



Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Information Technology

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

Choice Based Credit System (CBCS) 2019-20

SEMESTER VII

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CRED ITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCS601	DCC	Compiler Design	60	20	20	30	20	3	1	2	5

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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UnitII

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 Stagemanagement,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 Education Asia, 2012
2. Jean Paul Tremblay, Paul G Serenson, "The Theory and Practice of Compiler Writing", BS Publications, 2005
3. Dhamdhare, 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. Henk Alblas and Albert Nymeyer, "Practice and Principles of Compiler Building with C", PHI, 2001
4. Kenneth C. Loudon, "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.
6. Write a program to compute the leading and trailing symbols of grammar.
7. Write a program to implement Operator Precedence Parser.

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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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BBAI501	AECC	Human Values and Professional Ethics	60	20	20	0	0	4	0	0	4

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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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Course Educational Objectives (CEOs):

The objective of the course would be to

1. Understand Financial Performance Management,
2. Overview of Cognos TM1
3. Import Data to Create Objects
4. Create and Customize Dimensions & Cubes.

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. Learners will be able to create new server, dimensions, cubes and import data using TM1. Learners will be able to understand how to share data across cube and create complete model and use additional modeling techniques in TM1
2. Learners will be able to understand how to model data using architect
3. To learn about Customize Business Rules, SKIPCHECK, FEEDERS, Creation of applications in TM1
4. To learn about using MDX queries in TM1, integrate with Cognos BI and contribute to Planning Applications
5. To understand Financial Performance Management, Overview of Cognos's TM1, Import Data to Create Objects, Create and Customize Dimensions and Cubes

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Syllabus

Unit I

10HRS

Understanding of Enterprise Performance Management Finance function in an organization Financial performance management Importance of financial performance management for CFO; Architecture and components of Planning Analytics / TM1 server fundamentals Fundamental modeling concepts TM1 MOLAP Solution In-Memory Data Storage.

Identify characteristics of Operational and Reporting Databases Online Analytical Processing Core Model Design Principles create a TM1 model and deploy it; Guided Import Import data to create a dimension Import Data to Create and populate cube; Cubes dimensions and elements Create dimensions manually Import dimensions Edit dimensions Create dimension calculations;

Unit II

9HRS

Construct a new cube properties Edit a cube structure Review and use a pick list Create cube calculations; Import Data: Identify data sources Create processes to load data Create a process to delete data in a cube Create processes to update and maintain the model; Share Data Across Cubes with Links: Types of links Create and modify links Review rule- and process-based links.

Unit-III

8HRS

Rule automatically generated rules Rule Blocks Disable & Enable auto-generated rules Manual Rules; Optimize Rule Performance: Consolidations and Sparsely SKIPCHECK FEEDERS Complete Model: Discuss the model development process complete objects for the model Review tools to aid in model development

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Unit-IV

7HRS

Application types create a new application Apply security in the application Activate and de-activate an application; Additional Modeling Techniques: Create dynamic subsets Use dimension functions Implement business logic Improve cube performance Use TM1 utilities

Unit-V

8HRS

Discuss currency challenges Review control cubes Create rules for currency conversion Use TM1 techniques to reduce maintenance; Model Data with Cognos TM1 Architect: Review Cognos TM1 Architect Record MDX queries Customize drill-through paths Use trace calculations; Model for Different Fiscal Requirements: Discuss time considerations Use discrete time dimensions Implement a continuous time dimension model Contribute to Planning Applications: Identify the user roles and workflow states Enter da

Text Books:

1. Cognos TM1: Develop and Design Models, IBM Cognos , IBM, 2010 Edition 1.

References:

1. Fintech: The Beginner's Guide to Financial Technology, Jacob William, Create Space Independent Publishing Platform, 2016 Edition 1.
2. Think Python, Allen B. Downey, O'Reilly Media, 2016 Edition 2.

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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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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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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.

Text Books:

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

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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.
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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SEMESTER VII

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CRED ITS
			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 global context.
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.
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.
5. Privacy and Ethics - why does it creep us out when companies market to us? What is

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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 of Big Data.

UNIT II

10HRS

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

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.

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

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

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

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

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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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