Course Code	CS 446/646
Title of the Course	Blockchain for Responsible Computing
Course Category	Department Elective
Credit Structure	L-T-P–Credits 2-1-0-3
Concerned Department	Computer Science and Engineering
Pre-requisite	Programming skills, Basic Software Engineering, Digital Systems, Databases
Scope	This course focuses on the principles and applications of blockchain technology with a focus on responsible computing. Students will explore the blockchain fabric as distributed technology to enhance trust, transparency and accountability across domains, simultaneously considering the ethical and societal implications of its use. Course Objectives: 1. To understand the fundamentals of blockchain technology and its potential for trust and accountability. 2. To analyze the ethical and societal implications of blockchain applications. 3. To explore and understand the responsible computing practices for designing and implementing blockchain solutions. 4. To foster an interdisciplinary perspective by integrating ethical, technical, and social aspects.
Course Syllabus	• Module 1: Centralized Vs Decentralized Computing, Local vs Distributed systems, On premises Vs cloud instances, Foundations of Blockchain, Ledger Vs Decentralized ledger, Trust as Consensus, Types of blockchains and Motivation with Different Use cases • Module 2: Privacy and data protection Considerations in Blockchain, Challenges in Blockchain, Smart contracts, Protection against fraud and cyber-vulnerabilities, • Module 3: Blockchain and Sustainable Development Goals, Blockchain in Supply Chain/I4.0/Health Applications -Trust brokerage, Traceability, transparency, and responsible sourcing_ Ethical/privacy and fairness considerations • Module 4: Blockchain development, Creating and deploying smart contracts, Debugging and security testing, Responsible coding practices in blockchain • Module 5: Regulatory and Legal Considerations with Blockchain, Compliance with legal requirements of the land, Case Studies and Industry Trends, Analysis of real-world blockchain projects, Standard guidelines on Blockchain
Suggested Books	Textbooks: 1. SK Hafizul Islam, Arup Kumar Pal, Debabrata Samanta, Siddhartha Bhattacharyya : Blockchain Technology for Emerging Applications : Elsevier : Netherlands : 2022 : 9780323901949 : 2. Alexander Lipton and Adrien Treccani : Blockchain And Distributed Ledgers: Mathematics, Technology, And

	Economics : World Scientific Publishing Co Pte Ltd : Singapore : 2021 : 9811221510/978-9811221514 : Reference: 3. Imran Bashir : Mastering Blockchain (Third Edition) : Packt Publishing : UK : 2020 : 1839213191/978-1839213199 :