Shri Vaishnav Vidyapeeth Vishwavidyalaya

B.Tech.(CSE- Cloud and Mobile Computing -IBM)
Choice Based Credit System (CBCS) 2018-19
SEMESTER VII

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*
BTCS601	UG	Compiler Design	3	1	2	5	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:
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:
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
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.

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

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

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

Reference Books:
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.
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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BBAI501	UG	Human Values and Professional Ethics	4	0	0	4	60	20	20	0	0

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Course Objectives:
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:
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
1. Definition, Essence, Features and Sources

2. Sources and Classification

3. Hierarchy of Values

4. Values Across Culture

Unit II: Morality
1. Definition, Moral Behaviour and Systems

2. Characteristics of Moral Standards

3. Values Vs Ethics Vs Morality

4. Impression Formation and Management
Unit III: Leadership in Indian Ethical Perspective.
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: Human Behavior – Indian Thoughts
1. Business Ethics its meaning and definition
2. Types, Objectives, Sources, Relevance in Business organisations.

3. Theories of Ethics, Codes of Ethics

Unit V: Globalization and Ethics
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.

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

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

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

After completion of course, students would 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.

SYLLABUS

UNIT–I
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
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
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

UNIT–IV
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
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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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*
BTIBM701	UG	MongoDB and NoSQL	3	0	2	4	60	20	20	30	20

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Course Objectives:

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:

After the successful completion of this course 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.

Syllabus:

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

UNIT III
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.

Unit IV

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:

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.

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

| | | | | | | | TEACHING & EVALUATION SCHEME | | | | |
| | | | | | | | THEORY | | | PRACTICAL | |
COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BTIBM402	**UG**	**Cyber Physical System Using IoT**	3	0	2	4	60	20	20	30	20

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

This course will help the students in:

5. Understand the evolution and impact of IoT in the world today.
6. Explore IoT by industry domains: automotive, connected homes, manufacture, energy & utilities, transportation, healthcare, aerospace.
7. Explore end-to-end case studies for every key IoT industry and identify common patterns.

Course Outcomes:

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

1. Understand technical aspects of IoT solutions: devices and networks, data, cloud, applications, blockchain, analytics and security.
2. Build cognitive IoT solutions, leveraging artificial intelligence and data science.
3. Understand industry practices to design and build agile IoT solutions, using the design thinking methodology.
4. Work in team's jointly exploring real-world IoT scenarios.
5. Prototype bespoke IoT solutions leveraging industry-proven concepts, technologies and methodologies

Syllabus:

UNIT I
IoT Global LANDSCAPE: What is the Internet of things, IoT global adoption, IoT common Patterns: sensor, data, analytics, IoT challenges: security and scalability, Resources.

UNIT II
IoT Application Domains: IoT Technology Domains, Connected Devices, Connected Vehicles, Smart Buildings, Smart Cities, Resources

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UNIT III

IoT Solution Anatomy – Device and Networks: IoT Solution Architecture, Physical Layer (Devices, Hardware, Sensors), Communication layer (IoT networks), Resources

Unit IV

IoT Solution Anatomy – IoT Data Platform: IoT Platform Layer, Data Analytics and applications Layer, Resources

Unit V:

Cognitive IoT Solutions: IoT Sensor Data and AI, Data Science on the Cloud, Resources
IoT Industry Case Studies: IoT Trends, IoT in Manufacturing, Global Logistics with IoT, Worker Safety, Industry Predictions, Resources

TEXT BOOKS:
3. Vijay Madisetti, ArshdeepBahga," Internet of Things A Hands-On- Approach",2014, ISBN:978 0996025515
4. Adrian McEwen, Hakim Cassimally "Designing the Internet of Things", John Wiley & Sons (2013), ISBN - 9781118430620
5. IBM Skills Academy

REFERENCES:
5. Daniel Kellmereit, "The Silent Intelligence: The Internet of Things". 2013, ISBN 0989973700
6. Massimo Banzi, "Getting Started with Arduino", O'Reilly Media, Inc." (2011), ISBN- 9781449309879
7. Richard Grimmett, "Raspberry Pi Robotics Essentials", Packt Publishing Ltd (2015), ISBN-978178528564

LIST OF EXPERIMENTS:

1. Remote Sensor Data Visualization: Preface, Remote Sensors
2. IBM Cloud Account Creation and Device Setup: Preface, Obtain an IBM Cloud Account, Provision the Node-Red App, Register a new Device
3. Node-RED setup & Chart Data: Preface, Node-RED setup, Receive Environmental Sensor Data in Node-RED, Dashboard Charts – Plot Sensor Data
4. Store Data in Cloudant Storage & Chart Data: Preface, Import the Node-RED Cloudant storage flow, Chart Historical Sensor Data
5. Use IoT Sensor Data to track Zebras in Botswana with AI: Preface, Clone & Deploy, Create Services, Run the Application, Links
6. Analyze large Data Sets Collected from a Long-range IoT System: Preface, Create Services, and Run Watson Studio Notebook.

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*
BTCS706	UG	Project	0	0	8	4	0	0	0	120	80

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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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