Seventh Semester Professional Elective Course 2

Dr. Ambedkar Institute of Technology,
Bengaluru – 56
Department of Computer Science and Engineering,
Scheme and Syllabus – CSE – 2023 – 2024

Course Title	**BLOCKCHAIN TECHNOLOGY**						
Course Code	**21CST7041**						
Category	**PROFESSIONAL ELECTIVE COURSE**						
Scheme and Credits	**No. of Hours/Week**					**Total Teaching hours**	**Credits**
	L	**T**	**P**	**SS**	**Total**		
	03	00	00	00	03	42	03
CIE Marks: 50	**SEE Marks: 50**		**Total Max. marks=100**		**Duration of SEE: 02 Hours**		

COURSE OBJECTIVES:

- Define and Explain the fundamentals of Blockchain
- Illustrate the technologies of blockchain
- Decribe the models of blockchain
- Analyze and demonstrate the Ethereum

UNIT I **9 Hours**

Blockchain 101: Distributed systems, History of blockchain, Introduction to blockchain, Types of blockchain, CAP theorem and blockchain, Benefits and limitations of blockchain.

UNIT II **9 Hours**

Decentralization and Cryptography: Decentralization using blockchain, Methods of decentralization, Routes to decentralization, Decentralized organizations. Cryptography and Technical Foundations: Cryptographic primitives, Asymmetric cryptography, Public and private keys .

UNIT III **8 Hours**

Bitcoin and Alternative Coins A: Bitcoin, Transactions, Blockchain, Bitcoin payments B: Alternative Coins Theoretical foundations, Bitcoin limitations, Name.

UNIT IV **8 Hours**

Smart Contracts and Ethereum 101: Smart Contracts: Definition, Ricardian contracts. Ethereum 101: Introduction, Ethereum blockchain, Elements of the Ethereum blockchain, Precompiled contracts.

UNIT V **8 Hours**

Alternative Blockchains: Blockchains Blockchain-Outside of Currencies: Internet of Things, Government, Health, Finance, Media .

TEACHING LEARNING PROCESS: Chalk and Talk, power point presentation, animations, videos

COURSE OUTCOMES: On completion of the course, student should be able to:

CO 1: Define and Explain the fundamentals of Blockchain

CO 2: Illustrate the technologies of blockchain

CO 3: Describe the models of blockchain

CO 4: Analyse and demonstrate the Ethereum

CO 5: Analyse and demonstrate Hyperledger fabric

TEXT BOOKS

1. Mastering Blockchain - Distributed ledgers, decentralization and smart contracts explained, Imran Bashir, Packt Publishing Ltd, Second Edition, ISBN 978-1-78712-544-5, 2017

REFERENCE BOOKS

1. Bitcoin and Cryptocurrency Technologies, Arvind Narayanan, Joseph Bonneau, Edward Felten, 2016.

2. Blockchain Basics: A Non-Technical Introduction in 25 Steps, Daniel Drescher, Apress, First Edition, 2017.

3. Mastering Bitcoin: Unlocking Digital Cryptocurrencies, Andreas M. Antonopoulos, O'Reilly Media, First Edition, 2014

ONLINE RESOURCES

1. https://www.coursera.org/specializations/blockchain.
2. https://nptel.ac.in/courses/106105184/
3. Introduction to Blockchain Technology and Applications, https://swayam.gov.in/nd1_noc20_cs01/preview

MAPPING of COs with POs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	**3**	**2**	**2**		**1**	**1**						**1**
CO2	**3**											
CO3	**3**	**3**	**3**		**3**							
CO4	**3**		**3**		**2**	**1**	**1**					**1**
CO5	**3**	**3**	**3**		**2**	**1**	**1**					**1**
Strength of correlation: Low-1, Medium- 2, High-3												

	Course Title: Natural Language processing		
	Course Code : 21CST7042	**No. of Credits: 3: 0: 0 (L-T-P)**	**No. of lecture hours/week : 3**
	Exam Duration : 3 hours	**CIE+ Assignment + SEE = 45+5+50=100**	**Total No. of Contact Hours : 42**

	Description
Course Objectives:	1. Fundamental concepts of texts and grammer. 2. Basic knowledge of formal language and automata theory. 3. Python Programming fundamentals

Unit No	**Syllabus Content**	**No of Hours**
1	**Overview and Language Modelling:** Overview: Origins and challenges of NLP-Language and Grammar-Processing Indian Languages- NLP Applications - Information Retrieval. **Accessing Text Corpora**: Accessing Text Corpora, Brown Corpus, Loading your own corpus, Annotated text corpus, Conditional Frequency Distributions, WordNet. **Processing Raw Text :** Regular Expressions for Detecting Word Patterns, Useful Applications of Regular Expressions, Normalizing Text ,Regular Expressions for Tokenizing Text	9
2	**Categorizing and Tagging Words:** Using a Tagger, Tagged Corpora, Mapping Words to Properties Using Python Dictionaries Automatic Tagging, N-Gram Tagging, How to Determine the Category of a Word. **Introduction to Machine Learning:** Supervised and Unsupervised algorithms. **Learning to Classify Text:** Supervised Classification, Further Examples of Supervised Classification, Evaluation, Decision Trees, Naive Bayes Classifiers.	9
3	**Extracting Information from the text:** Information Extraction, Chunking, Developing, Named Entity Recognition, Term weighting, Inverse document frequency, Residual inverse document frequency. **Analyzing Sentence Structure:** Some Grammatical Dilemmas, What‘s the Use of Syntax?, Context-Free Grammar, Parsing with Context-Free Grammar.	8
4	**Analyzing the Meaning of words and Sentences:** The semantics of English sentences, Representing Meaning, Semantic Analysis, Lexical semantics, Word-sense disambiguation. **NLP Applications:** Machine translation, Sentiment Analysis, Chat-Bot, Question Answering System, Text Classification, Spell Checking and Market Intelligence.	8

5	**NLP Applications (Continued):** Machine translation - Basic issues in MT. Statistical translation **Information Retrieval:** Vector space model, term weighting, homonymy, polysemy, synonymy, improving user queries.	8

Course Outcomes	Description	RBT Levels
CO1	Understand the approaches to syntax and semantics in Natural Language Processing, the various types of language processors, the elements of formal language theory, the types of grammar, and computational morphology.	L2
CO2	Understand the basic parsing technique for context-free grammars, the data structures and algorithms for parsing, and the approaches to ambiguity resolution.	L2
CO3	Apply the fundamental algorithms and techniques in the area of Natural Language Processing.	L3
CO4	Comprehend and compare different natural language models.	L4

CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	P06	PO 7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2					2	2		3
CO2	3	3	3	3	2				2	2		3
CO3	3	3	2	2	2				2	2		3
CO4	2	2	2		2				2	2		3

Strong -3 Medium -2 Weak -1

TEXTBOOKS:

1. Tanveer Siddiqui, U.S. Tiwary, ―Natural Language Processing and Information Retrieval‖, OUP India, 2008, ISBN :9780195692327
2. Steven Bird, Ewan Klein, Edward Loper,―Natural Language Processing with Python, ‖Publisher: O'Reilly Media, June 2009, ISBN:9780596516499

REFERENCE BOOKS:

1. Anne Kao and Stephen R. Poteet (Eds), ―Natural Language Processing and Text Mining ‖, Springer, 2007 ISBN: 9781846281754
2. James Allen,―Natural Language Understanding, 2ndedition, Benjamin/Cummings publishing company, 1995, ISBN : 9788131708958

SELF STUDY REFERENCES / WEBLINKS:

1. https://onlinecourses.nptel.ac.in/noc23_cs45/preview
2. https://www.coursera.org/specializations/natural-language-processing
3. https://www.ibm.com/topics/natural-language-processing

Dr. Ambedkar Institute of Technology,
Bengaluru-56

Department of Computer Science & Engineering Scheme and Syllabus - NEP – 2023 -2024

Course Title	**OBJECT ORIENTED MODELING AND DESIGN**						
Course Code	**21CST7043**						
Category	**Professional Elective Course-III(PEC-III)**						
Scheme and Credits	No. of Hours/Week					Total teaching hours	Credits
	L	T	P	SS	Total		
	03	00	**00**	00	**03**	**42**	**03**
CIE Marks: 50	**SEE Marks: 50**		**Total Max. marks=100**		**Duration of SEE: 03 Hours**		

1. Present students with the concept and terms used in Object Oriented Modeling using UML and to identify modeling as a design technique.
2. Develop an understanding of Class Models with advanced notations.
3. Develop an understanding of State and Interaction Models with diagrams.
4. Acquire the knowledge and understanding of the process of System Conception, Domain and Application Analysis.
5. Improve the creativity in developing a overall Class Design and fine tuning of classes and relationships.

COURSE OBJECTIVES

UNIT-1
INTRODUCTION: Object Orientation, OO development, OO themes; Evidence for usefulness of OO development; OO modeling history. **INTRODUCING THE UML:** An Overview of the UML, A Conceptual Model of the UML, Architecture, Software Development Life Cycle. **MODELING CONCEPTS:** Modeling as Design Technique; Modeling; abstraction; The three models. **DIAGRAMS:** Terms and Concepts, Common Modeling Techniques- Modeling different views of a system, modeling different levels of abstraction, Modeling complex views.
UNIT-2
CLASS MODELING: Object and class concepts; Link and associations concepts; Generalization and inheritance; A sample class model; Navigation of class models; Practical tips. **ADVANCED CLASS MODELING:** Advanced object and class concepts; Association ends; N-ary

associations; Aggregation; Abstract classes; Multiple inheritance; Metadata; Reification; Constraints; Derived data; Packages; Practical tips.
UNIT-3
STATE MODELING: Events, States, Transitions and Conditions; State diagrams; State diagram behavior; Practical tips. **ADVANCED STATE MODELING:** Nested state diagrams; Nested states; Signal generalization; Concurrency; A sample state model; Relation of class and state models; Practical tips. **INTERACTION MODELING:** Use case models; Sequence models; Activity models. Use case relationships; Procedural sequence models; Special constructs for activity models.
UNIT-4
PROCESS OVERVIEW: Development stages; Development life cycle. **SYSTEM CONCEPTION:** Devising a system concept; Elaborating a concept; Preparing a problem statement. **DOMAIN ANALYSIS**: Overview of analysis; Domain class model; Domain state model; Domain interaction model; Iterating the analysis. **APPLICATION ANALYSIS**: Application interaction model; Application class model; Application state model; Adding operations.
UNIT-5
SELF-STUDY **CLASS DESIGN:** Overview of class design; Bridging the gap; Realizing use cases; Designing algorithms; Recursing downwards, Refactoring; Design optimization; Reification of behavior; Adjustment of inheritance; Organizing a class design; ATM example. **IMPLEMENTATION MODELING:** Overview of Implementation; Fine-tuning classes; Fine-tuning generalizations; Realizing associations; Testing.

TEACHING LEARNING PROCESS: Chalk and Talk, power point presentation, animations, videos

COURSE OUTCOMES: On completion of the course, student should be able to,

CO1: Understand the concepts of Object-Oriented Analysis and Design, ML Architecture, Notations and Diagrams and also demonstrate an

understanding of modeling as a design technique.

CO2: Construct advanced Class models for a given case study.

CO3: Construct advanced State and Interaction models and know their importance in realistic situations..

CO4: Apply the process of System Conception for any given problem and understand the process of Domain and Application analysis with respect to its Class, State and Interaction model.

CO5: Create a Class model and enhance its design and associated relationships.

TEXT BOOKS

1. **Object-Oriented Modeling and Design with UML** – Michael Blaha, James Rumbaugh, 2nd Edition, Pearson , 2012 First Impression.(**Chapters 1,2,3,4,5,6,7,10,11,12,13,15,17&23**)

ISBN : 978-81-317-6462-6

REFERENCE BOOKS

1. **Object-Oriented Analysis and Design with Applications** – Grady Booch et al, 3rd Edition, Pearson Education, 2007
2. **The Unified Modeling Language User Guide** – Booch, G., Rumbaugh, J., and Jacobson I, 2nd Edition, Pearson, 2005.

ONLINE RESOURCES

1. https://www.youtube.com/watch?v=zid-MVo7M-E
2. https://www.youtube.com/watch?v=ao1ESgIy2Ws

MAPPING of COs with POs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	3	3	-	3	-					
CO2	3	3	3	2	1	3	2					
CO3	2	3	2	2	1	3	-					
CO4	3	3	2	3	-	3	-					
CO5	3	3	3	3	3	-	-					

Strength of correlation: Low-1, Medium- 2, High-3