria.

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BTIBM701	**DCC**	**MongoDB and NoSQL**	60	20	20	30	20	3	0	2	4

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.

6. Write Query for an array element by Index Position
7. Write query which return all the fields in documents, which return specific fields in documents.
8. Setting replica set in Mongo DB using Docker.
9. Install Eclipse IDE which is required for Maven installation

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			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTIBM702	**DCC**	**Big Data Security**	60	20	20	30	20	3	0	2	4

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 Objectives:

1. To provide an overview of an exciting field of Big Data Security.
2. To introduce the tool to required concepts of monitoring and auditing data with Guardium.
3. Develop an understanding in depth for Exploring security standard of Big Data for securing and Protecting Data.
4. Data Protection Laws for Big data: This unit gives an overview Protection Data law enforced for Data.
5. To enable students to have skills that will help them to solve security of data in complex real-world problems for better business decisions.

Course Outcomes:

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

1. Understand the concept of Big Data Security from a globalcontext.
2. To understand and apply Guardium IBM tool in Market perspective of Big Data Security.
3. Applying and analyzing architecture, Capabilities, Threats and Security discipline of Big Data Security.

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BTIBM702	**DCC**	**Big Data Security**	60	20	20	30	20	3	0	2	4

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.

4. Inventorying and classifying sensitive data, Remediation plans, Security Perimeters, Encryption of data, Introduction to Kerberos, Identity management, Activity Monitoring and Apache Knox overview in detail.
   Privacy and Ethics - why does it creep us out when companies market to us? What is privacy, and why is it important?

Syllabus:

UNIT I **9HRS**

Introduction to Big Data: This unit explains the concept of Big Data and reviewing capabilities, Architecture, threats and security disciplines of Big Data. After completing this unit, you should be able to: Explain what Big Data is, Reviewing concept of Big data capabilities, Use cases of Big Data, Architecture ofBig Data.

UNIT II **10**HRS

Securing & Protecting Data: This unit consist more in depth for Exploring security of Big Data - securing and Protecting Data, After completing this unit, you should be able to:, Understand how to identify data for down streaming processes, Understand how to integrate, process, generate data, Understand Security perimeter for security Management.

UNIT III **9HRS**

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BTIBM702	DCC	Big Data Security	60	20	20	30	20	3	0	2	4

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.

Threats &Security Disciplines of Big Data: Threats and Security Disciplines of Big Data, There is a particularly focus on how Big Data can support Security like – CIA, 3A, Software attacks, theft of intellectual property, identity theft, theft of equipment or information, sabotage, Social Engineering and information extortion.

Unit IV **8 HRS**

Monitor, Enforce and Audit: This unit introduces concepts of monitoring and auditing data with Guardium After completing this unit, you should be able to: Understand Guardium data activity Monitoring, Benefits of Big InfosphereGuardium, Understand Architecture of Guardium, Hands-on experience with all of them, Know how Access management and Auditing works.

Unit V **7 HRS**

Data Protection Laws for Big data: Data Protection Laws for Big data: This unit gives an overview Protection Data law enforced for Data. After completing this unit, you should be able to: Explain GDPR Laws, Explain ILG (Lifecycle Governance), ISO 27000 Series, HIPAA

TEXT/REFERENCEBOOKS:

1. Mayer-Schonberger and Cukier 2013 Big Data: A Revolution that Will Transform How We Live, Work, and Think.
2. Tom White " Hadoop: The Definitive Guide" Third Edit on, O'reily Media, 2012.

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BTIBM702	**DCC**	**Big Data Security**	60	20	20	30	20	3	0	2	4

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.

3. SeemaAcharya, SubhasiniChellappan, "Big Data Analytics" Wiley 2015.
4. IBM Content/Books.

Further Suggested Readings:

1. Michael Mineli, Michele Chambers, AmbigaDhiraj, "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses", Wiley Publications, 2013.
2. ArvindSathi, "BigDataAnalytics: Disruptive Technologies for Changing the Game", MC Press, 2012
3. Paul Zikopoulos ,Dirk DeRoos , Krishnan Parasuraman , Thomas Deutsch , James Giles , David Corigan , "Harness the Power of Big Data The IBM Big Data Platform ", Tata McGraw Hill Publications, 2012.

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BTIBM704	**DCC**	**Introduction to Text Analytics**	60	20	20	30	20	1	0	2	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 provide an overview of Introduction to Text Analytics.
2. To introduce the students with the base of all the text analysis concepts.
3. To teach the fundamental techniques and principles in text analytics so that their data analysis skills can be achieved.
4. To enable students to have skills that will help them to analysis structured and unstructured real-world data and introduce them to a new world of emerging technologies.

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. Introduction to text mining
2. An overview of text mining
3. Reading text data
4. Linguistic analysis and text mining
5. Creating a text mining concept model
6. Reviewing types and concepts in the Interactive Workbench
7. Editing linguistic resources
8. Fine-tuning resources

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BTIBM704	DCC	Introduction to Text Analytics	60	20	20	30	20	1	0	2	2

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

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9. Performing Text Link Analysis
10. Clustering concepts
11. Categorization techniques
12. Creating categories
13. Managing linguistic resources
14. Using text mining models
15. The process of text mining

Syllabus

Unit I **10HRS**

Introduction to text mining

Text mining and data mining, Text mining applications, Text Mining nodes, Identify the Text Mining modeling node, Steps in a typical text mining session, Demonstration 1: A typical text-mining session and Functions Recursion

Unit II **9HRS**

Reading text data

File List node, Use the File List node in text mining, Demonstration 1: Using the File List node

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BTIBM704	DCC	Introduction to Text Analytics	60	20	20	30	20	1	0	2	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.

to read text from multiple files, File Viewer node, Demonstration 2: Using the File Viewer node to view documents, Web Feed node, Web Feed node - RSS format, Web Feed node - HTML format, Demonstration 3: Reading text from a Web Feed.

Unit-III **8HRS**

Linguistic analysis and text mining

Identify elements in linguistic analysis, Identify Parts of Speech (PoS), Extractor component workflow, Text preprocessing, Identification of candidate terms, Identification of equivalence classes, Forcing and excluding, Assign types, Categorize extracted concepts, Use Libraries and Resource templates, Use Text Analysis Packages (TAPs), Linguistic resource relationships.

Unit-IV **7HRS**

Categorization techniques

Strategies for creating categories, Text Analysis Package (TAP), Demonstration 1: Using a Text Analysis Package to categorize data, Import predefined categories, Demonstration 2: Importing predefined categories, from a Microsoft Excel file, automated classification automated classification methods, Linguistic categorization techniques, Additional categorization options, Demonstration 3: Automated classification

Unit-V **8HRS**

Using text mining models

Demonstration 1: Explore a text mining model, Demonstration 2: Develop a model by combining categories and customer data, Demonstration 3: Score new data.

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Choice Based Credit System (CBCS) 2020-21

SEMESTER VII

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTIBM704	**DCC**	**Introduction to Text Analytics**	60	20	20	30	20	1	0	2	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.

Text Books:

1. IBM Skills Academy Content

List of Experiments:

1. Making preparations for a text mining project.
2. Text mining customer opinions about portable music players.
3. Text mining data from an RSS feed.
4. Review extracted results in the Interactive Workbench.
5. Editing dictionaries.
6. Editing advanced resources.
7. Perform Text Link Analysis.
8. Categorize music player data.
9. Use text mining models.

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BTCS706	PW	Project	0	0	0	120	80	0	0	8	4

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Guideline and instruction for Project

S.No	Particular
1.	Group formation and Submission of Project Topic (At least three(03))
2.	Guide allotment and Topic Finalization
3.	Presentation –I Contents: 1. Problem Domain 2. Literature Survey 3. Feasibility Study 4. References
4.	Synopsis Submission
5.	Presentation – II Contents: 1. SRS / URD 2. Conceptual Design
6.	Presentation – III Contents: 1. Detail Design 2. Implementation & Test Plan
7.	Project Report Submission

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