Department of Computer Science & Engineering

Final Year
Bachelor in Technology (B. Tech)
Computer Science & Engineering
2023-24

B. Tech. Computer Science & Engineering
Syllabus Structure and Curriculum under Autonomy

Abbreviations

Sr. No.	Acronym	Definition
1	ISE	In-Semester Examination
2	ISE-I	In-Semester Examination-I
3	ISE-II	In-Semester Examination-II
4	ESE	End-Semester Examination
5	ISA	In-Semester Assessment (Term Work)
6	L	Lecture
7	T	Tutorial
8	P	Practical
9	CH	Contact Hours
10	C	Credit

Course/ Subject Categories

Sr. No.	Acronym	Definition
1	BSC	Basic Science Course
2	HSC	Humanity Science Course
3	ESC	Engineering Science Course
4	PCC	Professional Core Course
5	OEC	Open Elective Course
6	MC	Mandatory Course
7	PEC	Professional Elective Course
8	PW	Project Work (Mini and Major Project)
9	II	Industrial Internship

Course/ Subject Code

C	S	E	7	0	1
Branch Code			Semester	Course Number	

Course Term work and POE Code

C	S	E	7	0	1	T / P / A
Branch Code			Semester	Course Number		T- Term work P- POE A- Audit Course H- Honors' Course

Tatyasaheb Kore Institute of Engineering and Technology, Warananagar
An Autonomous Institute

Department of Computer Science & Engineering

Vision

To become center of excellence in the field of Computer Science and Engineering and develop competent IT technocrats

Mission

- To develop engineering graduates with high degree of processional excellence
- To excel in academics and research through contemporary and real world problems
- To enhance graduate employability through work based learning in social entrepreneurship
- To encourage industrial and nationally recognized institutes collaboration
- To create an environment to nurture lifelong learning

Program Educational Objectives (PEOs)

Graduates will be,
- Able to design and develop computing system using modern technologies by adapting business intelligence and challenges.
- Able to acquire capabilities with aptitude for higher education and entrepreneurship
- Able to function effectively as professionals having excellent interpersonal skills with ethical and social obligations.
- Able to work efficiently in multidisciplinary and multicultural environment
- Able to lead in their respective domain and contribute positively to the needs of society.

Program Specific Outcomes (PEOs)

Graduate will be able to
- Identify, design and develop solution for real world problems by implementing phases of software development process model
- Analyze and apply the computer science engineering solutions in societal and human context
- Demonstrate the skills and knowledge of contemporary issues in the field of Computer science and Engineering

Quality Policy

- To promote excellence in academic and training activities by inspiring students for becoming competent professionals to cater industrial and social needs.

Tatyasaheb Kore Institute of Engineering and Technology, Warananagar

An Autonomous Institute

Department of Computer Science & Engineering

Program Outcomes (POs)

The students after successfully completing this programme will have ability to:

- **PO1: Engineering Knowledge**:
  Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

- **PO2: Problem Analysis**:
  Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

- **PO3: Design/Development of Solutions**:
  Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

- **PO4: Conduct Investigations of Complex Problems**:
  Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

- **PO5: Modern Tool Usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

- **PO6: The Engineer and Society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice

- **PO7: Environment and Sustainability**:
  Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

- **PO8: Ethics**:
  Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

- **PO9: Individual and Team Work**:
  Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

- **PO10: Communication**:
  Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

- **PO11: Project Management and Finance**:
  Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

- **PO12: Life-long learning**:
  Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change

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Course/ Subject Code

C	S	E	3	0	1
Branch Code			Semester	Course Number	

Course Term work and POE Code

C	S	E	3	0	1	T/P / A
Branch Code			Semester	Course Number		T- Term work P- POE A- Audit Course H- Honours Course

Final Year B. Tech
(Computer Science & Engineering)
Semester VII
Detailed Syllabus

Final Year B.Tech (Computer Science & Engineering)

Semester-VII
Final Year B.Tech (Regular Track)

(To be implemented from 2023 - 24)
Curriculum Structure, Credit Scheme and Evaluation Scheme

Course Code	Category	Course Title	Teaching and Credit Scheme					Examination & Evaluation Scheme		
			L	T	P	CH	C	Scheme	Marks	Min for Passing
CSE701	PCC	Artificial Intelligence	3	-	-	3	3	ISE	40	16
								ESE	60	24
CSE702	PCC	Cloud Computing	3	-	-	3	3	ISE	40	16
								ESE	60	24
CSE703	PCC	Advanced Database Systems	3	-	-	3	3	ISE	40	16
								ESE	60	24
CSE704	PEC-I	Block Chain & Cryptocurrency	2	-	-	2	2	ISE	40	16
CSE705		Deep Learning						ESE	60	24
CSE702P	PCC	Cloud Computing Lab	-	-	2	2	1	ISA (TW)	50	20
CSE703P	PCC	Advanced Database Systems Lab	-	-	2	2	1	ISA (TW)	50	20
								ESE (POE)	50	20
CSE706P	PCC	Web Technologies	2	-	4	6	3	ISA (TW)	50	20
								ESE (POE)	50	20
CSE707P	PW	Project – I	-	-	4	4	4	ISA (TW)	75	30
								ESE (OE)	75	30
CSE708A		**Audit Course VII:** Workshop Certification/ MOOC Course	-	-	-	-	-	--		
TOTAL			13	-	12	25	20	--	800	--

- ISE : In Semester Examination
- ESE : End Semester Examination
- ISA : In Semester Assessment

CSE701 (PCC) - Artificial Intelligence

Teaching Scheme			**Evaluation Scheme**		
Lectures	:	3 Hrs/Week	ISE	:	40 Marks
Credits	:	3	ESE	:	60 Marks

Course Objective: The objective of this course is to	
1	Gain a historical perspective of AI and its foundation
2	Become familiar with basic principles of AI toward problem-solving
3	Get to know approaches of inference, perception, Uncertain Knowledge, and Reasoning

Course Outcomes:		
COs	**At the end of the successful completion of the course, the students will be able to**	**Bloom's Taxonomy**
CO1	Implement knowledge of agent architecture, searching, and reasoning techniques for different applications.	Apply
CO2	Investigate Searching and Inferencing Techniques.	Analyse
CO3	Establish knowledge base sentences using propositional logic and first-order logic.	Develop
CO4	Illustrate the application of probability in uncertain reasoning.	Apply
CO5	Assess the AI expert systems using engineering knowledge.	Evaluate

| **Course Description:**		
In this course, students will learn what Artificial Intelligence (AI) is, explore use cases and applications of AI, and understand AI concepts and terms like machine learning, deep learning, and neural networks.		
Prerequisites:	1	Basic knowledge of Statistics and modelling.
	2	Ability to understand complex algorithms like classification, Regression, etc.
Section – I		
Unit-1	**Introduction to AI**	**06 Hours**
	Introduction: What is AI? Foundations and History of AI Intelligent Agents: Agents and environment, Concept of Rationality, The nature of the environment, The structure of agents.	
Unit-2	**Uninformed Searching Strategies**	**06 Hours**
	Problem-solving: Problem-solving agents, Example problems, Searching for Solutions Uninformed Search Strategies: Breadth First Search, Depth First Search, Iterative deepening depth-first search;	
Unit-3	**Informed Search Strategies**	**07 Hours**
	Informed Search Strategies: Heuristic functions, Greedy best-first search, A*search. Heuristic Functions Logical Agents: Knowledge–based agents, The Wumpus world, Logic, Propositional logic, Reasoning patterns in Propositional Logic.	
Section – II		
Unit-4	**First Order Logic**	**06 Hours**
	First Order Logic: Representation Revisited, Syntax and Semantics of First Order logic, Using First Order logic. Inference in First Order Logic: Propositional Versus First Order Inference, Unification, Forward Chaining, Backward Chaining, Resolution	
Unit-5	**Uncertain Knowledge and Reasoning**	**06 Hours**
	Uncertain Knowledge and Reasoning: Quantifying Uncertainty, acting under Uncertainty, Basic Probability Notation, Inference using Full Joint Distributions, Independence, Baye's Rule and its use. Wumpus World Revisited	
Unit-6	**Expert Systems**	**06 Hours**
	Expert Systems: Characteristics of expert system, components of expert system, expert system development: Rule based expert system, meta rules and knowledge, Knowledge engineering, Applications of expert system, case studies: A simple medical expert system.	
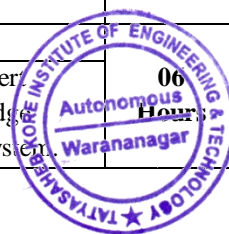
Mapping of POs & COs:

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

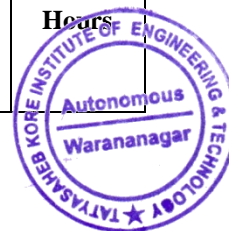| References |
|---|
| **Text Books :** |
| 1   Artificial Intelligence, Stuart J. Russell and Peter Norvig, 3rd Edition, Pearson,2015 |
| 2   Artificial Intelligence and machine learning, Vinod Chandra S. S. Anand Hareendra S., PHI Learning private limited 2014 |
| **Reference Books :** |
| 1   Artificial Intelligence, Elaine Rich, Kevin Knight, 3rd edition, Tata McGraw Hill,2013 |
| 2   Artificial Intelligence Structure and Strategies for Complex, George F Lugar, Pearson Education, 5th Edition, 2011 |
| **SWAYAM Courses** |
| **1**   https://nptel.ac.in/courses/106105077 (IIT-Kharagpur: Timestamp: 13/3/2023: 04:15PM) |

CSE702 (PCC) - Cloud Computing

Teaching Scheme			Evaluation Scheme		
Lectures	:	3 Hrs/Week	ISE	:	40 Marks
Credits	:	3	ESE	:	60 Marks

Course Objective: The objective of this course is to	
1	To become familiar with Cloud Computing and its ecosystem.
2	To learn the basics of virtualization and its importance.
3	To evaluate the in-depth analysis of Cloud Computing capabilities.
4	To give a technical overview of Cloud Computing and Services.
5	To understand security issues in cloud computing.

Course Outcomes:		
COs	At the end of the successful completion of the course, the students will be able to	Bloom's Taxonomy
CO1	Describe the main concepts, key technologies, strengths, and limitations of cloud computing and the possible applications for state-of-the-art cloud computing.	Understand
CO2	Demonstrate the architecture and infrastructure of cloud computing	Apply
CO3	Identify problems, and explain, analyze, and evaluate various cloud computing solutions.	Remember
CO4	Use AWS cloud for designing solutions to various computational problems.	Apply

Course Description:
Cloud computing is a scalable services consumption and delivery platform that provides on-demand computing service for a shared pool of resources, namely servers, storage, networking, software, database, applications, etc., over the Internet. It is a model for enabling ubiquitous, on-demand access to a shared pool of configurable computing resources, which can be rapidly provisioned and released with minimal management effort. This course will introduce various aspects of cloud computing, including fundamentals, management issues, security challenges, and future research trends.

Prerequisites:	1	Operating Systems
	2	Computer Networks
	3	Information Security

Section – I		
Unit-1	**Introduction to Cloud**	07 Hours
	Introduction to Cloud, Cloud and Other Similar Configurations, Benefits and Limitations of cloud computing, Components of cloud computing, Types of Cloud—Private; Public; and Hybrid, Impact of Cloud Computing on Businesses.	
Unit-2	**Virtualization**	08 Hours
	Introduction and benefits, Implementation Levels of Virtualization, Virtualization at the OS Level, Virtualization Structure, Virtualization Mechanism, Open Source Virtualization Technology, Xen Virtualization Architecture, Binary Translation with Full Virtualization, Paravirtualization, Virtualization of CPU, Memory and I/O Devices, Hardware support for Virtualization in Intex x86 Processor, Virtualization in Multicore Processors	
Unit-3	**Cloud Computing Architecture**	08 Hours
	Cloud Computing Stack-Comparison with traditional computing architecture (Client/Server), Infrastructure as a Service (IaaS), Platform asa Service (PaaS), Leveraging PaaS for Productivity, Guidelines for Selecting a PaaS Provider, Concerns with PaaS, Language and PaaS, Software as a Service (SaaS), Storage as a Service (STaaS), Database as aService (DBaaS), Specialized Cloud Services.	

Section – II			
Unit-4	**Cloud Security**		07 Hours
	Infrastructure Security - Network level security; Host levelsecurity; Application-level security, Data security, and Storage – Dataprivacy and security Issues; Jurisdictional issues raised by Data location: Identity &Access Management; Access Control; Trust; Reputation; Risk; Authentication in cloud computing; Client access in the cloud; Cloud contracting Model; Commercial and business considerations.		
Unit-5	**Advanced Concepts – Docker, Container, and Kubernetes**		06 Hours
	Introduction to CaaS; Containers; Difference between Virtualization and Containers, Introduction to Containers; Docker and its architecture (Jain);Understanding Docker Container; Networking, Kubernetes – Introduction; Architecture, Case Study (Any case study available on the Internet such as– IBM; AWS; Google Qwiklabsusing Kubernetes; docker container).		
Unit-6	**Amazon Web Service**		04 Hours
	Compute, Storage, Database, Cloud Architecture.		

Mapping of POs & COs:

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

References	
Text Books :	
1	Cloud Computing Black Book- Jayaswal, Kallakurchi, Houde, Shah, Dreamtech Press.
2	Cloud Computing for Dummies-Judith Hurwitz, R. Bloor, M.Kanfman, F. Halper, WileyIndia Edition.
3	Cloud Computing: Principles and Paradigms- RajkumarBuyya, James Broberg, AndrzejGoscinski, Wiley India
Reference Books :	
1	Cloud Security & Privacy- Tim Mather, S. Kumara Swammy, S. Latif, SPD, O'Reilly
2	Cloud Computing: A Practical Approach- Anthony T.Velte, et.al, McGraw Hill
SWAYAM Courses	
1	https://onlinecourses.nptel.ac.in/noc23_cs42/preview

CSE703 (PCC) - Advanced Database Systems

Teaching Scheme			Evaluation Scheme		
Lectures	:	3 Hrs/Week	ISE	:	40 Marks
Credits	:	3	ESE	:	60 Marks

Course Objective: The objective of this course is to	
1	To learn advances in Query Languages.
2	To understand and acquire knowledge of designing advanced data models &databases like Object &object-relational databases.
3	To learn, design & know the real-time applications of NoSQL Databases.
4	To understand Data Warehouses design &to explore data mining techniques used to store process, and transform unstructured data, and uncover patterns and other valuable information from large data sets.
5	To illustrate design architectures, storage, data processing, and management of parallel and distributed database systems.
6	To Understand database security and perform common database administration tasks on databases.

Course Outcomes:

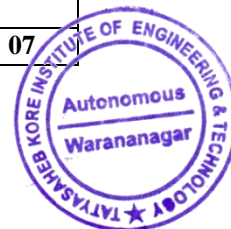| COs	At the end of the successful completion of the course, the students will be able to	Bloom's Taxonomy
CO1	Apply the knowledge of PL/SQL in writing queries.	Apply
CO2	Construct appropriate databases for real-world problems.	Evaluate
CO3	Demonstrate the use of data mining & data warehousing techniques in business data analytics.	Apply
CO4	Illustrate design, architectures, data storage, distribution &query processing in Parallel &distributed databases.	Apply
CO5	Construct a database using the SQL security features.	Create

Course Description:
Advanced Database Systems is an extension to database systems. Advanced database systems focuses and presents the features, benefits of advanced data models like Object oriented & Object relational models. Explores ahead the extension of SQL to PL/SQL to draw the benefits to the database designer & to the developer's community. Giving insights, this course covers NoSQL Databases like Key-Value Database, Document Database, Column Family Database, and Graph Database etc. Furthermore the course covers the data warehousing architecture & design, Data Mining techniques used in business applications by inducing intelligence into systems for Decision support systems. Addresses the challenges & needs of the security features, ensures building an robust and secured systems for the applications.

Prerequisites:	1	Database Engineering.
	2	Basic SQL Queries.
	3	Object Oriented Concepts.

| Section – I		
Unit-1	**Advanced SQL**	04 Hours
	Introduction to PL/SQL, PL/SQL Functions & Procedures, Oracle Sequences, Embedded SQL	
Unit-2	**Object-Database Systems**	06 Hours
	Motivating Example, Structured Data Types, Operations on Structured Data, Encapsulation and ADTs, Inheritance, Objects aIDs, and Reference Types, Database Design for an ORDBMS,ORDBMS Implementation Challenges, OODBMS, Comparing RDBMS, OODBMS, andORDBMS	
Unit-3	**NoSQL Database Management**	07

	Introduction, Data management with distributed databases, ACID and BASE NoSQL Types: Key-Value Database, Document Database, Column Family Database, and Graph Database Comparisonof relational databases and NoSQL	**Hours**
	Section – II	
Unit-4	**Data Warehousing and Data Mining**	**08 Hours**
	DATA WAREHOUSING AND DECISION SUPPORT: Introduction to Decision Support, OLAP: Multidimensional Data Model, Multidimensional Aggregation Queries, Finding AnswersQuickly, Data Warehousing, Views and Decision Support, View Materialization. DATA MINING: Introduction to Data Mining, Counting Co-occurrences, Mining for Rules,Tree-Structured Rules, Clustering, Similarity Search over Sequences, Incremental Mining andData Streams, Additional Data Mining Tasks	
Unit-5	**Parallel and Distributed Databases**	**08 Hours**
	Introduction, Architectures for Parallel Databases, Parallel Query Evaluation, ParallelizingIndividual Operations, Parallel Query Optimization, Introduction to Distributed Databases,Distributed DBMS Architectures, Storing Data in a Distributed DBMS, Distributed Catalog Management, Distributed Query Processing, Updating Distributed Data, Distributed Transactions,Distributed Concurrency Control, Distributed Recovery.	
Unit-6	**Database Security**	**06 Hours**
	Introduction to Database Security Issues, Discretionary Access Control Based on Granting andRevoking Privileges, Mandatory Access Control and Role-Based Access Control for MultilevelSecurity, SQL Injection, Privacy Issues, and Preservation, Challenges of Database Security, OracleLabel-Based Security	

Mapping of POs & COs:

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

References	
Text Books :	
1	Oracle® PL/SQL™ by Example FOURTH EDITION BENJAMIN ROSENZWEIG ELENA SILVESTROVA RAKHIMOV(Unit : 1)
2	Database Management System - Raghu Ramakrishnan, Johannes Gehrke - MGH, [4e] (Units: 2,4,5)
3	NoSQL for Mere Mortals- Dan Sullivan- 1st Edition, Pearson Education(Unit-3)
4	Fundamentals of Database Systems -R. Elmasri S. B. Navathe - Addison Wesley-SixthEdition(Unit-6)
Reference Books :	
1	Database System Concepts - Silberschatz, Korth, Sudarshan - MGH, 6th Edition
2	Data Mining - Margaret H. Dunham - Pearson Education
3	NoSQL Distilled: A brief guide to merging world of Polyglot persistence - Pramod J. Sadalage and Marin Fowler - Addison Wesley
4	Database Systems, Design, Implementation and Management - Coronel-Morris- Rob - Cengage Learning, [9e]
SWAYAM Courses	
1	https://onlinecourses.swayam2.ac.in/cec19_cs05/preview
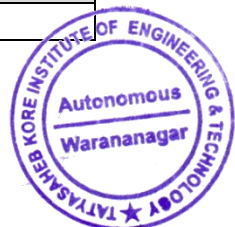
CSE704 (PEC-I) - Block Chain & Cryptocurrency

Teaching Scheme			**Evaluation Scheme**		
Lectures	:	2 Hrs/Week	ISE	:	40 Marks
Credits	:	2	ESE	:	60 Marks

Course Objective: The objective of this course is to	
1	To understand the history, types, and applications of Blockchain
2	To understand Bitcoin and Ethereum
3	To explore the basics of cryptocurrencies

Course Outcomes:		
COs	**At the end of the successful completion of the course, the students will be able to**	**Bloom's Taxonomy**
CO1	Contentedly discuss and describe the history, types, and applicationsof Blockchain.	Understand
CO2	Study the basics of cryptocurrencies.	Remember
CO3	Compare Transactions of Bitcoin and Ethereum	Analyse
CO4	Demonstrate different operations of Blockchain.	Apply

Course Description:
The goal of this course is to introduce the main concepts related to block chains and crypto currencies. It includes a deep dive in to block chain technology underlying Bit coin and Ethereum networks, scalability solutions, network consensus mechanics, encryption basics. Special focus is made on architecture and models of decentralised exchanges, borrowing and lending protocols, stablecoins and prediction markets solutions.

Prerequisites:	1	Information Security
	2	Discrete Mathematical Structures

Section – I		
Unit-1	**Introduction to Blockchain:**	**04 Hours**
	History, Definition, Distributed Ledger, Blockchain Categories – Public,Private, Consortium, Blockchain Network and Nodes, Peer-to-Peer Network, Mining Mechanism, Generic elements of Blockchain, Features of Blockchain, and Types of Blockchain	
Unit-2	**Blockchain Achieves & Store and Use:**	**05 Hours**
	Simple Local Storage, Hot and Cold Storage, Splitting and Sharing Keys, Online Wallets and Exchanges, Payment Services, Transaction Fees, Currency Exchange Markets	
Unit-3	**Operation of Blockchain:**	**04 Hours**
	Blockchain Architecture – Block, Hash, Distributer P2P, Structure of Blockchain-Consensus mechanism: Proof of Work (PoW), Proof of Stake(PoS), Byzantine Fault Tolerance (BFT), Proof of Authority (PoA) and Proof of Elapsed Time (PoET)	
Section – II		
Unit-4	**Basics of cryptocurrency:**	**04 Hours**
	Creation of coins, Payments, and double spending, Bitcoin – Digital Signatures as Identities – e Wallets – Personal Crypto security – Bitcoin Mining – Mining Hardware	
Unit-5	**Bitcoin (BTC):**	**03 Hours**
	Genesis Block, Buy Bitcoin, Transactions, Unspent Transaction Output(UTXO), Bitcoin Mining, Value of Bitcoin, Advantages and Disadvantages	
Unit-6	**Ethereum (ETH):**	**04 Hours**
	Smart Contracts, UTXO, Types of Accounts - Externally controlled accounts and Contract account, Merkley Tree, Ether, Components of Ethereum Transaction	
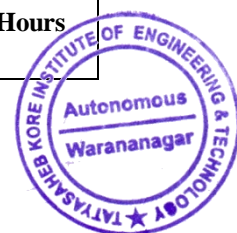
Mapping of POs & COs:

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

References
Text Books :
1   Narayanan, A., Bonneau, J., Felten E., Miller, A., & Goldfeder, S. (2016). Bitcoinand cryptocurrency technologies: a comprehensive introduction. Princeton University Press
2   Imran Bashir, "Mastering Blockchain: Distributed Ledger Technology, decentralization, and smart contracts explained", 2nd Edition, Packt Publishing Ltd, March 2018
Reference Books :
1   Antonopoulos, A. M. (2014). Mastering Bitcoin: unlocking digital cryptocurrencies."O'Reilly Media, Inc.
2   Franco, P. (2014). Understanding Bitcoin: Cryptography, engineering, and economics. John Wiley &Sons.
SWAYAM Courses
1   https://onlinecourses.swayam2.ac.in/aic21_ge01/preview 30/05/2023

CSE705 (PEC-I) - Deep Learning

Teaching Scheme		Evaluation Scheme		
Lectures	: 2 Hrs/Week	ISE	:	40 Marks
Credits	: 2	ESE	:	60 Marks

Course Objective: The objective of this course is to	
1	To understand basic concepts of Deep learning networks
2	Introduce Different Models of Deep learning to work with various types of inputs
3	Learn effects of different parameters and hyper-parameters on deep learning model output

Course Outcomes:		
COs	**At the end of the successful completion of the course, the students will be able to**	**Bloom's Taxonomy**
CO1	Identify the deep learning algorithms to solve various problems.	Understand
CO2	Analyses optimization and regularisation techniques of deep learning for the given problem	Analyse
CO3	Develop different deep learning models for given tasks	Apply
CO4	To Demonstrate the mathematical, statistical and computational challenges of building neural networks	Apply

Course Description:
Deep learning is a sub-field of machine learning that focuses on learning complex, hierarchical feature representations from raw data. This course aims to present the core fundamentals behind the much talked about field of Deep Learning. We will delve into selected topics of Deep Learning, from discussing basics of neural networks, to understanding how CNN and RNN work with common examples.

Prerequisites:	1	Machine Learning

Section – I		
Unit-1	**Machine Learning Basics:**	**04 Hours**
	Overfitting and Underfitting, Hyperparameters and Validation Sets, Estimator, Bias and Variance, Maximum Likelihood Estimation, Bayesian Statistics, Stochastic Gradient Decent, Challenges Motivating Deep Learning.	
Unit-2	**Deep Feedforward Networks:**	**04 Hours**
	Gradient-Based Learning, Hidden Units, Architecture Design, Back-Propagation	
Unit-3	**Regularization:**	**04 Hours**
	Parameter Norm Penalties, Norm Penalties as Constrained Optimization, Regularization and Under-Constrained Problems, Dataset Augmentation, Noise Robustness, Semi-Supervised Learning, Multi-Task Learning.	
Section – II		
Unit-4	**Optimization for Training Deep Models:**	**04 Hours**
	How Learning Differs from Pure Optimization, Challenges in Neural Network Optimization, Basic Algorithms. Parameter Initialization Strategies, Algorithms with Adaptive Learning Rates	
Unit-5	**Convolutional Networks:**	**04 Hours**
	The Convolution Operation, Motivation, Pooling, Convolution and Poolingas an Infinitely Strong Prior, Variants of the Basic Convolution Function, Structured Outputs, Data Types	
Unit-6	**Sequence Modelling:**	**04 Hours**
	Recurrent and Recursive Nets: Unfolding Computational Graphs, Recurrent Neural Networks, Bidirectional RNNs, Encoder-Decoder Sequence-to-Sequence Architectures	

Mapping of POs & COs:

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

References
Text Books :
1   Deep Learning Lan Good fellow and YoshuaBengio and Aaron Courville MIT Press 2016
Reference Books :
1   Neural Networks: A systematic Introduction Raúl Rojas 1996
2   Pattern Recognition and machine Learning Chirstopher Bishop 2007.
SWAYAM Courses
1   --

CSE702P (PCC) - Cloud Computing Lab

Teaching Scheme			Evaluation Scheme		
Practical	**:**	2 Hrs/Week	**ISA(TW)**	**:**	50 Marks
Credits	**:**	1	**ESE**	**:**	--

Course Objective: The objective of this course is to	
1	To become familiar with Cloud Computing and its ecosystem.
2	To learn the basics of virtualization and its importance.
3	To evaluate the in-depth analysis of Cloud Computing capabilities.
4	To give a technical overview of Cloud Computing and Services.
5	To understand security issues in cloud computing.

Course Outcomes:		
COs	**At the end of the successful completion of the course, the students will be able to**	**Bloom's Taxonomy**
CO1	Describe the deep-learning key technologies, strengths, and limitations of cloud computing and the possible applications for state-of-the-art cloud computing.	Understand
CO2	Demonstrate the architecture and infrastructure of cloud computing	Apply
CO3	Identify problems, and explain, analyze, and evaluate various cloud computing solutions.	Remember
CO4	Use AWS cloud for designing solutions to various computational problems.	Apply

Course Description:
Cloud computing is a scalable services consumption and delivery platform that provides on-demand computing service for a shared pool of resources, namely servers, storage, networking, software, database, applications, etc., over the Internet. It is a model for enabling ubiquitous, on-demand access to a shared pool of configurable computing resources, which can be rapidly provisioned and released with minimal management effort. This course will introduce various aspects of cloud computing, including fundamentals, management issues, security challenges, and future research trends.

Prerequisites:	1	Operating Systems
	2	Computer Networks
	3	Information Security

Experiment List		
Exp. 1	Installing OS on a Virtual Machine Monitor.	Apply
Exp. 2	Introduction to AWS Identity and Access Management (IAM)	Apply
Exp. 3	Build a Virtual Private Cloud (VPC) and Launch a Webserver	Apply
Exp. 4	Introduction to Amazon EC2	Apply
Exp. 5	Working with Amazon Elastic Block Store (EBS)	Apply
Exp. 6	Build Your Database Server and Interact With Your Database Using an App	Apply
Exp. 7	Scale and Load Balance your Cloud Architecture	Apply
Exp. 8	Hands-on virtualization using Xen Server	Apply
Exp. 9	Hands-on Containerization using Docker	Apply
Exp. 10	Building and Deploying "Hello Word App" for the cloud	Apply

CSE702P (PCC) - Advanced Database Systems Lab

Teaching Scheme

Practical **:** 2 Hrs/Week

Credits **:** 1

Evaluation Scheme

ISA **:** 50 Marks

ESE(POE) **:** 50 Marks

	Experiment List	
Exp. 1	Write a simple PL/SQL Program for the following i. Print the sum of "N" numbers ii. Check whether the input number is prime or not.	Apply
Exp. 2	Implement & Demonstrate Declaring, Defining, and Invoking a Simple PL/SQL Function for the below statement. i. Find the Factorial of the number.	Apply
Exp. 3	Implement a PL/SQL Procedure for the following i. Find a Maximum of three numbers using "IN" & "OUT" Parameters ii. Find the square of the Number using the "IN OUT" Parameter	Apply
Exp. 4	Using Oracle Sequence demonstrate creating and dropping of an auto-number field for Customer Table.	Apply
Exp. 5	Demonstrate NoSQL Key-Value Database.	Apply
Exp. 6	Demonstrate No SQL Document Database.	Apply
Exp. 7	Demonstrate Data Control Language Commands	Apply
Exp. 8	Construct star schema. Demonstrate Fact and dimension tables	Create
Exp. 9	Examine SQL Injections.	Analyze
Exp. 10	Demonstrate Object-oriented& Object Relational databases.	Apply

CSE706P (PCC) - Web Technologies

Teaching Scheme			Evaluation Scheme		
Lecture	:	2 Hrs/Week	ISA(TW)	:	50 Marks
Practical	:	4 Hrs/Week	ESE(POE)	:	50 Marks
Credits	:	3			

Course Objective: The objective of this course is to	
1	Introduce students tofront-end designing
2	Motivate the students to develop web applications using PHP.
3	To introduce emerging Web technology concepts and tools
4	To learn database access technologies and state management techniques
5	To expose students to XAMPP web services

Course Outcomes:		
COs	At the end of the successful completion of the course, the students will be able to	Bloom's Taxonomy
CO1	Apply knowledge of client-side scripting	Apply
CO2	Develop web applications using angular and nodeJS	Create
CO3	Design web applications using MVC architecture.	Create
CO4	Demonstrate the use of server-side technologies with MySQL.	Apply
CO5	Explore the latest tools for web development	Analyse

| Course Description :		
Web Technology subject mainly deals with emerging web technology concepts and tools. It covers HTML,CSS, Javascript, Angular, NodeJS, and server-side scripting languages like PHP with MySQL.		
Prerequisites :	1	C++
	2	html
Section – I		
Unit-1	**Front End Web Designing HTML and CSS** HTML Design Patterns: HTML Structure, XHTML, DOCTYPE, Header Elements, Conditional Style Sheet, Structural Block Elements, Terminal Block Elements, Multipurpose Block Elements, Inline Elements, Class and ID Attributes, HTML Whitespaces CSS Selector and Inheritance: Type, Class, and ID Selector, Position and Group Selectors, Attribute Selectors, Pseudo-element Selectors, Pseudo-class Selectors, Subclass Selector, Inheritance, Visual Inheritance, and Bootstrap	**06 Hours**
Unit-2	**JavaScript Basics** Introduction to JavaScript, a Basic program of JavaScript, variables, functions, conditions, loops and repetition, Functions, Event handling In JavaScript, Validating HTML form data using JavaScript	**07 Hours**
Unit-3	**Angular and Node JS** Angular - Web Application architecture, MVC and MVVM design pattern, Angular architecture, Angular building blocks, Forms implementation, Filters, Services, Consuming REST Web Services, Modules: Built-in and custom, Directives: Built-in and custom, Routing and Navigation, Animations, Testing Angular application. Node, NodeJS architecture, Modules: Built-in and custom, Event loop, Asynchronous application Testing node application.	**05 Hours**
Section – II		
Unit-4	**PHP basics** PHP Basics: Embedding PHP code in Your Web Pages, Commenting on Your Code, Outputting Data to the Browser, PHP supported Data Types, Identifiers, Variables, Constants, Expressions, String Interpolation, and Control Structures Functions: Invoking	**05 Hours**
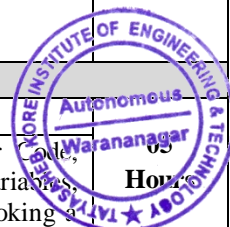
Unit		Hours
	Function, Creating a Function, Function Libraries Array: What is Array?, Creating an array, outputting an Array, Merging, slicing, splicing, and Dissecting Arrays, and Other useful Array, Functions.	
Unit-5	**PHP session management (state management):** Session Handlers: What Is Session Handling, Configuration Directives, Working with Sessions, Practical Session-Handling Examples, Creating Custom Session Handlers, PHP cookies, Uploading Files with PHP	**06 Hours**
Unit-6	**PHP Database and small app using Laravel and Code to generate** Installation Prerequisites, Using the MySQL Extension, Interacting with the Database, Executing Database Transactions	**07 Hours**

Mapping of POs & COs:

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

References	
Text Books:	
1	Pro HTML5 and CSS3 Design Patterns by Michael Bowers, DionysiosSynodinos and Victor Sumner, Apress edition for (Unit I & II)
2	Beginning PHP and MySQL: From Novice to Professional by W. Jason Gilmore Fourth Edition Unit IV to VI
3	MEAN Web Development by Amos Q. Haviv PACKT PUBLISHING LTD Unit III
Reference Books:	
1	Pro HTML5 and CSS3 Design Patterns by Michael Bowers, DionysiosSynodinos and Victor Sumner Apress edition
2	Web Development withNode and Express by Ethan Brown Published by O'Reilly Media
MOOC Courses	
1	Modern Application Development - Course (nptel.ac.in)
2	Web Technologies and Security	Coursera
3	CERTIFICATE IN WEB TECHNOLOGY, COMPUTER COURSE CERTIFICATION (iisdt.in)
4	Web Resources 1. https://www.w3schools.com/angular/default.asp 2. https://angular.io/ 3. https://www.w3schools.com/nodejs/default.asp 4. Web Technology - GeeksforGeeks 5. PHP Tutorial (w3schools.com) 6. http://www.php.net

Experiment List	
Exp. 1	Create html pages for website like login, registration and about us pages using html and CSS
Exp. 2	Write a program demonstrating javascript to implement client side validation for above pages.
Exp. 3	Create simple Testing Angular application
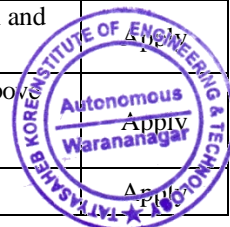
Exp. 4	Write a program demonstrating NodeJs application	Apply
Exp. 5	Program based on PHP variables, Expression, arrays, control structure.	Apply
Exp. 6	Experiment Based on OOP and Advance OOP PHP	Analyse and Apply
Exp. 7	Form validation using PHP using regular expressions	Analyse and Apply
Exp. 8	Upload various types of file from client side to server with validation	Create
Exp. 9	Write a program to create and handle a session in PHP	Apply
Exp. 10	Insert user entered data in form to MySQL database using PHP	Remember and Apply
Exp. 11	Update user's data stored in MySQL database using PHP	Remember and Apply
Exp. 12	Write a program to manage session in PHP having login facility in any web application	Apply

CSE707P (PW) - Project I

Teaching Scheme			Evaluation Scheme		
Practical	:	4 Hrs/Week	ISA	:	75 Marks
Credits	:	4	ESE	:	75 Marks

Course Objective : The objective of this course is to	
1	Develop problem solving approach and propose solutions to real-world problems
2	Acquainted with team work for completion of industry projects and will learn how to partition a project between team members
3	Learn to follow a formal SDLC process to complete a project in a team.
4	Learn how to write a Software Requirement Specification (SRS) document, Design document, Database design
5	Understand the aspects in technical report writing and produce a final design report describing the project

Course Outcomes :		
COs	At the end of successful completion of the course, the students will be able to	Bloom's Taxonomy
CO1	Identify project topic based on real-world problem in the field of interest	Apply
CO2	Analyze the requirement analysis of the Project by surveying the technical literature, recent trends in the technology/domain	Survey
CO3	Prepare the design document of the Project using necessary conventions	Construct
CO4	Understand and write the design report of the Project	Interpret
CO5	Deliver presentation on the Project design	Demonstrate

Course Description :		
This course will be conducted largely as an individual or small group project under the direct supervision of a member of academic staff. The specific project topic undertaken will reflect the common interests and expertise of the student(s) and supervisor		
Prerequisites :	1	Software Engineering
	2	Object Oriented Modeling and Design
	3	Mini Project – I and II

Contents

The project work is to be carried out in two semesters of Final Year Computer Science and Engineering. The project should be undertaken preferably by group of 4-5 students who will jointly work and implement the project in the two semesters. In Semester VII, the group will select a project with the approval of the Guide (staff member) and submit the Name of the project with a synopsis of the proposed work of not more than 02 to 08 pages before second week of August in the academic year.

- The group is expected to complete
- Detailed system design,
- Analysis,
- Data Flow Design,
- Procurement of hardware and/or software,
- Implementation of a few modules of the proposed work at the end of semester –VIII as a part of the term work submission in the form of a joint report.

Term Work

The term work assessment will be done jointly by teachers appointed by Head of the Institution

External Examination

The oral examination will be conducted by an internal and external examiner

Note

- Project work should be continually evaluated based on the contributions of the group members, originality of the work, innovations brought in, research and developmental efforts, depth and applicability, etc.
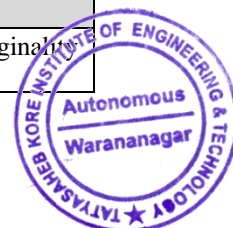
- Two mid-term evaluations should be done, which includes presentations and demos of the work done.
- Care should be taken to avoid copying and outsourcing of the project work.

References Books	
Software Engineering:	
1	Roger S. Pressman, Software Engineering : A Practitioner's Approach, McGraw Hill Education
2	Pankaj Jalote, Software Engineering : A Precise Approach, Wiley India
3	Ian Sommerville, Software Engineering, Pearson (9th or 10th Edition)
4	Rajib Mall ,Fundamentals of Software Engineering , 3/E,PHI
Project Management:	
1	Kathy Schwelbe, Information Technology Project Management, Cengage Learning
2	Joseph Phillips, IT Project Management (3rd Edition), McGraw Hill Edu. (India) Pvt. Ltd
3	Bob Huges, Mike Cotterell, Rajib Mall, Software Project Management, 5/E, Tata McGraw Hill Edu. (India) Pvt. Ltd
Database Design:	
1	Silberschatz, Korth, Sudarshan, Database System Concepts 6/ Edition, McGraw Hill Education
Object Oriented Modeling and Design	
1	J. Rambaug, Object Oriented Modeling and Design, 2nd Edition, Pearson Education
2	Grady Booch, James Rambaugh, Lvar Jacobson, The Unified Modeling Language User Guide, Addison Wesley

# CSE708A-Massive Open Online Courses (MOOCs)

Teaching Scheme		Evaluation Scheme	
Lectures	**:** --	**ISE** **:** --	
Credits	**:** --		
Tutorials	**:** --	**ESE** **:** --	

Course Objective: The objective of this course is to	
1	To promote interactive user forums to support community interactions among students, professors, and experts
2	To promote learning additional skills anytime and anywhere
3	To enhance teaching and learning on campus and online

Course Outcomes :		
COs	**At the end of successful completion of the course, the students will be able to**	**Bloom's Taxonomy**
CO1	Expand knowledge in yourself and others.	Understand
CO2	Impart lifelong learning skills	Apply
CO3	Improve self-learning skills.	Apply
CO4	To acquire variety of methods for grading assessment and certification.	Evaluation

Course Description:
In order to promote self learning and Skill development among the students, various online MOOC's platform providing suitable courses. This audit course aimed at providing a mentored opportunity to enhance up skill the student talent.
Guidelines: Students should complete MOOC course under the supervision of assigned mentors.

Prerequisites:	1	Basics of Engineering Mathematics course.
	2	Basics of Appeared Course.

Section – I	
Unit-1	**List of Courses**
	Department will provide the list of courses for the certification during time frame.
Unit-2	**Enrolment**
	Student must enrol course under the guidance of mentor.
Unit-3	**Submission of weekly assignments**
	• Student will submit the weekly assignment using online platform.
	• Mentor will take the submission of weekly assignment/Quiz

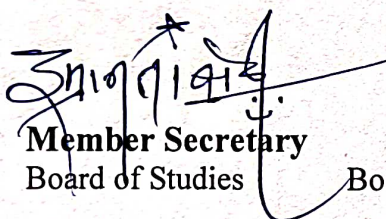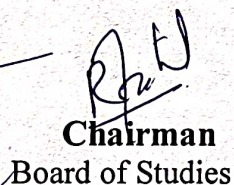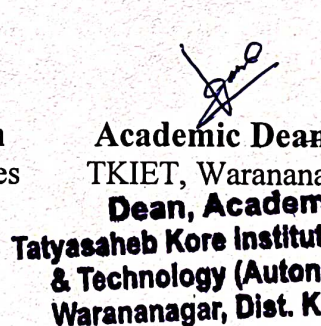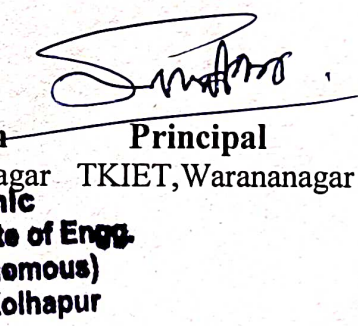| Section – II	
Unit-4	**Assessment**
	• Online platform will assess the student weekly assignment.
	• Mentor will check the weekly assignment/Quiz and declare the result.
Unit-5	**Registration for certification**
	Student must register course for certification under the TKIET Chapter.
	(Note: for registration following documents are requires.
	i. Scanned ID size Photo
	ii. Digital Signature
	Original scanned ID proof.
Unit-6	**Evaluation**
	• Final score (score on certificate) =75% of exam score+25% of assignment score.
	• Department will take evaluation for appeared course.
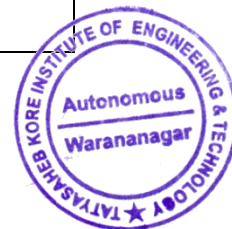
Mapping of POs & COs:

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

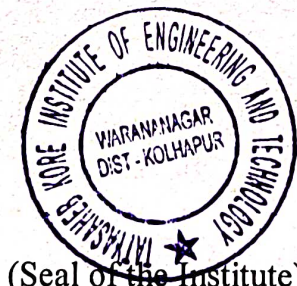| References:	
1	1. https://swayam.gov.in/ 2. https://onlinecourses.nptel.ac.in/ 3. https://www.edx.org

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