Shri Vaishnav Vidyapeeth Vishwavidyalaya

B.Tech.(CSE- Artificial Intelligence -IBM)

Choice Based Credit System (CBCS) 2018-19

SEMESTER VII

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*
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.

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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

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.

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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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BTIBMA702	**UG**	**Deep Learning**	2	0	0	2	60	20	20	0	0

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COURSE OBJECTIVES

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

Upon completion of the subject, 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.

SYLLABUS

UNIT–I
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
Convolutional Networks
Introduction to convolutional networks. CNN Architecture. Understanding Convolutions. CNN

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for Classification.

UNIT–III
Recurrent Neural Network
Introduction to RNN model. What is Sequential Problem? The LSTM model

UNIT–IV
Restricted Boltzmann Machines and Auto encoders
Introduction to RBMs. Training RBMs. Introduction to auto encoders. Structures of auto encoders.

UNIT–V
PROJECT
Research Activities on Deep Learning with projects and research letters.

TEXT BOOKS:

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

REFERENCES:

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

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BTIBMA701	**UG**	**Text Analysis**	3	0	2	4	60	20	20	30	20

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COURSE OBJECTIVES

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

Upon completion of the subject, 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
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

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

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UNIT–II

Reading text data

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

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

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

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.

TEXT BOOKS/ REFERENCES:

1. IBM Skills Academy Content

List of Experiment:

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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BTIBMA703	**UG**	**Programs of Quantum Computing**	3	0	2	4	60	20	20	30	20

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COURSE OBJECTIVES

1. Recall the basics of computer science and algorithms.
2. Explore all the parts of a quantum computer and how this fights interference issues.
3. Explore the specific tasks in which a quantum computer can make a difference.
4. Understand the hardware behind the quantum computer.
5. Understand the importance of IBM Q Network and its strategic partners.

COURSE OUTCOMES

Upon completion of the subject, students will be able to:

1. Understand how the quantum computing fits the big picture.
2. Understand quantum computing industry applications.
3. Explain the difference between classical and quantum computing with the importance of IBM Q Network and its strategic partners.
4. Explore which companies are betting on quantum and how.
5. Explain how quantum-enhanced feature spaces can help with feature mapping and Explore Aqua risk analysis for finance module.

SYLLABUS

UNIT–I

Quantum Introduction

Basics of computer science, the business case for quantum computing, the path from science to system. **Industry and Business Impacts:** The Road to quantum advantage, problem solving with quantum computing, Industry Applications of quantum computing.

Science and Tech of Quantum Computing:

Quantum vs. Classical: The power of conventional computing, Pre-quantum computing, Controlling quantum phenomena,

Core concepts: Superposition, Interference,

Hardware: Qubits, Refrigeration, Quantum volume, IBM Q System One.

UNIT–II

IBM Q Programs:

IBM Q Experience: Circuit Composer, Qiskit Notebooks,

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IBM Q Network: The IBM QNetwork Focus Areas, The IBM Q Network Member Benefits, The IBM Q Teams.
Quantum Computing Security: Infrastructure, Applications, Services,
Quantum Computing Companies: Quantum Computing Landscape, IBM Q, Alibaba, D-Wave Systems, Google, Microsoft, Rigetti Computing, Amazon Web Services.

UNIT–III
Quantum Computing in Depth:
Review of Quantum Computing fundamentals: Basic computer systems, Quantum computer systems, Qubits,
Inside a quantum computer: Scalable Quantum Systems, Parts of a quantum computer,
Programming a quantum computer: IBM Q Experience**.**

UNIT–IV
Machine Learning with Qiskit:
Classic AI-Support Vector Machine: Classify data, Improved AI/ML Processes with Quantum, Quantum-enhanced feature spaces to classify data,
Quantum-enhanced Feature Spaces: A quantum circuit representing the quantum feature map, this is the circuit we just constructed for input vector x, Qiskit
Aqua can make feature maps in one line of code, With Aqua, we can solve thefull problem in a few lines of code.

UNIT–V
Qiskit Aqua Framework: Algorithms and Applications, Modularity and Extensibility of the Aqua Library, Algorithms and Optimizers, Extensible Libraries and Features, Modularity, Qiskit Chemistry
Algorithms and Applications,
Solving Problem with Qiskit: Speeding up calculations in quantitative finance. Industry Scenario, Risk analysis, Quantum risk analysis, Possibilities of new chemical innovation.

TEXT BOOKS/ REFERENCES:

- Computing with Quantum Cats: From Colossus to Qubits **by John Gribbin.**
- Quantum Computation and Quantum Information Michael Nielsen and Isaac Chuang.
- Quantum Computing for Computer Scientists Noson Yanofsky and Mirco Mannucci.

List of Experiment:

1. Build a Quantum Random Number Generator.
2. Implement Grover's Search Algorithm.
3. Use Shor's Algorithm to Factor a Number.

4. Find the Ground State Energy of a Lithium Hydride Molecule.
5. Explore Quantum Hardware with Qiskit Pulse.
6. Sort Images Using a Quantum Machine Learning Algorithm.
7. Implement IBM Q Experience
8. Understand the Superposition, Entanglement, & Noise
9. Non-Connected Qubits & Gate Swaps
10. Identify Quantum SVM for Classification

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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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