GOVERNMENT OF INDIA
MINISTRY OF
PARLIAMENTARY AFFAIRS

Azadi Ka
Amrit Mahotsav

my GOV
मेरी सरकार

PREAMBLE TO THE CONSTITUTION

PREAMBLE

WE, THE PEOPLE OF INDIA,

having solemnly resolved to constitute India

into a **SOVEREIGN SOCIALIST SECULAR DEMOCRATIC**

REPUBLIC and to secure to all its citizens:

JUSTICE, social, economic and political;

LIBERTY of thought, expression, belief, faith and worship;

EQUALITY of status and of opportunity;

and to promote among them all

FRATERNITY assuring the dignity of the individual and

the unity and integrity of the Nation;

IN OUR CONSTITUENT ASSEMBLY this 26th day of

November, 1949, do HEREBY ADOPT, ENACT AND GIVE

TO OURSELVES THIS CONSTITUTION.

I have read the Preamble

Signature

23-01-2022

SRI SIDDHARTHA ACADEMY OF HIGHER EDUCATION

("Deemed to be University u/s 3 of the UGC Act, 1956")
Accredited 'A+' Grade by NAAC
Agalakote, B.H.Road, Tumkur – 572 107.KARNATAKA, INDIA.

No. SSAHE/ACA-S&C/19 /UG(BE)/2024   Date: 15/07/2024

N O T I F I C A T I O N

Sub: - Ordinance pertaining to Curriculum of Undergraduate Programme Bachelor of Engineering (4th Year Computer Science and Engineering)

Ref: Proceedings of the Academic Council meeting held on 10/07/2024 vide agenda No. SSAHE/AC/XXVIII-12/2024

In exercise of the powers vested under section 6 of 6.05 of MoA / Rules of SSAHE, the Revised Ordinance pertaining to Curriculum of Undergraduate Programme Bachelor of Engineering (4th Year Computer Science and Engineering) is notified herewith as per Annexure.

By Order,

REGISTRAR
Sri Siddhartha Academy of Higher Education
TUMKUR - 572 107, Karnataka.

To,
Dean / Principal, Sri Siddhartha Institute of Technology,

Copy to
1) Office of the Chancellor, SSAHE, for kind information,
2) PA to Vice-Chancellor / PA to Registrar / Controller of Examinations / Finance Officer, SSAHE
3) All Officers of the Academy Examination Branch / Academic Section
4) Guard File / Office copy.

Syllabus for VII Semester (2020 Scheme)

SCHEME OF TEACHING AND EXAMINATION

Academic Year: 2024-25

<table>
<tr><td colspan="6">Subjects and Syllabus as per AICTE-
Model Curriculum for UG Course in Engg. & Tech.- Jan. 2018</td><td colspan="4">Teaching
Hours/week</td><td colspan="4">Examination</td></tr>
<tr><td>Sl.
No.</td><td colspan="2">Course and
Course Code</td><td>Course Title</td><td>Teaching
Department</td><td>Board of
Exam</td><td>L</td><td>T</td><td>P</td><td>C</td><td>CIE</td><td>SEE</td><td>Total
Marks</td><td>Exam
hours</td></tr>
<tr><td>01</td><td>PC</td><td>CS7TH1</td><td>Cryptography and Network Security</td><td>CS</td><td>CS</td><td>3</td><td>-</td><td>-</td><td>3</td><td>50</td><td>50</td><td>100</td><td>3</td></tr>
<tr><td>02</td><td>PC</td><td>CS7TH2</td><td>Big Data & Analytics</td><td>CS</td><td>CS</td><td>3</td><td>-</td><td>-</td><td>3</td><td>50</td><td>50</td><td>100</td><td>3</td></tr>
<tr><td>03</td><td>PE</td><td>CS7PE3x</td><td>Professional Elective – III</td><td>CS</td><td>CS</td><td>3</td><td>-</td><td>-</td><td>3</td><td>50</td><td>50</td><td>100</td><td>3</td></tr>
<tr><td>04</td><td>PE</td><td>CS7PE4x</td><td>Professional Elective – IV</td><td>CS</td><td>CS</td><td>3</td><td></td><td>-</td><td>3</td><td>50</td><td>50</td><td>100</td><td>3</td></tr>
<tr><td>05</td><td>PE</td><td>CS7PE5x</td><td>Professional Elective – V</td><td></td><td></td><td>3</td><td></td><td></td><td>3</td><td>50</td><td>50</td><td>100</td><td>3</td></tr>
<tr><td>06</td><td>PC</td><td>CS7LB1</td><td>Cryptography and Network Security Lab</td><td>CS</td><td>CS</td><td>-</td><td>-</td><td>3</td><td>1.5</td><td>50</td><td>50</td><td>100</td><td>3</td></tr>
<tr><td>07</td><td>PC</td><td>CS7LB2</td><td>Advanced Database & Big Data Lab</td><td>CS</td><td>CS</td><td>-</td><td>-</td><td>3</td><td>1.5</td><td>50</td><td>50</td><td>100</td><td>3</td></tr>
<tr><td>08</td><td>PC</td><td>CS7PW1</td><td>Project Phase-I</td><td>CS</td><td>CS</td><td>-</td><td>-</td><td>4</td><td>2</td><td>50</td><td>-</td><td>50</td><td>-</td></tr>
<tr><td colspan="6">Total</td><td>15</td><td>-</td><td>10</td><td>20</td><td>400</td><td>350</td><td>750</td><td>-</td></tr>
<tr><td colspan="14">**L-Lecture, T-Tutorial, P-Practical, C-Credits, CIE-Continuous Internal Evaluation, SEE-Semester End Examination**</td></tr>
</table>

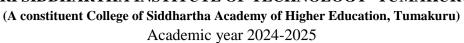| Professional Elective – III	Professional Elective – IV	Professional Elective – V
CS7PE31: Natural Language Processing	CS7PE41: Agile Technologies	CS7PE51: .Net with C#
CS7PE32: High Performance Computing	CS7PE42: Android Programming	CS7PE52: Business Intelligence and its Applications
CS7PE33: Deep Learning	CS7PE43: Information Storage Management	CS7PE53: Software Testing

Department: **Computer Science and Engineering**		Semester:	VII

Subject: **Cryptography and Network Security**				
Subject Code:	**CS7TH1**		L – T – P - C:	**3–0–0–3**

SI. No	Course Objectives
1	Understand the fundamentals of cryptography
2	Acquire knowledge on standard algorithms used to provide confidentiality, integrity and authenticity
3	Describe how to deploy encryption techniques and various key distribution schemes to secure data in transit across data networks
4	Design security applications in the field of information technology

Unit	Description	Hrs
I	**Introduction, Symmetric ciphers** Introduction: The OSI Security Architecture, Security Services, Mechanisms and Attacks, A Model of Network Security. Classical Encryption Techniques: Symmetric Cipher Model, Substitution Techniques, Transposition Techniques, Steganography. Block Cipher and the Data Encryption Standard: Block Cipher principles, The Data Encryption Standard, DES Example, Strength of DES.	8
II	Symmetric ciphers (Contd...) **Block Cipher Operation**: Multiple Encryption and triple DES, Electronic Code Book, Cipher Block Chaining Mode, Cipher Feedback Mode, Output Feedback Mode, Counter Mode. Number Theory: Prime Numbers, Format's and Euler's Theorems, Testing for Primality. Public-Key Cryptography and RSA: Principles of Public-Key Cryptosystems, The RSA Algorithm. Diffie-Hellman Key Exchange.	8
III	**Cryptographic data integrity algorithms** Cryptographic Hash Functions: Applications of Cryptographic hash functions, Two simple hash Functions, Secure Hash Algorithm. Message Authentication: Authentication Requirements, Authentication Functions, Message Authentication Codes, Security of MACs, MACs based on Hash Functions: HMAC. Digital Signatures: Digital Signatures, Digital Signature Standard.	8
IV	**Key management, Transport-level security** Key Management and Distribution: Symmetric Key distribution using symmetric encryption, Symmetric Key distribution using Asymmetric encryption, Distribution of public keys, X.509 certificates, Kerberos. Transport level security: Web Security considerations, Secure Sockets Layer and Transport Layer Security.	8
V	**Internet security, System security** Electronic Mail Security: Pretty Good Privacy. IP Security: Overview, IP Security Policy. Intruders: Intruders, Intrusion detection. Malicious Software: Types of Malicious Software Viruses. Firewalls: The need for Firewalls, Firewall Characteristics, Types of Firewalls.	8

Course Outcomes:

Course outcome	Descriptions
CO1	Explain the basic issues addressed by network security
CO2	Differentiate between working of typical symmetric and asymmetric ciphers.
CO3	Apply effective cryptographic techniques to provide security services in different applications and computer network.
CO4	Identify and describe vulnerabilities, attacks and IP security protocols in Internet domain

Course Articulation Matrix

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	2	1	1		2	2	3						
CO2	2	3	3		3		3	3			3	3		
CO3	3	3	3	3	3	3	3	3			3	3		
CO4		2		2	3	3	3	3				3		

Text Books:

SI No	Text Book title	Author	Volume and Year of Edition
1	Cryptography and Network Security	William Stallings	Sixth Edition, Pearson Education,2014, 978-93-325-1877-3

Reference Books:

SI No	Text Book title	Author	Volume and Year of Edition
1	NetworkSecurity:Private communication in a Public World	Charlie Kaufman, Radia Perlman, Mike Speciner	Second Edition, Pearson Education Asia, 2002 0-13-046019-2
2	Cryptography and Network Security	AtulKahate	TataMcGrawHill, 2003. 0-07-049483-5

Signature of the course coordinator   **Signature of the HoD**   **Signature of the Dean (Academic Affairs)**

Department: **Computer Science and Engineering**		Semester:	VII
Subject: Big Data and Analytics			
Subject Code:	**CS7TH2**	L – T – P - C:	**3–0–0–3**

SI. No	Course Objectives
1	Understand the Big Data Platform and its Use cases
2	Introduce students the concept and challenge of big data
3	Provide HDFS Concepts and Interfacing with HDFS
4	Teach students in applying skills and tools to manage and analyze the big data

Unit	Description	Hrs
I	**Understanding Hadoop Ecosystem** Introducing Hadoop, Cloud Computing and Big Data: Cloud Delivery Models, Cloud Services for Big Data, Cloud Providers in Big Data Market Hadoop Ecosystem, Hadoop Distributed File System: HDFS Architecture, Concept of Blocks in HDFS in HDFS Architecture, NameNodes and DataNodes, HDFS commands, Features of HDFS, MapReduce, Hadoop YARN.	8
II	**Introducing HBase** HBase Architecture, Regions, Storing Big Data with Hbase, Interacting with Hadoop Ecosystem, Hbase in Operation – Programming with HBase, Combining HBase and HDFS: REST and Thrift, Data Integrity in HDFS, Features of HBase, Role of HBase in Big dataProcessing : Characteristics of HBase. **Understanding MapReduce Fundamentals** The MapReduce Framework: Exploring the Features of MapReduce, working of MapReduce, Techniques to Optimize MapReduce Jobs,Uses of MapReduce.	8
III	**Understanding Big Data Technology Foundations** Exploring the Big Data stack: Stack of layers in Big Data Architecture, Virtualization and Big Data, Virtualization approaches: server Virtualization, Application Virtualization, Network Virtualization, Processor and Memory Virtualization, Data and Storage Virtualization, Managing Virtualization with Hypervisor, Implementing Virtualization to work with Big Data.	8
IV	**Introduction to MongoDB and Cassandra** Introduction to MongoDB: What is and Why MongoDB? Terms used in RDBMS and MongoDB, Data types in MongoDB, MongoDB Query language. **Introduction to Cassandra** Apache Cassandra, features, CQL data types, CQLSH, key spaces, CRUD, collections, TTL, using a counter, ALTER commands, import and export, query system tables.	8
V	**Introduction to Pig** What is Pig? The Anatomy of Pig, Pig on Hadoop , Pig Philosophy, Use Case for Pig: ETL Processing, Pig Latin Overview , Data Types in Pig, Running Pig , Execution Modes of Pig ,HDFS Commands ,Relational Operators, Eval Function, Complex Data Types ,Piggy Bank, User-Defined Functions (UDF)	8

	,Parameter Substitution , Diagnostic Operator , Word Count Example using Pig,When to use Pig? When not to use Pig? Pig at Yahoo!,Pig versus Hive.	

Course Outcomes:

Course outcome	Descriptions
CO1	Identify the characteristics of datasets and compare the trivial data and big data for various applications.
CO2	Understand the concept of open source software frame work and its core components.
CO3	Compare and Contrast different Hadoop supporting tools With traditional tool
CO4	How BigData can be analyzed to extract knowledge and apply tools for bigdata analytics

Course Articulation Matrix

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2			3										
CO2	3	2		2	3							3		
CO3	1	1	3	2	3			2				3		
CO4	1		3	1	2			2						

Text Books:

SI No	Text Book title	Author	Volume and Year of Edition
1	Big Data: BlackBook	Dt Editorial Services	Dreamtech Press, Edition2019,978-93-5119-931-1
2	Big Data and Analytics	Seema Acharya, SubhashiniChellappan	1st Edition, Wiley India 2015, SBN:978-81-265-5478-2

Reference Books:

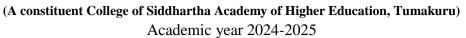| SI No	Text Book title	Author	Volume and Year of Edition
1	Hadoop in Practice	Alex Holmes	2nd Edition, Manning Publications Co., January 2015, ISBN-13:978-9351197423
2	Programming Pig	Alan Gates	2nd Edition, O'Reilly Media, 2017, ISBN-978-1-491-93709-9
3	Programming Hive	Dean Wampler	1st Edition, O'Reilly Media, 2012, ISBN:978-1-449-31933-5

Signature of the course coordinator   **Signature of the HoD**   **Signature of the Dean (Academic Affairs)**

Department: **Computer Science and Engineering**		Semester:	VII

Subject: **Natural Language Processing**				
Subject Code:	**CS7PE31**		**L – T – P - C:**	**3–0–0–3**

Sl.No	Course Objectives
1	Provide theoretical concepts of language processing that shows how to explore interesting bodies of text.
2	Familiarize with fundamental topics in language processing that include tagging, classification, and information extraction using tiny Python programs.
3	Facilitate understanding of formal grammar to describe the structure of an unlimited set of sentences.
4	Acquaint with methods to parse a sentence, recognize its syntactic structure and construct - representations of meaning.
5	Familiarize with design of existing corpora, the typical work flow for creating a corpus and the life cycle of a corpus.

UNIT	Description	Hours
I	**Overview**: Origins and challenges of NLP Language and Grammar- Processing Indian Languages, NLP Applications-Information Retrieval. **Language Modeling**: Introduction-Various Grammar-based Language Models-Statistical Language Model.	8
II	**Word Level Analysis**: Introduction Morphological Parsing-Spelling Error Detection and correction, Words and Word Classes-Part-of Speech Tagging. Parsing: Constituency Parsing - Probabilistic Parsing.	8
III	**Semantic Analysis**: Introduction- Meaning Representation-Lexical Semantics Ambiguity-Word Sense Disambiguation. Discourse Processing: Introduction-cohesion-Reference Resolution Discourse Coherence and Structure.	8
IV	**Natural Language Generation**: Introduction-Architecture of NLG Systems Generation Tasks and Representations-Application of NLG. Problems in Machine Translation, Characteristics of Indian Languages- Machine Translation Approaches Translation involving Indian Languages.	8
V	**Information Extraction**, Automatic Text Summarization, Question Answering System. **LEXICAL RESOURCES**: Introduction - WordNet, FrameNet, Stemmers - POS Tagger, Research Corpora.	8

Course Outcomes:

Course outcome	Descriptions
CO1	Understand the basic concepts and applications of Natural Language processing
CO2	Analyze words using prefix, suffix, grammar, Parts of Speech (PoS)
CO3	Analyze structures of Semantic and Discourse to determine what words and phrases mean in Relationship.
CO4	Analyze Natural Language Generation and apply machine translation.
CO5	Implement levels of NLP system using the Components or lexical resources to demonstrate Morphology syntax of a language.

Course Articulation Matrix

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1													
CO2	1	2	2			2						2		
CO3	2	2	3	3		2						2		
CO4	2	2	3			3						2		
CO5	2										2			

Text Books:

SI No	Text Book title	Author	Volume and Year of Edition
1	Natural Language Processing and Information Retrieval	Tanveer Siddiqui, U.S. Tiwary,	Oxford University Press, 2008. ISBN:978-0195692327

Reference Books:

SI No	Text Book title	Author	Volume and Year of Edition
1	Foundations of Statistical Natural Language Processing	Christopher Manning	MIT Press, July 1999

2	Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics and Speech Recognition	Dan Jurafsky, James H Martin	Pearson Education India,2nd edition (2013)

Signature of the course coordinator   **Signature of the HoD**   **Signature of the Dean (Academic Affairs)**

Department: **Computer Science and Engineering**		Semester:	VII
Subject: High Performance Computing			
Subject Code:	**CS7PE32**	L – T – P - C:	**3–0–0–3**

Sl. No	Course Objectives
1	Understand the fundamentals of modern processor and parallel processing.
2	Acquire knowledge on standard algorithms used to provide confidentiality, integrity and authenticity.
3	Describe how to deploy encryption techniques and various key distribution schemes to secure data in transit across data networks
4	Design security applications in the field of information technology

Unit	Description	Hrs
I	**Introduction to Parallel Computing**: Motivating Parallelism, Scope of Parallel Computing, Parallel Programming Platforms: Implicit Parallelism: Trends in Microprocessor Architectures, Limitations of Memory System Performance, Dichotomy of Parallel Computing Platforms, Physical Organization of Parallel Platforms, Communication Costs in Parallel Machines, Routing Mechanisms for Interconnection Networks, Impact of Process-Processor Mapping and Mapping Techniques.	8
II	**Principles of Parallel Algorithm Design:** Preliminaries, Decomposition Techniques, Characteristics of Tasks and Interactions, Mapping Techniques for Load Balancing, Methods for Containing Interaction Overheads, Parallel Algorithm Models Basic Communication Operations: One-to-All Broadcast and All-to-One Reduction, All-to-All Broadcast and Reduction, All-Reduce and Prefix-Sum Operations, Scatter and Gather, All-to-All Personalized Communication, Circular Shift, Improving the Speed of Some Communication Operations	8
III	**Analytical Modeling of Parallel Programs**: Sources of Overhead in Parallel Programs, Performance Metrics for Parallel Systems, The Effect of Granularity on Performance, Scalability of Parallel Systems. Minimum Execution Time and Minimum Cost-Optimal Execution Time, Asymptotic Analysis of Parallel Programs Section 5.7. Other Scalability Metrics, **Programming Using the Message-Passing Paradigm**: Principles of Message-Passing Programming, The Building Blocks: Send and Receive Operations, MPI: the Message Passing Interface, Topologies and Embedding, Overlapping Communication with Computation, Collective Communication and Computation Operations, Groups and Communicators	8
IV	**Programming Shared Address Space Platforms:** Thread Basics, Why Threads?, The POSIX Thread API, Thread Basics: Creation and Termination, Synchronization Primitives in Pthreads, Controlling Thread and Synchronization Attributes, Thread Cancellation, Composite Synchronization Constructs, Tips for Designing Asynchronous Programs, OpenMP: a	8

	Standard for Directive Based Parallel Programming Dense Matrix Algorithms: Matrix-Vector Multiplication, Matrix-Matrix Multiplication, Solving a System of Linear Equations Sorting: Issues in Sorting on Parallel Computers, Sorting Networks, Bubble Sort and its Variants, Quicksort, Bucket and Sample Sort.	
V	**Graph Algorithms:** Definitions and Representation, Minimum Spanning Tree: Prim's Algorithm, Single-Source Shortest Paths: Dijkstra's Algorithm, All-Pairs Shortest Paths, Transitive Closure, Connected Components, Algorithms for Sparse Graphs, Search Algorithms for Discrete Optimization Problems: Definitions and Examples, Sequential Search Algorithms, Search Overhead Factor, Parallel Depth-First Search, Parallel Best-First Search, Speedup, Anomalies in Parallel Search Algorithms	8

Course Outcomes:

Course outcome	Descriptions
CO1	Illustrate the key factors affecting performance of CSE applications.
CO2	Illustrate mapping of applications to high-performance computing systems
CO3	Apply hardware/software co-design for achieving performance on real-world applications

Course Articulation Matrix

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	1	3	3	2	2	2	2		1	2		
CO2	2	2	1	3	3	2	2	2		1	1	2		
CO3			2	2	2	2	2	2		1	1	2		
CO4														

Text Books:

SI No	Text Book title	Author	Volume and Year of Edition
1	Introduction to Parallel Computing,	AnanthGrama, Anshul Gupta, George Karypis, and Vipin Kumar	2nd edition, Addison-Welsey, 2003

Reference Books:

SI No	Text Book title	Author	Volume and Year of Edition
1	An Introduction to Parallel Computing, Design and Analysis of Algorithms:,	Grama, A. Gupta, G. Karypis, V. Kumar	2/e, Addison-Wesley, 2003.

	Cambridge University		
2	Parallel Scientific Computing in C++ and MPI: A Seamless Approach to Parallel Algorithms and their Implementation	G.E. Karniadakis, R.M. Kirby II,	Press,2003.

Signature of the course coordinator   **Signature of the HoD**   **Signature of the Dean (Academic Affairs)**

Department: **Computer Science and Engineering**		Semester:	VII
Subject: Deep Learning			
Subject Code:	**CS7PE33**	L – T – P - C:	**3–0–0–3**

Sl. No	Course Objectives
1	Understand the concepts of machine learning and deep networks
2	Explain optimization and generalization techniques.
3	Understand dimensionality reduction techniques for high dimensional data
4	Understand deep learning application to solve real world problem

Unit	Description	Hrs
I	**Introduction to Deep Learning:** Introduction, Deep learning Model, Historical Trends in Deep Learning, Machine Learning Basics: Learning Algorithms, Supervised Learning Algorithms, Unsupervised Learning Algorithms.	8
II	**Feedforward Networks:** Introduction to Feedforward neural networks, Gradient-Based Learning, BackPropagation and Other Differentiation Algorithms.Regularization for Deep Learning.	8
III	**Optimization for Training Deep Models:** Empirical Risk Minimization, Challenges in Neural Network Optimization, Basic Algorithms: Stochastic Gradient Descent, Parameter Initialization Strategies, Algorithms with Adaptive Learning Rates: The AdaGrad algorithm, The RMSProp algorithm, Choosing the Right Optimization Algorithm. Right Optimization Algorithm.	8
IV	**Convolutional Networks:** The Convolution Operation, Pooling, Convolution and Pooling as an Infinitely Strong Prior, Variants of the Basic Convolution Function,Structured Outputs, Data Types, Efficient Convolution Algorithms, Random orUnsupervised Features-LeNet, AlexNet.	8
V	**Recurrent and Recursive Neural Networks:** Unfolding Computational Graphs,Recurrent Neural Network, Bidirectional RNNs, Deep Recurrent Networks, Recursive Neural Networks, The Long Short Term Memory and Other Gated RNNs. Applications: Large-Scale Deep Learning, Computer Vision, Speech Recognition, Natural Language Processing and Other Applications.	8

Course Outcomes:

Course outcome	Descriptions
CO1	Explain the fundamental issues and challenges of Deep Learning data, model selection, and model complexity.
CO2	Analyse the architecture and working of various Deep Learning models.
CO3	Apply the suitable Deep Learning model for specific real time applications.
CO4	Implement deep learning algorithms on various real world problems.

Course Articulation Matrix

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2											2		
CO2	2	2										2		
CO3		2	2	3								2		
CO4		2	2	3								2		

Text Books:

SI No	Text Book title	Author	Volume and Year of Edition
1	Deep Learning	Ian Good Fellow, Yoshua Bengio, and Aaron Courville:	The MIT Press, 2016, ISBN: 0262035618

Reference Books:

SI No	Text Book title	Author	Volume and Year of Edition
1	Learning deep architectures for AI Foundations and trends in Machine Learning	Bengio, Yoshua	2009
2	Deep Learning Made Easy with R: A Gentle Introduction for Data Science	N.D.Lewis	2016

Signature of the course coordinator   **Signature of the HoD**   **Signature of the Dean (Academic Affairs)**

Department: **Computer Science and Engineering**		Semester:	VII
Subject: Agile Technologies			
Subject Code:	**CS7PE41**	L – T – P - C:	**3–0–0–3**

Sl. No	Course Objectives
1	To provide students with a theoretical as well as practical understanding of agile software development practices and how small teams can apply them to create high-quality software.
2	To provide a good understanding of software design and a set of software technologies and APIs.
3	To do a detailed examination and demonstration of Agile development and testing techniques.
4	To understand the benefits and pitfalls of working in an Agile team.
	To understand Agile development and testing.

Unit	Description	Hrs
I	**AGILE METHODOLOGY** Theories for Agile Management–Agile Software Development–Traditional Models Agile Model – Classification of Agile Methods – Agile Manifesto and Principles – Agile Project Management – Agile Team Interactions – Ethics in Agile Teams – Agility in Design, Testing – Agile Documentations – Agile Drivers, Capabilities and Values	8
II	**AGILE PROCESSES** Lean Production–SCRUM , Crystal ,Feature Driven Development-Adaptive Software Development – Extreme Programming: Method Overview – Lifecycle – Work Products, Roles and Practices.	8
III	**AGILITY AND KNOWLEDGE MANAGEMENT** Agile Information Systems – Agile Decision Making – Earl_S Schools of KM – Institutional Knowledge Evolution Cycle – Development, Acquisition, Refinement, Distribution, Deployment , Leveraging – KM in Software Engineering – Managing Software Knowledge – Challenges of Migrating to Agile Methodologies – Agile Knowledge Sharing – Role of Story-Cards – Story-Card Maturity Model(SMM).	8
IV	**AGILITY AND REQUIREMENTS ENGINEERING** Impact of Agile Processes in RE–Current Agile Practices – Variance – Overview of RE Using Agile – Managing Unstable Requirements – Requirements Elicitation – Agile Requirements Abstraction Model – Requirements Management in Agile Environment, Agile Requirements Prioritization – Agile Requirements Modeling and Generation – Concurrency in Agile Requirements Generation.	8
V	**AGILITY AND QUALITY ASSURANCE** Agile Product Development – Agile Metrics –Feature Driven Development (FDD) – Financial and Production Metrics in FDD – Agile Approach to Quality Assurance – Test Driven Development – Agile Approach in Global Software Development.	8

Course Outcomes:

Course outcome	Descriptions
CO1	Realize the importance of interacting with business stakeholders in determining the requirements for a software system
CO2	Perform iterative software development processes: how to plan them, how to execute them.
CO3	Point out the impact of social aspects on software development success.
CO4	Develop techniques and tools for improving team collaboration and software quality.

Course Articulation Matrix

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1			3	3					3	3				
CO2		2	3	3	2						3	2		
CO3		3	3	3	3	3						1		
CO4					3		3	3	3	2				

Text Books:

SI No	Text Book title	Author	Volume and Year of Edition
1	Agile Management for Software Engineering: Applying theTheoryof Constraints for Business Results	David J .Anderson and Eli Schragenheim	Prentice Hall, 2003.
2	Agile Software Engineering ,Series:UndergraduateTopicsinComputerScience	Hazza and Dubinsky	Springer, 2009

Reference Books:

SI No	Text Book title	Author	Volume and Year of Edition
1	Agile and Iterative Development: A Managers Guide	CraigLarman	Addison-Wesley,2004
2	Agile InformationSystems: Conceptualization,Construction,and Management	KevinC.Desouza	Butterworth-Heinemann, 2007

Signature of the course coordinator   **Signature of the HoD**   **Signature of the Dean (Academic Affairs)**

Department: Computer Science and Engineering		Semester:	VII
Subject: Android Programming			
Subject Code:	CS7PE42	L – T – P - C:	3–0–0–3

Sl. No	Course Objectives
1	To introduce Android platform and its architecture.
2	To learn activity creation and Android UI designing.
3	To be familiarized with Intent, Broadcast receivers and Internet services.
4	To integrate multimedia, camera and Location based services in Android Application.

Unit	Description	Hrs
I	**Mobility and Android** Introduction, Mobility Panorama, Mobile Platforms, App Development Approaches, Android Overview. Getting Started with Android. Introduction, Setting up Development Environment, Saying Hello to Android, Traversing an Android App Project Structure, Logical Components of an Android App, Android Tool Repository, Installing and Running App Devices. Learning with an Application-3Cheers Cable Introduction,3CheersCable App, Mobile App Development Challenges, Tenets of a Winning App.	8
II	**App User Interface** Introduction, Activity, UI Resources, UI Elements and Events, Interaction among Activities, Fragments, Action Bar. App Functionality- Beyond UI Introduction, Threads, AsyncTask, Service, Notifications, Intents and Intent Resolution, Broadcast Receivers, Telephony and SMS.	8
III	**App Data - Persistence and Access** Introduction Flat Files, Shared Preferences, Relational Data, Data Sharing Across Apps, Enterprise Data. Graphics and Animation. Introduction, Android Graphics, Android Animation.	8
IV	**Multimedia** Introduction, Audio, Video and Images, Playback185, Capture and Storage. Location Services and Maps Introduction, Google Play Services, Location Services, Maps.	8
V	**Sensors**: Introduction, Sensors in Android, Android Sensor Framework, Motion Sensors, Position Sensors, Environment Sensors. Testing Android Apps: Introduction, Testing Android App Components, App Testing Landscape Overview. Publishing Apps Introduction, Groundwork, Configuring, Packaging, Distributing.	8

Course outcome:

Course outcome	Descriptions
CO1	Able to understand various approaches and technologies for App development.
CO2	Capable of understanding, designing user interface app and implementing app functionalities.
CO3	Able to develop location services using device sensors while building android apps.
CO4	Capable of validating, packaging and moving apps to market.

Course Articulation Matrix

CO \ PO/PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1	2									1		
CO2	2	2	1			2	2					1		
CO3	2	3	1	2	3					1		2		
CO4	2	3	1	2	2		2				1	1		

Text Books:

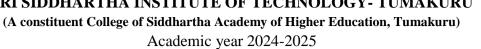| SI No	Text Book title	Author	Volume and Year of Edition
1	Composing Mobile Apps: Learn, Explore and Apply Using Android	Anubhav Pradhan, Anil V. Deshpande	IstEdition,Wiley,2014,ISBN 978-81-265-4660-2

Reference Books:

SI No	Text Book title	Author	Volume and Year of Edition
1	Android Application Development All in one for Dummies	Michael Burton, Donn Felker	2nd Edition, Wiley,2012, ISBN:978-1-118- 38710-8, ISBN978-1-118-41745-4
2	Teach Yourself Android Application Development in 24Hours	Lauren Darcey, Shane Conder	1stEdition , SAMS Publishing,2010, ISBN-13:9780321673350 ISBN-10:0-321-67335-2

Signature of the course coordinator   **Signature of the HoD**   **Signature of the Dean (Academic Affairs)**

Department: **Computer Science and Engineering**		Semester:	VII
Subject: **Information Storage and Management**			
Subject Code:	**CS7PE43**	**L – T – P - C:**	**3–0–0–3**

SI. No	Course Objectives
1	To understand the basics of Storage Networks and Devices
2	To understand the availability of different storage technologies
3	To understand the working and availability of channels for communication
4	To know the applications of storage technologies, Backup &Recovery mechanisms

Unit	Description	Hrs
I	Introduction, Information Storage, Data centre infrastructure, Key challenges, Information Lifecycle, Server centric IT architecture and its limitations, Storage centric IT architecture and its advantages, Case study: Replacing a server with storage networks.	8
II	Architecture of intelligent disk subsystems, Hard disks and internal I/O channels, JBOD, Storage virtualization using RAID and different RAID levels, RAID 0, RAID 1, RAID 10, RAID 01, RAID 4 and RAID 6, RAID Comparisons, Caching: Acceleration of hard disk access, Caching: Intelligent disk subsystems, Logical Unit Numbers, Remote Mirroring, Comparison, Availability of disk subsystems.	8
III	The physical i/o path from the CPU to the storage system, SCSI(Small Computer System Interface): basics, Storage Networks, Fibre Channel Protocol Stack: Links & Topologies, (Fibre Channel 0) FC0, (Fibre Channel 1) FC1, (Fibre Channel 2) FC2, (Fibre Channel 3) FC3, Link & Fabric Services, (Fibre Channel 4) FC4 & (Upper Layer Protocols) ULPs.	8
IV	Local file systems: File systems and Databases, Journaling, Snapshots, Volume Manager, Network file systems and file servers, Shared disk file systems, Comparison: NAS (Network Attached Storage), FC SAN (Fibre Channel Storage Area Networks) and iSCSI SAN	8
V	Definition of Storage virtualization, Implementation considerations, Storage virtualization on Block or File level, Symmetric and Asymmetric storage virtualization.	8

Course Outcomes:

Course outcome	Descriptions
CO1	Analyze and understand the concepts of Storage networks and its various technologies.
CO2	ApplydifferentstoragetechnologiestoestablishDatacentertofulfillthe Storage requirements.
CO3	Understand and apply the concepts like RAID, LUN and Remote mirroring To maintain data safely and securely with backup.
CO4	Apply Fiber channel, SCSI to have error free, efficient and effective data transmission between nodes and datacenters.
CO5	Analyze different scenario to provide the solutions.

Course Articulation Matrix

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1	1	2	2		2				1	1		
CO2	2	1	2	2	2		2				1	1		
CO3		1	2	2	2		2			1	1	1		
CO4	2	1	2	2	2		2			1	2	1		
CO5	2	1	1	1	1		1			1	2	1		

Text Books:

SI No	Text Book title	Author	Volume and Year of Edition
1	Storage networks explained	Ulftroppens,Rainererkinsad Wol fgang Muller	WileyIndia,2017
2	Information Storage and Management,	G.Somasundaram,Alok Shrivastava(Editors)	EMCEducationServices,Wiley-India,2016.

Reference Books:

SI No	Text Book title	Author	Volume and Year of Edition
1	"Storageareanetworkessentials:Acompleteguidetounderstanding&implementingSANs"	RichardBarkerand PaulMassiglia	JohnwileyIndia,2012.
2	"Storage networks: The complete reference"	Robert spalding	TataMcgraw-hill,2003.

Signature of the course coordinator   **Signature of the HoD**   **Signature of the Dean (Academic Affairs)**

Department: **Computer Science and Engineering**	Semester:	VII

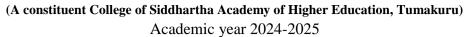| Subject: **.Net & C#**			
Subject Code:	**CS7PE51**	**L – T – P - C:**	**3–0–0–3**

Sl. No	Course Objectives
1	To learn basic programming in .net and C# .
2	Understand Object Oriented Programming concepts in C# programming language.
3	Understand event handling to design GUI.
4	Study object model and file systems.

Unit	Description	Hrs
I	**.Net Framework Overview**- Architecture-.Net Framework class Libraries-CLR-Metadata-Interoperability-Assemblies-the .net Packaging system-CLR-MSIL , Introduction to Visual Studio.Net-C# Programming Concepts-Predefined Types- Value types and reference type, Classes and Objects, Constructors and methods , Collection classes: Array List , Hash Table, Stack ,Queue, indexers and properties.	8
II	**String class**: methods and properties of string class, enumerations, boxing and unboxing, OOPS concepts: Encapsulation, data hiding, inheritance, interfaces, polymorphism, operator overloading, overriding Methods, Static Class members, Delegates and events. Exception Handling, garbage collector, generics and collection	8
III	**Basics of Windows Programming**- Event Driven Programming, Windows Forms, Using common controls-Labels, textboxes, buttons, check boxes, radio button, progress bar, combo box, list box. Components-timer, image list, Menus, Modal and Modeless Dialog Boxes, MDI, Mouse and keyboard event handling.	8
IV	**Introduction to ADO.Net-Object Model**- System. Data Namespace-Data Bound controls- Connected Mechanism-Disconnected mechanism-.Net Data Providers.	8
V	**Files**: System.IO, directory and file types, Stream readers and stream writers, working with binary data.	8

Course Outcomes:

Course outcome	Descriptions
CO1	Understand the concept of .net frame work and C# language fundamentals.
CO2	Understand the basic libraries and its functions.
CO3	Built and debug well-formed web forms.
CO4	Develop web application using ADO.net

Course Articulation Matrix

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2											1		
CO2	2	2		1	2									
CO3		2	3	3								2		
CO4				2	3	1		1				1		

Text Books:

SI No	Text Book title	Author	Volume and Year of Edition
1	C# 4.0 the Complete Reference	Herbert Schildt	Publisher : Osborne/McGraw-Hill; 1st edition (16 June 2010) ISBN-10 : 007174116X ISBN-13 : 978-0071741163
2	Latest version of C# text from Apress(Pro C# 5.0 and the .NET Framework 4.5)	Andrew Trolsens	Publisher : Apress Berkeley, ISBN978-1-4302-4233-8 ISBN978-1-4302-4234-5
3	Weeks, C# and the .NET Framework, Techmedia	Robert Powel, Richard	Publisher:Tech (media 2002) ISBN: 9788176355728

Signature of the course coordinator   **Signature of the HoD**   **Signature of the Dean (Academic Affairs)**

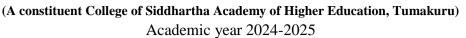| Department: **Computer Science and Engineering**		Semester:	VII
Subject: Business Intelligence and its Applications			
Subject Code:	**CS7PE52**	**L – T – P - C:**	**3–0–0–3**

SI. No	Course Objectives
1	Assess Advanced BI concepts and core IT concepts
2	Explain predictive analytics fundamentals
3	Facilitate advanced problem-solving using data mining
4	Critique problems, issues, and trends using predictive analysis

Unit	Description	Hrs
I	**Introduction to Business Intelligence** Introduction to OLTP, BI Definitions & Concepts, Business Applications of BI, BIO Framework, Role of Data Warehousing in BI, BI Infrastructure Components BI Process, BI Technology, BI Roles & Responsibilities.	8
II	**Basics of Data Integration (Extraction Transformation Loading)** Concepts of data integration need and advantages of using data integration, introduction to common data integration approaches, introduction to ETL using SSIS, Introduction to data quality, data profiling	8
III	**Introduction to Multi-Dimensional Data Modeling** Introduction to data and dimension modeling, multidimensional data model, ER Modeling VS .Multi-dimensional modeling	8
IV	**Introduction to Multi-Dimensional Data Modeling** Concepts of dimensions, facts, cubes, attributes, hierarchies, star and snowflake schema, introduction to business metrics and KPIs, Creating cubes using SSAS.	8
V	**Basics of Enterprise Reporting** Introduction to enterprise reporting, concepts of dashboards, balanced scorecards, introduction to SSRS architecture, enterprise reporting using SSRS	8

Course Outcomes:

Course outcome	Descriptions
CO1	Able to understand how intelligently data is used in industry.
CO2	Able to understand the guidelines to utilize various modern tools for data handling.
CO3	Able to understand the recent applications to make report in enterprise.
CO4	Able to understand the multi-dimensional data modeling for BI applications.

Course Articulation Matrix

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	2	2	2	2	2		2	1		1		
CO2	2	2	1	1	3					1				
CO3		2	2	2	2	2		2	1	1	1	1		
CO4	2	2	1	2	1	2	2	2	2	1	1	1		

Text Books:

SI No	Text Book title	Author	Volume and Year of Edition
1	Fundamentals of Business Analytics	R N Prasad, Seema Acharya	Ist Edition, Wiley India, 2011, ISBN:9788126532032

Reference Books:

SI No	Text Book title	Author	Volume and Year of Edition
1	Delivering business intelligence with Microsoft SQL server	Brain Larson	2nd Edition, McGraw-Hill Professional, 2008 ISBN: 0071549455, 9780071549455
2	Business Intelligence	David Loshin	1st Edition, Morgan Kaufmann, 2010 ISBN: 9781558609167

Signature of the course coordinator   Signature of the HoD   Signature of the Dean (Academic Affairs)

Department: **Computer Science and Engineering**		Semester:	VII
Subject: **Software Testing**			
Subject Code:	**CS7PE53**	**L – T – P - C:**	**3–0–0–3**

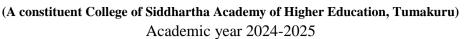| SI. No	Course Objectives
1	Fundamentals for various testing methodologies.
2	Describe the principles and procedures for designing test cases.
3	Provide supports to debugging methods.
4	Acts as the reference for software testing techniques and strategies.

Unit	Description	Hrs
I	**Introduction**: Purpose of Testing, Dichotomies, Model for Testing, Consequences of Bugs, Taxonomy of Bugs. Flow graphs and Path testing: Basics Concepts of Path Testing, Predicates, Path Predicates and Achievable Paths, Path Sensitizing, Path Instrumentation, Application of Path Testing.	8
II	**Transaction Flow Testing**: Transaction Flows, Transaction Flow Testing Techniques. Dataflow testing: Basics of Dataflow Testing, Strategies in Dataflow Testing, Application of Dataflow Testing.	8
III	**Domain Testing**: Domains and Paths, Nice & Ugly Domains, Domain testing, Domains and Interfaces Testing, Domain and Interface Testing, Domains and Testability.	8
IV	**Paths, Path products and Regular expressions**: Path Products & Path Expression, Reduction Procedure, Applications, Regular Expressions & Flow Anomaly Detection. Logic Based Testing: Overview, Decision Tables, Path Expressions, KV Charts, Specifications	8
V	**State, State Graphs and Transition Testing**: State Graphs, Good & Bad State Graphs, State Testing, Testability Tips. **Graph Matrices and Application**: Motivational Overview, Matrix of Graph, Relations, Power of a Matrix, Node Reduction Algorithm, Building Tools.	8

Course Outcomes:

Course outcome	Descriptions
CO1	Capable to support in generating test cases and test suites.
CO2	Having knowledge to test the applications manually by applying different testing methods and automation tools.
CO3	Apply tools to resolve the problems in Real time environment.
CO4	Analyze different testing techniques individually.

Course Articulation Matrix

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1	2	2	3	2	2	2			1	1		
CO2	2	1	1	2	2		2	2				1		
CO3					2		3					1		
CO4	2	1	1	2	2	2	2	2	1		1	1		

Text Books:

SI No	Text Book title	Author	Volume and Year of Edition
1	Software testing techniques	Boris Beizer	Second Edition Dreamtech, ISBN: 9788177222609

Reference Books:

SI No	Text Book title	Author	Volume and Year of Edition
1	Foundations of Software Testing	Aditya P Mathur	1st Edition, Pearson Education, 2012, ISBN: 8131707954, 9788131707951
2	Software testing Principles and Practices	Srinivasan Desikan, Gopalaswamy Ramesh	2nd Edition, Pearson Education, 2007, ISBN: 9788177581218
	The Craft of Software Testing	Brian Marrick	1st Edition, MARICK, 1995 ISBN: 813171571X, 9788131715710

Signature of the course coordinator   **Signature of the HoD**   **Signature of the Dean (Academic Affairs)**

Department: Computer Science & engineering		Semester:	VII
Subject: Cryptography & Network Security Lab			
Subject Code: CS7LB1		L – T – P - C:	0 – 0 – 3 – 1.5

Sl. No	Course Objectives
1	Understand the concepts of different encryption algorithms like Caesar, Playfair, Hill cipher.
2	Get the overview of symmetric algorithm like DES.
3	Understand and implement asymmetric algorithm like RSA and Diffie-Hellman.
4	Develop Digital Signature Scheme for signing and verification of messages.

LAB CONTENT

Sl. No	Experiment Description
1	Implement the following Substitution and Transposition techniques: a) Caesar Cipher b) Playfair Cipher c) Hill Cipher d) Rail fence Cipher e) Mono-alphabetic Cipher
2	Implement the following algorithms: a) DES b) RSA c) Diffie-Hellman d) SHA-1
3	Implement the Signature Scheme - Digital Signature Standard.

Course Outcomes:

Course outcome	Descriptions
CO1	Develop and execute various symmetric ciphers.
CO2	Implement various asymmetric encryption algorithms.
CO3	Implement Digital Signature algorithm for signing and verification of messages.

Course Articulation Matrix

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1		2									1		
CO2				3	2		2					1		
CO3				3	2		2					1		

Signature of the course coordinator

Signature of the HoD

Signature of the Dean (Academic Affairs)

Department: Computer Science & engineering		Semester:	VII
Subject: Advanced Database and Big Data Lab			
Subject Code: **CS7LB2**		**L – T – P - C:**	0 – 0 – 3 – 1.5

Sl. No	Course Objectives
1	Practice advance database programming concepts
2	Practice programming tools PIG and HIVE in Hadoop eco system.
3	Implement best practices for Hadoop development.

Sl. No	Experiment Description
	CYCLE - I
1	Write a program to implement database triggers in PL/SQL by using following schema -employee(e_id, e_name, e_doj, e_salary, e_age, primary key(e_id)) i. Create an employee table and insert any five records. Write row-level trigger for salary changes, Display the relevant message (insert / update / delete operations on employee)

2	Write a program to implement database triggers in PL/SQL by using following schema – employee(e_id,e_name,e_age, primary key(e_id))
	   i. Create an employee table and insert any five records.
	   ii. Write a trigger to check the age of an employee is between 18 to 58, if not raise an error. (during insert / update / delete operations on employee)

3	Write a program to implement cursor in PL/SQL to display the employee details from the following table. emp (eno,ename,designation,doj,salary, primary key(eno))
4	Write a program to implement Procedure in PL/SQL to change the salary of employee by 10% if salary>25000 and 20% if salary<25000.Display the employee details from the following table. employee(eno, ename, designation, doj, salary , primary key(eno))
5	Write a program to implement packages in PL/SQL by using following schema. employee(id, name, age, address, salary, primary key (id)); Create the package for adding, removing and listing a Employee. Display suitable output
	CYCLE- II
1	Querying Data using MangoDB 1. Create a collection named "products" with fields: "name", "category", "price", and "stock". 2. Insert multiple documents into the "products" collection. 3. Write queries to find all products in a specific category. 4. Retrieve products with a price less than a certain value. 5. Find products that are out of stock. 6. Count the number of products in a specific category.

2	Aggregation Framework 1. Create a collection named "orders" with fields: "order_date", "total_amount", and "customer_id". 2. Insert orders into the "orders" collection. 3. Write an aggregation pipeline to calculate the total sales per month. 4. Calculate the average order amount for each customer. 5. Find the customer with the highest total order amount. 6. Group orders by year and month and calculate the total revenue for each period.
3	Indexing and Performance 1. Insert a large number of documents into a collection. 2. Measure the time taken for a simple query without an index. 3. Create an index on a specific field and measure the query performance again. 4. Experiment with compound indexes and observe the impact on query performance. 5. Monitor the performance of the database using the MongoDB profiler.
4	Implement MongoDB queries using CRUD operations for a restaurants collection For the structure of "Restaurants" collection 1. Write a MongoDB query I. to display all the documents in the collection restaurants 2. To display the fields restaurant_id, name, borough and cuisine for all the documents in the Collection restaurant. 3. To display the fields restaurant_id, name, borough and cuisine, but exclude the field _id for all the documents in the collection restaurant 4. To display all the restaurant which is in the borough Bronx 5. To display the first 5 restaurant which is in the borough Bronx. 6. To find the restaurants who achieved a score more than 90 7. To find the restaurants that achieved a score, more than 80 but less than 10
	CYCLE- III
I	Execute the following commands in HADOOP. . To get the list of directories and files at the root of HDFS. . To get the list of complete directories and files of HDFS. . To create a directory (say, sample) in HDFS. . To copy a file from local file system to HDFS. . To copy a file from HDFS to local file system . To copy a file from local file system to HDFS via copy From Local command . To copy a file from Hadoop file system to local file system via copy To Local . To display the contents of an HDFS file on console To copy a file from one directory to another directory . To remove a directory HDFS.

II	***Execute the following commands in HIVE***
	    A. To create a database named "STUDENTS" with comments and database pro
	    B. To display the list of all databases
	    C. To describe the database
	    D. To describe the extended database
	    E. To alter the database properties
	    F. To make the database as current working database
	    G. To drop database
	    H. To create managed table named 'STUDENT'.
	    I. To describe the "STUDENT" table
	    J. To create external table name "EXT_STUDENT".
	    K. To load data into the table from file named student.tsv

III	***Execute the following commands in PIG using the table***

		Input :Student (rollno:int, name:chararray, gpa:float);
		Department(rollno:int, deptno:int, deptname:chararray);
		A. Find the tuples of those student where the GPA is greater than 4.0
		B. Display the name of all students in uppercase
		C. Group tuples of students based on gpa
		D. To remove duplicate tuples of students.
		E. Display the first 3 tuples from the "student" relation.
		F. Display the name of students in Ascending order
		G. To Join two relations namely "student" and "department " based on the value in the "rollno" column
		H. To merge the contents of relations namely "student" and "department "

Course Outcomes:

Course outcome	Descriptions
CO1	Implement the concept of Triggers, Cursors and procedures,
CO2	Implement the CRUD operation in MANGO-DB
CO3	Implement the Pig latin scripts and HIVE programming.

Course Articulation Matrix

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1	2	2			2			1		1		
CO2	1				3					2		1		
CO3	2	1	2	1	3						1	1		
CO4														

Signature of the course coordinator   **Signature of the HoD**   **Signature of the Dean (Academic Affairs)**

Department: Computer Science & Engineering		Semester:	VII
Subject: Project Work Phase – I			
Subject Code:	**CS7PW1**	**L – T – P - C:**	**0 – 0 – 4 – 2**

Description

Scheme of Evaluation

1. Students shall carry out a detailed survey on the Area and the Topic on which they are interested to do the Project work. Students are expected to prepare documentation and submit three different Synopses to the Evaluation Committee.

2. Evaluation Committee will review the synopsis and suggest suitable area for project. If project proposals are not to the expected standards or outdates then recommend the students to resubmit the refined synopsis.

3. Students are expected to give a detailed presentation on the Topic approved and justify the panel members to start their project work.

4. Presentation consists of Basic Overview of the Project which includes Introduction, Literature Survey, Problem Statement, Motivation, Objectives, Requirement Analysis and Specification, Features of Existing and Proposed System and Algorithms Selected.

➢ *Evaluation Scheme-I (50% percent of CIE):*

Continuous evaluation will be done by respective Project Guides based on the Regularity, Technical Knowledge and Competence, Programming Skills, Communication Skills, Demonstration skills, Collaborative Learning and Documentation Skills of the students.

➢ *Evaluation Scheme – II (50% percent of CIE):*

Students are evaluated by the team of faculty members based on the Presentation, Technical Competence, Slides Preparation, Team Working Abilities, Questionnaires and overall Performance in the Seminar-1 and Seminar-2 of Project Phase-I.

Course Outcomes:

Course outcome	Descriptions
CO1	Identify the problem in the specified area by a literature survey.
CO2	Analyze the problem and identify the different modules/algorithms to solve the problems.
CO3	Choose the platform to solve the selected problem.

Course Articulation Matrix

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1	1	2								1		
CO2	2	1	2	2			3					1		
CO3		1	1	1	3	2			1		1	1		
CO4														

Signature of the course coordinator   **Signature of the HoD**   **Signature of the Dean (Academic Affairs)**

Syllabus for VIII Semester (2020 Scheme)

SCHEME OF TEACHING AND EXAMINATION

Academic Year – 2024-25

Sl. No.	Course and Course Code		Course Title	Teaching Department	Board of Exam	L	T	P	C	Duration in Hrs.	CIE	SEE	Total Marks
			Subjects and Syllabus as per AICTE-Model Curriculum for UG Course in Engg. & Tech.- Jan. 2018			Teaching Hours/week				Examination			
01	PE	CS8PE1x	Professional Elective – VI	CS	CS	3	-	-	3	3	50	50	100
02	PE	CS8PE2x	Professional Elective – VII	CS	CS	3	-	-	3	3	50	50	100
03	PC	CS8TS1	Technical Seminar	CS	CS	-	-	-	1	-	50	-	50
04	PC	CS8PW2	Project Phase – 2	CS	CS	-	-	18	9	3	50	50	100
			Total			6	-	18	16	9	400	150	350

L-Lecture, T-Tutorial, P-Practical, C-Credits, CIE-Continuous Internal Evaluation, SEE-Semester End Examination

Professional Elective – VI	Professional Elective – VII
CS8PE11: Mobile Computing	CS8PE21: Information Retrieval System
CS8PE12:Software Architecture and Design Pattern	CS8PE22:System Simulation and Modelling
CS8PE13:User Interface Design	CS8PE23: Blockchain Technology
CS8PE14:Advanced DBMS	CS8PE24: Cyber Security

Department: **Computer Science and Engineering**		Semester:	VIII
Subject: **Mobile Computing**			
Subject Code:	**CS8PE11**	L – T – P - C:	**3–0–0–3**

SI. No	Course Objectives
1	Understand the basic concepts and principles of mobile computing.
2	Discuss the various Emerging Technologies of mobile computing.
3	Compare the different architectures and techniques of mobile Communication Networks.
4	Understand the concepts of SMS and WAP Applications.

Unit	Description	Hrs
I	**Mobile computing Architecture**: Internet-The Ubiquitous Network, Architecture for Mobile Computing, Three-tier Architecture, Design Considerations for Mobile Computing, Mobile Computing through Internet, Making Existing Applications Mobile-Enabled.	8
II	**Emerging Technologies**: Introduction, Bluetooth-Bluetooth Protocol, Bluetooth Protocol Stack, Bluetooth Security, Bluetooth Application Models, Radio Frequency Identification (RFID), Wireless Broadband (WIMAX), Mobile IP-Discovery, Registration, Tunneling, Cellular IP, Internet Protocol Version 6(IPV6)-IPV6 Security, Migrating from IPV4 to IPV6, Mobile IP with IPV6.	8
III	**Global System for Mobile Communication (GSM)**: Global System for Mobile Communications, GSM Architecture, GSM Entities, Call Routing in GSM, PLMN Interfaces, GSM Addresses and Identifiers, Network Aspects in GSM, Mobility Management, Personal Communication Service.	8
IV	**Short Message Service (SMS) and Wireless Application Protocol (WAP)**: Short Message Service (SMS)-Strength of SMS, SMS Architecture, Value Added Service through SMS, Introduction to WAP, WAP, WAE, MMS, GPRS Applications.	8
V	**General Packet Radio Service (GPRS)**: Introduction, GPRS and Packet Data Network, GPRS Network Architecture, GPRS Network Operations, Data Services in GPRS, Applications for GPRS, Limitations of GPRS, Billing and Charging in GPRS.	8

Course Outcomes:

Course outcome	Descriptions
CO1	Explain the various design Considerations for Mobile Computing.
CO2	Analyze the principles and theories of mobile computing technologies.
CO3	Compare the different aspects of mobile Communication Networks.
CO4	Outline the concept of SMS and WAP Applications.

Course Articulation Matrix

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2		3	1			3			1			
CO2	3	3			1			3						
CO3			2	2	3						2			
CO4	2	1	2	2				1		1		2		

Text Books:

SI No	Text Book title	Author	Volume and Year of Edition
1	Mobile Computing, Technology, Applications and Service Creation	Dr.Ashok Talukder, Ms RoopaYavagal, Mr.HasanAhmed	2nd Edition, McGraw Hill Education,2017 ISBN-13:978-0070144576

Reference Books:

SI No	Text Book title	Author	Volume and Year of Edition
1	MobileComputing,	Raj kamal	3rd Edition, 2018, Oxford University Press, ISBN:978-0198068914
2	Wireless Communications and Networks,3G and Beyond,	ItiSahaMisra	2nd Edition, 2017, McGraw Hill Education. ISBN-13: 978-1259062735

Signature of the course coordinator   **Signature of the HoD**   **Signature of the Dean (Academic Affairs)**

Department: **Computer Science and Engineering**		Semester:	VIII
Subject: **Software Architecture and Design Patterns**			
Subject Code:	**CS8PE12**	L – T – P - C:	**3–0–0–3**

Sl. No	Course Objectives
1	Learn the architecture and build the system from the components.
2	Be capable of applying knowledge to create software architecture for an application.
3	Be able to explain the role of analysing architectures.
4	Learn architectural techniques to design and implement a real-world software system.

Unit	Description	Hrs
I	**INTRODUCTION**: The Architecture Business Cycle: Where do architectures come from? Software processes and the architecture business cycle; what makes a "good" architecture? What software architecture is and what it is not; other points of view; Architectural patterns, reference models and reference architectures; Importance of software architecture; Architectural structures and views.	8
II	**Architectural Styles and Case Studies**: Architectural styles; Pipes and filters; Data abstraction and object-oriented organization; Event-based, implicit invocation; Layered systems; Repositories; Interpreters; Process control; Other familiar architectures; Heterogeneous architectures. Case Studies: Keyword in Context;	8
III	**Architectural Patterns** – 1: Introduction; from mud to structure: Layers, Pipes and Filters, Blackboard, Distributed Systems: Broker	8
IV	**ARCHITECTURAL PATTERNS** – 2: Interactive Systems: MVC, Presentation-Abstraction-Control. Micro kernel and Refection	8
V	**Designing and Documenting Software Architecture: Architecture in the life cycle**: Designing the architecture; forming the team structure; creating a skeletal system. Uses of Architectural documentation; Views; choosing the relevant views; documenting a view; Documentation across views	8

Course Outcomes:

Course outcome	Descriptions
CO1	To apply the knowledge of various architectural tactics and styles in given scenario
CO2	To apply architectural styles for designing software systems.
CO3	Identify and assess the quality attributes of a system at the architectural level.
CO4	Generate architectural alternatives for a problem and selection among them.

Course Articulation Matrix

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1		2	2	2								2		
CO2			3	2	2									
CO3		3		1								1		
CO4		2	3	3	2							2		

Text Books:

SI No	Text Book title	Author	Volume and Year of Edition
1	Software Architecture in Practice	Len Bass, Paul Clements, Rick Kazman	2nd Edition, Pearson Education, 2010. ISBN 978-81-7758-996-2
2	Software Architecture-Perspectives on an Emerging Discipline	Mary Shaw and David Garland	Prentice-Hall of India, 2013 , ISBN 978-0131829572

Reference Books:

SI No	Text Book title	Author	Volume and Year of Edition
1	Design Patterns- Elements of Reusable Object-Oriented Software	E. Gamma, R.Helm, R. Johnson, J. Vlissides	Addison-Wesley, 1995.
2	Pattern-Oriented Software Architecture A System of Patterns - Volume 1	Regine Meunier, Hans Rohnert, Peter Sommerlad, Michael Stal,	JohnWiley and Sons, 2006.

Signature of the course coordinator   **Signature of the HoD**   **Signature of the Dean (Academic Affairs)**

Department: **Computer Science and Engineering**			Semester:	VIII
Subject: User Interface Design				
Subject Code:	**CS8PE13**		**L – T – P - C:**	**3–0–0–3**

Sl. No	Course Objectives
1	To study the concept of menus, windows, interfaces
2	To study about business functions
3	To study the characteristics and components of windows and the various controls for the windows.
4	To study about various problems in windows design with color, text, graphics and To study the testing methods

Unit	Description	Hrs
I	The User Interface-Introduction, Overview, The importance of user interface – Defining the user interface, The importance of Good design, Characteristics of graphical and web user interfaces-The Graphical User Interface, The Web User Interface, Principles of user interface design.	8
II	The User Interface Design process- Obstacles and Pitfalls in the Development Path, Usability, Important Human characteristics in Design, Human Interaction speeds, Understand the Business functions-Business definition and requirement analysis, Determining Basic Business Functions, Design standards or Style Guides.	8
III	Develop System menus and navigation schemes- Structures of menus, Functions of menus, Contents of menus, Formatting of menus, Phrasing the menu, Selecting menu choices, Website Navigation, Kinds of graphical menus.	8
IV	Select the Proper Kinds of windows- Window Characteristics, Components of a window, Window presentation styles, Types of window, Organising window functions, The web and the Browser, Select the proper Interaction devices - Input Devices, Output Devices.	8
V	Choose the proper Screen based controls- Operable control, Text Entry / Read-only control, Selection controls, Custom control, Presentation control, Examples.	8

Course Outcomes:

Course outcome	Descriptions
CO1	Gain insight into theories and current topics in user interface design.
CO2	Design the User Interface like menu creation, windows creation and connection between menus and windows.
CO3	Get Practical experience in design of the components that make up a graphical user interface.
CO4	To organise information, explore and choosing the right UI patterns.

Course Articulation Matrix

PO/PSO\nCO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2											1		
CO2	2	2	2									1		
CO3	2	2	2									1		
CO4	2											1		

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	"The Essential Guide to User Interface Design"	Wilbert O. Galitz	John Wiley & Sons, Third Edition 2007. ISBN-13: 978-0-470-05342-3 ISBN-10: 0-470-05342-9.
2	"The Essential Guide to User Interface Design"	Wilbert O. Galitz	John Wiley & Sons, Third Edition 2007. ISBN-13: 978-0-470-05342-3 ISBN-10: 0-470-05342-9.

Reference Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Design the User Interface	Ben Sheiderman	Pearson Education, 1998
2	The Essential of User Interface Design	Alan Cooper	Wiley- Dream Tech Ltd.,2002

Signature of the course coordinator   **Signature of the HoD**   **Signature of the Dean (Academic Affairs)**

Department: **Computer Science and Engineering**		Semester:	VIII
Subject: Advanced DBMS			
Subject Code:	**CS8PE14**	**L – T – P - C:**	**3–0–0–3**

SI. No	Course Objectives
1	Learn the concepts and techniques for data storage and query Evaluation.
2	Understand the concept of distributed database technology.
3	Learn the guidelines for index selection and tuning techniques.
4	Understand the recent applications in different databases.

Unit	Description	Hrs
I	**Overview of Storage and Indexing, Disks and Files: Data on external storage**; File organizations and indexing; Index data structures; Comparison of file organizations; Indexes and performance tuning. Memory hierarchy; RAID; Disk space management; Buffer manager; Files of records; Page formats and record formats.	8
II	**Overview Of Query Evaluation, External Sorting: The system catalog**; Introduction to operator evaluation; Algorithms for relational operations; Introduction to query optimization; Alternative plans: A motivating example; what a typical optimizer does. When does a DBMS sort data? A simple two-way merge sort; External merge sort.	8
III	**Evaluating Relational Operators**: The Selection operation; General selection conditions; The Projection operation; The Join operation; The Set operations; Aggregate operations; The impact of buffering.	8
IV	**Distributed databases and client-server Architectures**: Distributed database concepts, data fragmentation, Replication and allocation techniques for distributed database design. Types of distributed a systems, query processing in Distributed databases, overview of concurrency control and recovery in distributed databases. An overview of 3-tier client server architecture.	8
V	**Physical Database Design And Tuning: Introduction**; Guidelines for index selection, examples; Clustering and indexing; Indexes that enable index-only plans; Tools to assist in index selection; Overview of database tuning; Choices in tuning the conceptual schema; Choices in tuning queries and views; Impact of concurrency; DBMS benchmarking. More Recent Applications: Mobile databases; Multimedia databases; Geographical Information Systems; Genome data management.	8

Course Outcomes:

Course outcome	Descriptions
CO1	Explain the basic concepts of how data is store in file organization, indexing and query optimization.
CO2	Able to apply the choices of database tuning techniques.
CO3	Analyze the concept and working of distributed database system.
CO4	To organise information, explore and choosing the right UI patterns.

Course Articulation Matrix

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2											3		
CO2	2	2										2		
CO3	2											3		
CO4	2		1	2		3	2					2		

Text Books:

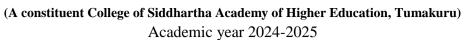| SI No	Text Book title	Author	Volume and Year of Edition
1	Database Management Systems	Raghu Ramakrishna, Johannes Gherkin	3rd Edition,McGraw- Hill, 2014, ISBN-10: 9339213114 ISBN-13: 978-9339213114
2	Fundamentals of Database Systems	Elmasri and Nava the	7th Edition, Edition-Wesle y, 2016 ISBN-10: 0133970779 ISBN-13: 978-0133970777

Reference Books:

SI No	Text Book title	Author	Volume and Year of Edition
1	Database Systems	Thomas M. Connolly, Carolyn E. Begg	6th Edition, Pearson Education, 2015, ISBN-10:0321210255 ISBN- 13:9780321210258

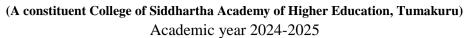**Signature of the course coordinator**   **Signature of the HoD**   **Signature of the Dean (Academic Affairs)**

Department: **Computer Science and Engineering**		Semester:	VIII
Subject: Information Retrieval System			
Subject Code:	**CS8PE21**	**L – T – P - C:**	**3–0–0–3**

SI. No	Course Objectives
1	Demonstrate genesis and diversity of information retrieval situations for text and hyper media.
2	Demonstrate the usage of different data/file structures in building computational search engines.
3	Analyze the performance of information retrieval using advanced techniques such as classification, clustering, and filtering over multimedia.
4	Demonstrate Information visualization technologies like Cognition and perception in the Internet or Web search engine.

Unit	Description	Hrs
I	Introduction: Retrieval strategies: vector space model, Probabilistic retrieval strategies: Simple term weights, Non binary independence model, Language models.	8
II	Retrieval Utilities: Relevance feedback, clustering, Passage based retrieval , N-grams, Regression analysis, Thesauri.	8
III	Retrieval utilities: Semantic networks, parsing Cross –Language: Information Retrieval: Introduction, Crossing the Language barrier.	8
IV	Efficiency: Inverted Index, Query processing, Signature files, Duplicate document detection.	8
V	Integrating structured data and text. A historical progression, Information retrieval as relational application, Semi Structured search using a relational schema. Distributed Information Retrieval: A theoretical Model of Distributed retrieval, web search	8

Course Outcomes:

Course outcome	Descriptions
CO1	Describe the objectives of information retrieval systems.
CO2	Describe models like vector-space, probabilistic and language models to identify the similarity of query and document.
CO3	Implement clustering algorithms like hierarchical agglomerative clustering and k-means algorithm.
CO4	Understand relevance feedback in vector space model and probabilistic model.

Course Articulation Matrix

PO/PSO \ CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2											1		
CO2	2	2										1		
CO3	2	2										1		
CO4	2											1		

Text Books:

SI No	Text Book title	Author	Volume and Year of Edition
1	Information Retrieval – Algorithms and Heuristics	David A. Grossman, OphirFrieder	Springer, 2nd Edition(Distributed by Universal Press), 2004

Reference Books:

SI No	Text Book title	Author	Volume and Year of Edition
1	An Introduction to Information Retrieval	Christopher D Manning, PrabhakarRaghavan, HinrichSchutze	Cambridge University Press, England, 2009

Signature of the course coordinator   **Signature of the HoD**   **Signature of the Dean (Academic Affairs)**

Department: **Computer Science and Engineering**		Semester:	VIII
Subject: **System Simulation and Modelling**			
Subject Code:	**CS8PE22**	L – T – P - C:	**3–0–0–3**

SI. No	Course Objectives
1	Develop mathematical formulation for linear programming and transportation problem
2	Define Queuing system and their characteristics.
3	Construct the required activities in an efficient manner so as to complete it on or before a specified time limit and at the minimum cost.
4	Develop mathematical model for interactive decision.

Unit	Description	Hrs
I	**Introduction:** When simulation is the appropriate tool and when it is not appropriate, Advantages and disadvantages of Simulation; Areas of application, Systems and system environment; Components of a system; Discrete and continuous systems, Model of a system; Types of Models, Discrete-Event System Simulation examples: Simulation of queuing systems. General Principles, Simulation Software: Concepts in Discrete-Event Simulation. The Event-Scheduling / Time-Advance Algorithm, Manual simulation Using Event Scheduling.	8
II	**Statistical Models in Simulation** Review of terminology and concepts, Useful statistical models, Discrete distributions. Continuous distributions, Poisson process, Empirical distributions. Queuing Models: Characteristics of queuing systems, Queuing notation, Long-run measures of performance of queuing systems, Long-run measures of performance of queuing systems cont.., Steady-state behavior of M/G/1 queue, Networks of queues.	8
III	**Random-Number Generation** Properties of random numbers; Generation of pseudo-random numbers, Techniques for generating random numbers, Tests for Random Numbers, Random-Variate Generation: Inverse transform technique Acceptance-Rejection technique.	8
IV	**Input Modeling** Data Collection; Identifying the distribution with data, Parameter estimation, Goodness of Fit Tests, Fitting a non- stationary Poisson process, Selecting input models without data, Multivariate and Time-	8

		Series input models. Estimation of Absolute Performance: Types of simulations with respect to output analysis, stochastic nature of output data, Measure of performance and their estimation.	
V	**Measures of performance and their estimation**		8
		Output analysis for terminating simulations Continued.., Output analysis for steady-state simulations. Verification, Calibration And Validation: Optimization: Model building, verification and validation, Verification of simulation models, Verification of simulation models, Calibration and validation of models, Optimization via Simulation	

Course Outcomes:

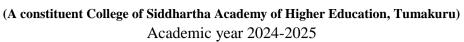| Course outcome	Descriptions
CO1	Describe the role of important elements of discrete event simulation and modeling paradigm.
CO2	Conceptualize real world situations related to systems development decisions, originating from source requirements and goals.
CO3	Develop skills to apply simulation software to construct and execute goal- driven system models.
CO4	Interpret the model and apply the results to resolve critical issues in a real world environment.

Course Articulation Matrix

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1										2		
CO2	2			3								2		
CO3			3		2									
CO4		2	2	2										

Text Books:

SI No	Text Book title	Author	Volume and Year of Edition
1	Discrete Event system Simulation	Jerry Banks, John S Carson, Berry L Nelson, David M Nicol	5th Edition, Pearson Education, Asia, 2013, ISBN: 81-203-2832-9

Reference Books:

SI No	Text Book title	Author	Volume and Year of Edition
1	System Simulation	Geoffrey Gordon	2nd Edition, Prentice Hall publication, 1978, ISBN: 81-203-0140-4.
	Simulation Modelling& Analysis	Averill M Law, WDavid Kelton	4th Edition, McGraw Hill International Editions IndustrialEngineering series, ISBN: 0-07-100803-9.

Signature of the course coordinator   **Signature of the HoD**   **Signature of the Dean (Academic Affairs)**

Department: **Computer Science and Engineering**		**Semester:**	**VIII**
Subject: Blockchain Technology			
Subject Code:	**CS8PE23**	**L – T – P - C:**	**3–0–0–3**

SI. No	Course Objectives
1	Understand the basics of blockchain technology
2	Describe the working principle of a Blockchain and its architecture
3	Explore different blockchain platforms
4	Understand the applications of Blockchain technology outside the currency

Unit	Description	Hrs
I	**Blockchain 101**: Distributed systems, The history of blockchain, Introduction to blockchain, Types of blockchain, CAP theorem and blockchain Benefits and limitations of blockchain	8
II	**Decentralization and cryptography**: Decentralization using Blockchain, Methods of decentralization, routes to decentralization, Blockchain and full echo system decentralization, Smart Contract, Decentralize organizations, Decentralized autonomous organization, Decentralized autonomous corporation, decentralized autonomous societies, Decentralized applications, Platforms for decentralization, Cryptographic primitives, Asymmetric cryptography, Public and Private keys- hash functions	8
III	**Bitcoin and Alternative coins**: Bitcoin, Transactions, Blockchain, Wallets, Bitcoin payments, Alternative Coins-Theoretical foundations, Bitcoin limitations.	8
IV	**Smart Contracts and Ethereum 101**: Smart Contracts: Definition, Ricardian contracts. Ethereum 101: Introduction, Ethereum blockchain, Elements of the Ethereum blockchain, Precompiled contracts, Accounts, Block, Ether, Messages, The Ethereum network, Applications developed on Ethereum	8
V	**Alternative Blockchains**: Blockchains- Kadena, Platforms, Blockchain-Outside of Currencies: Internet of Things, Government, Health, Finance, Media	8

Course Outcomes:

Course outcome	Descriptions
CO1	Describe the fundamental theory of blockchain such as decentralization, cryptography, and it's architecture.
CO2	Demonstrate the use on smart contracts and consensus protocols in implementing blockchains.
CO3	Analyze the design principles of different distributed ledger platforms including Ethereum, Bitcoin
CO4	Examine the applications of blockchain beyond cryptocurrencies

Course Articulation Matrix

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	3	2		2				2	2	1		
CO2	3	2	2	2		2				2		1		
CO3		3	2	3	2					2				
CO4				2		2	2			2		2		

Text Books:

SI No	Text Book title	Author	Volume and Year of Edition
1	Mastering Blockchain- Distributed ledgers, decentralization and smart contracts explained	Imran Bashir	Packet Publishing Ltd, Second Edition, ISBN 978-1- 78712-544-5, 2017
2	Blockchain Technology Overview-	Dylan Yaga, Peter Mell, Nik Roby Karen Scarfone	NISTIR 8202

Reference Books:

SI No	Text Book title	Author	Volume and Year of Edition
1	Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction	Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder	Princeton University Press (July 19, 2016).
2	Blockchain Basics	D. Drescher	Apress, 2017
3	Mastering Bitcoin	Andreas M Antonopoulos	O'Reilly Media publications, First Edition, ISBN: 978-1- 449-37404-4, Dec. 2014

Signature of the course coordinator   **Signature of the HoD**   **Signature of the Dean (Academic Affairs)**

Department: **Computer Science and Engineering**	Semester:	VIII
Subject: Cyber Security		
Subject Code:	CS8PE24	L – T – P - C:	3–0–0–3

Sl. No	Course Objectives
1	Gain the knowledge of cyber security that helps to understand the implications of cybercrime.
2	Understand different types of Cyber-attacks with an overview on social engineering.
3	Learn about password cracking, trojan horses, backdoors, types of phishing and its related techniques.
4	Appreciate the concepts of cyber forensics and digital evidence.

Unit	Description	Hrs
I	**Introduction to Cybercrime**: Introduction, Cybercrime: Definition and Origins of the Word, Cybercrime and Information Security, who are Cybercriminals? Classifications of Cybercrimes, Cybercrimes: An Indian Perspective, Hacking and the Indian Laws, A Global Perspective on Cybercrimes.	8
II	**Cyber offenses**: How Criminals Plan Them: Introduction, How Criminals Plan the Attacks, Social Engineering, Cyberstalking, Cybercafe and Cybercrimes. **Botnets:** The Fuel for Cybercrime.	8
III	**Tools and Methods Used in Cybercrime**: Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Keyloggers and Spywares, Virus and Worms, Trojan Horses and Backdoors, Steganography, DoS and DDOS Attacks	8
IV	**Phishing and Identity Theft**: Introduction, Methods of Phishing, Phishing Techniques, Spear Phishing, Types of Phishing Scams, Phishing Toolkits and Spy Phishing, Phishing Countermeasures, Identity Theft (ID Theft)	8
V	**Understanding Computer Forensics**: Introduction, Historical Background of Cyberforensics, Digital Forensics Science, The Need for Computer Forensics, Cyberforensics and Digital Evidence, Digital Forensics Life cycle.	8

Course Outcomes:

Course outcome	Descriptions
CO1	Describe various cybercrimes and cyber laws
CO2	Explain different types of Cyber-attacks, Criminal plans and fuel for cybercrime.
CO3	Illustrate Tools and Methods used in Cybercrime.
CO4	Justify the Need of Computer Forensics.

Course Articulation Matrix

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	2				3		3						
CO2		2	3	3				2				2		
CO3				3	3			2						
CO4						2	2	2				1		

Text Books:

SI No	Text Book title	Author	Volume and Year of Edition
1	Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives	Sunit Belapure, Nina Godbole	1st Edition (Reprinted 2018), Wiley India Pvt Ltd, ISBN: 978-81- 265-21791

Reference Books:

SI No	Text Book title	Author	Volume and Year of Edition
1	Cybersecurity: Managing Systems, Conducting Testing, and Investigations	Thomas J. Mowbray	John Wiley & Sons, ISBN: 978-1-118-69711-5, 2014

Signature of the course coordinator   **Signature of the HoD**   **Signature of the Dean (Academic Affairs)**

Department: Computer Science & Engineering		Semester:	VIII
Subject: Technical Seminar			
Subject Code:	CS8TS1	L – T – P - C:	0– 0 – 0 – 1

Guidelines for preparing Technical Seminar

1. Selection of Topic/Domain:

Each student shall identify a topic/domain of current cutting edge technology in the field of Computer Science and Engineering. Student is also allowed to choose the recent research paper/article of the standard journal.

2. Approval of the Topic:

After selecting the topic or research paper, get approval by the concerned faculty.

3. Collect and acquire thorough knowledge:

Students are required to collect sufficient information (past and recent updates) about the topic they have chosen and allowed to read the related research papers and refer the books.

4. Final Report and Presentation:

Students are required to prepare a final report of the collected information about the topic chosen and prepare a Power point presentation under the guidance of the concerned faculty.
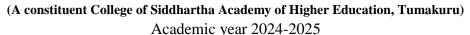
Course outcomes:

Course outcome	Descriptions
CO1	Survey the changes in the technologies relevant to the topic selected.
CO2	Discuss the technology and interpret the impact on the society, environment and domain.
CO3	Compile report of the study and present to the audience.

Course Articulation Matrix

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2		2			1							
CO2	2	2	2	3	3		2					1		
CO3						2		2	2	2				

Signature of the course coordinator   **Signature of the HoD**   **Signature of the Dean (Academic Affairs)**

Department: Computer Science & Engineering		Semester:	VIII
Subject: Project Work Phase – II			
Subject Code:	**CS8PW2**	L – T – P - C:	0– 0 – 18 – 9

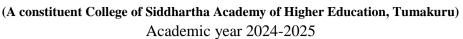| Description |
|---|
| 1. Student should give a presentation to the guide on the system requirements and design phase which includes hardware and software requirements, system architecture, high level design, low level design, system models, required implementation tools and algorithms. |
| 2. Students are allowed to complete the project by implementing/simulating to generate expected results under the guidance of project guide. |
| 3. Students are required to prepare the final report of the project with the generated results, future scope and conclusions. |
| 4. Students have to demonstrate the working model of the project to their respective evaluation panel. |

Evaluation:

➢ Continuous evaluation is done by respective evaluation panel based on the regularity, technical knowledge and competence, programming skills, communication skills, collaborative learning, demonstration skills and documentation skills of the students.

Demonstration:

Students have to demonstrate the working model of the project to their respective project guide and for External examiner in the final exam.

Course Outcomes:

Course outcome	Descriptions
CO1	Design a suitable system according to the problem stated inproject work phase – I.
CO2	Implement the design using necessary algorithms and tools.
CO3	Test the performance of the system with suitable data.

Course Articulation Matrix

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1		2	1				2		2		1		
CO2				3	2	2	2	2	2	2	2	2		
CO3		2			2	2		2	2					

Signature of the course coordinator

Signature of the HoD

Signature of the Dean (Academic Affairs)