Bachelor of Technology (Computer Science and Engineering)

Semester-V

L-0 T-0 P-4 C-2

CSE 300 PR1: Linux Laboratory

Course Objectives

- To apply the knowledge of mathematics, basic science and engineering solving the real-world computing problems to succeed higher education and professional careers.
- To develop the skills required to comprehend, analyze, design and create innovative computing products and solutions for real life problems.
- To inculcate professional and ethical attitude, communication and teamwork skills, multi-disciplinary approach and an ability to relate computer engineering issues with social awareness.

Course Outcomes (COs): Upon completion of this unit students will be able to:

1. Understand the basic knowledge of Linux commands and file handling utilities by using Linux shell environment.
2. Evaluate the concept of shell scripting programs by using an AWK and SED commands.
3. Create the directory, how to change and remove the directory.
4. Analyze the process of how the parent and child relationships
5. Understand the IPC mechanism.

Articulation Matrix

(Program Articulation Matrix is formed by the strength of correlation of COs with POs and PSOs. The strength of correlation is indicated as 3 for substantial (high), 2 for moderate (medium) correlation, and 1 for slight (low) correlation)

CO/PO/PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	1	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	2	1	-	1	-	1	-	-	-	-	-	-	-	-
CO3	1	3	2	1	1	1	1	-	-	-	-	1	2	1	1
CO4	2	2	3	2	2	1	2	1	-	-	-	1	2	1	1
CO5	3	2	1	1	1	2	1	-	-	-	-	1	2	-	1

High-3 Medium-2 Low-1

List of Practical(s)

1.To Install Ubuntu Linux and LINUX Commands(File Handling utilities, Text processing utilities, Network utilities, Disk utilities, Backup utilities and Filters).

2. Write a Shell Script that accepts a file name, starting and ending line numbers as arguments and displays all lines between the given line numbers.

3. Write a shell script that deletes all lines containing the specified word in one or more files supplied as arguments to it.

4. Write a shell script that displays a list of all files in the current directory to which the user has read, write and execute permissions.15. Write a program using get and post method in Servlet.

5. Write a shell script that receives any number of file names as arguments checks if every argument supplied

is a file or directory and reports accordingly. Whenever the arguments a file it reports no of lines present in it

6. Write a shell script that accepts a list of file names as its arguments, counts and reports the occurrence of each word that is present in the first argument file on other argument files.

7. Write a shell script to list all of the directory files in a directory.

8. Write a shell script to find factorial of a given number.

9. Write an awk script to count number of lines in a file that does not contain vowels.

10. Write an awk script to find the no of characters, words and lines in a file

11. Implement in c language the following UNIX commands using system calls

a) Cat b) ls c) mv 39-42

12. Write a C program that takes one or more file/directory names as command line input and reports following information

a) File Type b) Number Of Links

c) Time of last Access d) Read, write and execute permissions

13. Write a C program to list every file in directory, its anode number and file name

14. Write a C program to create child process and allow parent process to display "Parent "and the child to display "child" on the screen

15. Write a C program that illustrate communication between two unrelated processes using named pipes

Total: 60Hours

Reference(s):

1. Venkatesh Murthy, "Introduction to Unix &Shell", Pearson Edu
2. Forouzan, "Unix &Shell Programming", Cengage Learning
3. Sumitab Das,"Unix Concept & Application",TMH
4. Gopalan, Shivaselvan,"Beginners Guide to Unix " PHI Learning

List of e-Learning Resources:

1. https://www.rgpvnotes.in/btech/grading-system-old/qp/2019/07/lab-linux-cs-505

Subject Tr. Academic Coordinator HoD Sr. Faculty Nominated by DOAA

Bachelor of Technology (Computer Science and Engineering) (BCT)

Semester-V

L-0 T-0 P-2 C-1

CSE 981 PR1: Block chain Architecture Design and Use Cases

Course Objectives

- To understand the fundamentals of Blockchain technology
- To gain knowledge about Blockchain application templates
- To deal with solidity and smart contract
- To familiar with Dapps
- To foresee the uses of blockchain technology in various non-financial sector

Course Outcomes (COs): Upon completion of this unit students will be able to:

1. Understand the concepts and applications of Block chain.
2. Analyze problem by designing a Fundamental Block Chain. Apply
3. Create the Block chain with complete Architectural Primitives as per requirements. Create
4. Apply System and security features during the design of any Block Chain. Analyze
5. Apply Block chain use cases for different application domains.

Articulation Matrix

(Program Articulation Matrix is formed by the strength of correlation of COs with POs and PSOs. The strength of correlation is indicated as 3 for substantial (high), 2 for moderate (medium) correlation, and 1 for slight (low) correlation)

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CO2	3	2	1	-	1	-	1	-	-	-	-	-	-	-	-
CO3	1	3	2	1	1	1	1	-	-	-	-	1	2	1	1
CO4	2	2	3	2	2	1	2	1	-	-	-	1	2	1	1
CO5	3	2	1	1	3	1	1	-	-	-	-	1	2	-	1

High-3 Medium-2 Low-1

Practical(s)

1. Creating Merkle tree on hospital with use case and examples?

Use Case: Patient Records Management In a hospital, managing patient records securely and efficiently is crucial. Merkle trees can be used to ensure the integrity and consistency of patient records across different departments and systems.

Example Scenario

1. Data Blocks: Each patient's record (e.g., medical history, treatment plans, test results) is treated as a data block.
2. Leaf Nodes: Each data block is hashed to create a leaf node in the Merkle tree.
3. Non-Leaf Nodes: Hashes of leaf nodes are combined to form non-leaf nodes, continuing up the tree until a single root hash is obtained.

2. Creation of Block on banking system Cross-Border Payments

One of the most impactful use cases of blockchain in banking is cross-border payments. Traditional cross-border transactions can be slow, expensive, and lack transparency. Blockchain can address these issues by providing a faster, cheaper, and more transparent solution.

Example Scenario

1. Initiating a Transaction: A customer in the USA wants to send money to a supplier in India.
2. Creating a Block: The transaction details (amount, sender, receiver, timestamp) are recorded in a new block.

3. Verification: The block is verified by network nodes (miners) using consensus algorithms.
4. Adding to the Blockchain: Once verified, the block is added to the blockchain, and the transaction is completed.

3. Blockchain implementation with step and create on the base of Supply Chain Management?

4. Creating an ERC-20 token on the Ethereum blockchain is a great way to get started with blockchain development. Here's a step-by-step guide to help you create and deploy your own ERC-20 token?

5. Implementing Merkle Trees using in blockchain technology is crucial for ensuring data integrity and efficient verification.

6. Mining in Blockchain (Mining is a fundamental process in blockchain technology, particularly for cryptocurrencies like Bitcoin. Create a method how it works?)

7. Implementing a Peer-to-Peer (P2P) network using blockchain technology is a powerful way to create decentralized, secure, and efficient systems. And how it works and how you can implement it?

8. Creating a cryptocurrency wallet with programming examples. We'll use Python for this demonstration, focusing on building a basic wallet for the Ethereum network. This example will cover generating keys, checking balances, and sending transactions.

Total: 30 Hours

Reference(s)

1. Imran bashir, Mastering Blockchain: Distributed ledger technology, decentralization, and smart contracts explained, 2018, 2nd edition, Packt publishing, Birmingham-Mumbai Proceedings of the 64th Academic Council (16.12.2021)
2. Alessandro Parisi, Securing Blockchain Networks like Ethereum and Hyperledger Fabric: Learn advanced security configurations and design principles to safeguard Blockchain networks, 2020, 1th edition, Packt publishing, Birmingham-Mumbai.

List of e-Learning Resources:

1. https://nptel.ac.in/

Subject Tr. Academic Coordinator HoD Sr. Faculty Nominated by DOAA

Bachelor of Technology (Computer Science and Engineering) (BCT)

Semester-V

L-2 T-1 P-0 C-3

CSE 981 TR1: Block chain Architecture Design and Use Cases

Course Objectives

- To understand the fundamentals of Blockchain technology
- To gain knowledge about Blockchain application templates
- To deal with solidity and smart contract
- To familiar with Dapps
- To foresee the uses of blockchain technology in various non-financial sector

Course Outcomes (COs): Upon completion of this unit students will be able to:

6. Understand the concepts and applications of Block chain.
7. Analyze problem by designing a Fundamental Block Chain. Apply
8. Create the Block chain with complete Architectural Primitives as per requirements. Create
9. Apply System and security features during the design of any Block Chain. Analyze
10. Apply Block chain use cases for different application domains.

Articulation Matrix

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CO2	3	2	1	-	1	-	1	-	-	-	-	-	-	-	-
CO3	1	3	2	1	1	1	1	-	-	-	-	1	2	1	1
CO4	2	2	3	2	2	1	2	1	-	-	-	1	2	1	1
CO5	3	2	1	1	3	1	1	-	-	-	-	1	2	-	1

High-3 Medium-2 Low-1

UNIT I: Introduction to Blockchain **9 Hours**

Introduction to Blockchain – I (Basics, History, Architecture, Conceptualization) Basic Crypto Primitives: Bitcoin Basics, Distributed Consensus

UNIT II: Consensus in Bitcoin – I **9 Hours**

Consensus in Bitcoin – I (The Basics, PoW and Beyond, The Miners) Permissioned Blockchain (Basics, Consensus) Permissioned Blockchain (RAFT Consensus, Byzantine General Problem, Practical Byzantine Fault Tolerance) Blockchain for Enterprise - Overview Blockchain Components and Concepts

UNIT III:Hyperledger Fabric **9 Hours**

Hyperledger Fabric – Transaction Flow Hyper ledger Fabric Details Fabric – Membership and Identity Management Hyperledger Fabric Network Setup Fabric Demo on IBM Blockchain Cloud Fabric Demo on Fabric Demo, deploy from scratch Hyperledger Composer – Application Development Hyperledger Composer – Network Administration

UNIT IV: Blockchain Security **9 Hours**

Blockchain Security: Fabric SideDB, Consensus Scalability, Bitcoin-NG, Collective Signing, Byzcoin Algorand, Cross Fault Tolerance, Secured Multi-Party Computation.Blockchain for Science, Block chain for Big Data, Blockchain and AI

UNIT V: Blockchain Use Cases **9 Hours**

Blockchain Use Cases: Blockchain in Financial Service(Payments and Secure Trading, Compliance and Mortgage, Financial Trade) Revolutionizing Global Trade ,Blockchain in Supply Chain, Blockchain in Supply Chain Continued.

Total: 45 Hours

Reference(s)

3. Imran bashir, Mastering Blockchain: Distributed ledger technology, decentralization, and smart contracts explained, 2018, 2nd edition, Packt publishing, Birmingham-Mumbai Proceedings of the 64th Academic Council (16.12.2021)
4. Alessandro Parisi, Securing Blockchain Networks like Ethereum and Hyperledger Fabric: Learn advanced security configurations and design principles to safeguard Blockchain networks, 2020, 1th edition, Packt publishing, Birmingham-Mumbai.

List of e-Learning Resources:

1. https://nptel.ac.in/

Subject Tr. Academic Coordinator HoD Sr. Faculty Nominated by DOAA

Mandsaur University

Bachelor of Technology (Computer Science and Engineering)
Semester-Vth

L-2T-1P-0C-3

CSE190 TR1 - Computer Networks

Course Objectives

- To describe the simple file transfer between two systems by opening socket connection to out server on one system and sending a file from one system to another.
- To get familiarized with the basic protocols of computer networks.
- To describe the technical issues related to the local Area Networks
- To understand Network layer design issues, various routing algorithms and congestion control algorithms.
- An understanding of computer networking theory, including principles embodied in the protocols designed for the application layer, transport layer, network layer, and link layer of a networking stack.

Course Outcomes (COs): Upon completion of this unit students will be able to:

1. Understand the different components in a Communication System and their respective roles.
2. Understand the fundamental concepts on data communication and the design of computer networks.
3. Analyze network devices and layer protocols to synthesize effective network designs
4. Understand TCP/UDP protocols, process-to-process delivery, congestion management, and Quality of Service principles.
5. Analyze the hierarchical structure and distribution of the domain name space within the Application Layer

Articulation Matrix

(Program Articulation Matrix is formed by the strength of correlation of COs with POs and PSOs. The strength of correlation is indicated as 3 for substantial (high), 2 for moderate (medium) correlation, and 1 for slight (low) correlation)

CO/PO/PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	-	-	-	1	-	-	-	-	-	-	2	2
CO2	3	2	1	-	-	-	1	-	1	-	-	2	-	2	1
CO3	2	3	2	1	-	-	1	-	-	2	-	1	-	2	1
CO4	1	3	2	1	1	1	2	-	-	-	-	2	2	1	2
CO5	3	2	1	1	-	1	1	-	-	-	-	1	2	2	1

High-3 Medium-2 Low-1

UNIT I: Introduction to Network **9 Hours**

Definition, Applications, line configuration, Network topologies, Transmission mode, Types of Networks (LAN, WAN, MAN), Protocols,Network models: The OSI model, TCP/IP Protocol Suite. Physical Layer: Signals –Analog signals, Digital signals, Transmission media - Guided & Un- Guided.

UNIT II: Network LAN Technologies **9 Hours**

Network LAN Technologies: Ethernet, Fast Ethernet, Gigabit Ethernet, and Wireless LAN's Data Link Layer: Error Detection and correction - Types of Errors, Error Detection, Error correction. Data link Protocols – Stop-and-wait ARQ, Go-back-n ARQ, Automatic Repeat Request (ARQ).

UNIT III: Network Devices: **9 Hours**

Network Devices: Modem, Hub, Switch, Router, Repeaters, bridges, Gateway Network Layer: Internetwork Protocol (IP), Addressing (Classes, Dotted-decimal notation, Sample Internet), Subnet mask, Network layer Protocols – ARP, IPv4, and IPv6.

UNIT IV: Transport Layer **9 Hours**

Transport Layer: TCP protocol, UDP protocol, Process-to-Process delivery, Congestion: Congestion control, congestion avoidance, congestion discarding, Quality of Service (QOS).

UNIT V: Application Layer **9 Hours**

Application Layer: Domain Name System (DNS) - domain name space, distribution of name space, DNS in the Internet, SMTP, SNMP, FTP, POP3, HTTP, WWW.

Total: 45 Hours

References

1. Kurose and Ross, Computer Networking- A Top-Down approach, 6th edition, Pearson Education, 2017
2. Behrouz Forouzan, Computer Networks- A Top-Down approach, McGraw Hill 2017.
3. Andrew Tanenbaum, Computer Networks (5th edition), Prentice Hall 2010
4. Fred Halsall, Addison Wesley, Computer Networking and the Internet (5th edition), 2006
5. Behrouz Forouzan, Data Communications and Networking (5th edition), McGraw Hill 2017
6. Behrouz Forouzan, TCP/IP Protocol Suite (4th edition), McGraw Hill 2009

List of e-Learning Resources:

1. https://nptel.ac.in/
2. https://www.coursera.org/
3. https://www.netacad.com/courses/packet-tracer

Subject Tr. **Academic Coordinator** **HoD** **Sr. Faculty Nominated by DOAA**

Mandsaur University

Bachelor of Technology (Computer Science and Engineering)
Semester- Vth

L-0 T-0 P-2 C-1

CSE190 PR1 - Computer Networks

Course Objectives

- To describe the simple file transfer between two systems by opening socket connection to out server on one system and sending a file from one system to another.
- To get familiarized with the basic protocols of computer networks.
- To describe the technical issues related to the local Area Networks
- To understand Network layer design issues, various routing algorithms and congestion control algorithms.
- An understanding of computer networking theory, including principles embodied in the protocols designed for the application layer, transport layer, network layer, and link layer of a networking stack.

Course Outcomes (COs): Upon completion of this unit students will be able to:

1. Understand the different components in a Communication System and their respective roles.
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CO2	3	2	1	-	-	-	1	-	1	-	-	2	-	2	1
CO3	2	3	2	1	-	-	1	-	-	2	-	1	-	2	1
CO4	1	3	2	1	1	1	2	-	-	-	-	2	2	1	2
CO5	3	2	1	1	-	1	1	-	-	-	-	1	2	2	1

High-3 Medium-2 Low-1

Practical's

1. Write a program for print the IP Address of a WWW.YAHOO.COM
2. Write a program for to print the IP Address of the local machine and hostname.
3. Write HTML program to implement get( ) and post( ) methods
4. Write a program for to identify the well known ports on a Remote system.
5. Write a program for to print the parts of URL.
6. Write a program for to send & receive data from datagram packet.
7. Write a program for a chat application.
8. Write a program for the simple file transfer between two systems by opening socket connection to out server on one system and sending a file from one system to another.

9. Write a program for the HTTP server.
10. Implement the concept of static routing.
11. Implement the concept of dynamic routing (RIP, OSPF, BGP).
12. Packet capture and header analysis by wire-shark (TCP,UDP,IP)

Total: 30 Hours

References

1. Kurose and Ross, Computer Networking- A Top-Down approach, 6th edition, Pearson Education, 2017
2. Behrouz Forouzan, Computer Networks- A Top-Down approach, McGraw Hill 2017.
3. Andrew Tanenbaum, Computer Networks (5th edition), Prentice Hall 2010
4. Fred Halsall, Addison Wesley, Computer Networking and the Internet (5th edition), 2006
5. Behrouz Forouzan, Data Communications and Networking (5th edition), McGraw Hill 2017
6. Behrouz Forouzan, TCP/IP Protocol Suite (4th edition), McGraw Hill 2009

List of e-Learning Resources:

1. https://nptel.ac.in/
2. https://www.coursera.org/
3. https://www.netacad.com/courses/packet-tracer

Subject Tr. **Academic Coordinator** **HoD** **Sr. Faculty Nominated by DOAA**

Bachelor of Technology (Computer Science and Engineering)

Semester-V

L-2T-1P-0C-3

CSE-310 TR1: Computer Architecture and Organization

Course Objectives

- To know the background of internal communication of computer.
- To have better idea on how to write assembly language programs.
- To be clear with memory management techniques, I/O communication.
- To Summarize the Instruction execution stages.
- To notice how to perform computer arithmetic operations using different types of serial communication techniques.

Course Outcomes (COs):-Upon completion of this unit students will be able to

1. Understand the theory and architecture of the central processing unit. architecture and functionality of central processing unit, I/O and memory organization.
2. Understand the organization, design, and programming of a simple digital computer and introduces simple register transfer language to specify various computer operations.
3. Analyze cost performance and design trade-offs in designing and constructing a computer processor including memory.
4. Apply the concepts of parallel processing, pipelining and inter-processor.
5. Analyze the design issues in terms of speed, technology, cost, performance.

Articulation Matrix

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CO2	-	2	-	1	1	-	1	-	-	-	-	-	-	-	-
CO3	2	-	3	-	-	1	2	1	1	-	-	-	-	1	1
CO4	-	3	2	2	2	-	1	1	-	-	-	1	1	-	1
CO5	3	2	1	2	2	1	1	1	-	-	-	1	1	1	1

High-3 Medium-2 Low-1

UNIT I: Basic Structure of Computer 7Hours

Structure of Desktop Computers, CPU: GeneralRegister Organization- Memory Register, Instruction Register, Control Word, StackOrganization, Instruction Format, ALU, I/O System,bus, CPU and Memory ProgramCounter, Bus Structure, Register Transfer Language- Bus and Memory Transfer,addressing modes.

UNIT II: Control Unit Organization 11Hours

Basic Concept of Instruction, Instruction Types, Micro Instruction Formats, Fetch andExecution cycle, Hardwired control unit, Micro-programmed Control unit- microprogramsequencer Control Memory, Sequencing and Execution of Micro Instruction. ComputerArithmetic: Addition and Subtraction, Tools Compliment Representation, Signed Additionand Subtraction, Multiplication and division, Booths Algorithm, Division Operation.

UNIT III: Floating Point Arithmetic Operation 11Hours

Design of Arithmetic unit, Instruction set architecture, CISC Scalar Processors, RISC Scalar Processors, Linearpipeline processor, Nonlinear pipeline processor, Instruction pipeline design, Mechanismsfor instruction pipelining, pipeline hazards, Dynamic instruction scheduling – scoreboarding and

Tomsula'salgorithm, Branch handling techniques, Arithmetic Pipeline.

UNIT IV: Multifunctional Architecture Pipelines **7 Hours**

Design, Static arithmetic pipeline, Multifunctional arithmetic pipelines, Flynn's Classification, System Attributes to Performance, Parallel computer modelsMultiprocessors and multicomputer, Multivector and SIMD Computers. Data and resourcedependences, Hardware and software parallelism, Program partitioning and scheduling,Grain size and latency, Control flow, data flow and Demand driven mechanisms. Staticinterconnection networks, Dynamic interconnection Networks: Bus Systems, CrossbarSwitch, Multistage and Combining Networks.

UNIT V: SharedMemory model **9 Hours**

Main memory- RAM, ROM, Secondary Memory – Magnetic Tape, Disk, Optical Storage,Cache Memory: Cache Structure and Design, Mapping Scheme, Replacement Algorithm,Improving Cache Performance, Virtual Memory, memory management hardware, Cachecoherence, Snoopy protocols, Directory based protocols, distributed memory model.

Total: 45 Hours

Reference(s):

1. Morris Mano, "Computer System Organization"3rd the ed. PHI.2017
2. C. Hamacher, Z. Vranesic and S. Zaky, "Computer Organization"6th ed., McGraw-Hill, 2017
3. Kai Hwang, "Advanced computer architecture", TMH. 2013 – 14.
4. William Stallings: Computer Organization & Architecture, 9th Edition, Pearson, 2015.

List of e-Learning Resources:

1. https://nptel.ac.in/
2. https://www.coursera.org/

Subject Tr. Academic Coordinator HoD Sr. Faculty Nominated by DOAA

Mandsaur University

Bachelor of Technology (Computer Science and Engineering) (BCT)

Semester-V

L-0 T-0 P-2 C-1

CSE971 PR1: Design and Development of Block chain Applications

Course Objectives

- To understand the fundamentals of Block chain technology
- To gain knowledge about Block chain application templates
- To deal with solidity and smart contract
- To familiar with Dapps
- To foresee the uses of block chain technology in various non-financial sector

Course Outcomes (COs)

11. Understand the fundamentals of Block chain technology
12. Understand the concept of application templates
13. Understand the architecture of smart contract
14. Analyze the contemporary block chain decentralized applications
15. Apply block chain technologies other than financial applications

Articulation Matrix

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CO3	3	1	-	-	2	-	-	-	-	-	-	-	2	2	-
CO4	1	-	2	3	-	-	-	-	-	-	-	-	2	3	2
CO5	1	-	-	-	3	-	-	-	-	-	-	-	3	1	1

High-3 Medium-2 Low-1

Practical(s)

1. **Develop outline a straightforward approach to creating decentralized applications (DApps) utilizing JavaScript and the Web3.js library? The outline should encompass the fundamental phases of establishing a development framework, including the setup of essential tools such as Node.js, npm, and an integrated development environment (IDE).**
2. **Develop the process for creating a smart contract discovery engine? The description should cover the essential components needed for building a platform that can index, search, and retrieve smart contracts deployed on a blockchain network.**
3. **Develop an application that demonstrates common vulnerabilities in smart contracts and explores potential hacks**.
4. **Develop an IoT application that integrates blockchain technology to enhance security and transparency. Design the application to collect data from IoT devices and securely record this data on a blockchain.**
5. **Design E-Voting application using blockchain technology to ensure secure, transparent, and tamper-proof voting.**
6. **Insurance Application - Design the application to allow users to create and manage insurance policies, submit claims, and track claim statuses on the blockchain.**
7. **Develop a healthcare application using blockchain technology to securely manage patient**

records and improve data privacy.

8. **Peer-reviewing application - Design the application to allow authors to submit documents for review, reviewers to submit feedback, and maintain a tamper-proof record of all interactions on the blockchain.**
9. **Develop a transcript verification application using blockchain technology to securely validate academic records.**
10. **Inventory management application - Design the application to enable real-time recording of inventory transactions, from stock additions and withdrawals to item transfers.**

Total: 30 Hours

Reference(s)

1. Imran bashir, Mastering Blockchain: Distributed ledger technology, decentralization, and smart contracts explained, 2018, 2nd edition, Packt publishing, Birmingham-Mumbai Proceedings of the 64th Academic Council (16.12.2021)
2. Alessandro Parisi, Securing Blockchain Networks like Ethereum and Hyperledger Fabric: Learn advanced security configurations and design principles to safeguard Blockchain networks, 2020, 1th edition, Packt publishing, Birmingham-Mumbai.

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Subject Tr. **Academic Coordinator** **HoD** **Sr. Faculty Nominated by DOAA**

Mandsaur University

Bachelor of Technology (Computer Science and Engineering) (BCT)

Semester-V

L-2 T-1 P-0 C-3

CSE971 TR1: Design and Development of Block chain Applications

Course Objectives

- To understand the fundamentals of Block chain technology
- To gain knowledge about Block chain application templates
- To deal with solidity and smart contract
- To familiar with Dapps
- To foresee the uses of block chain technology in various non-financial sector

Course Outcomes (COs)

16. Understand the fundamentals of Block chain technology
17. Understand the concept of application templates
18. Understand the architecture of smart contract
19. Analyze the contemporary block chain decentralized applications
20. Apply block chain technologies other than financial applications

Articulation Matrix

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CO/PO/PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	3	-	2	-	-	-	-	-	-	-	-	1	1	-
CO2	1	1	3	-	-	-	-	-	-	-	-	-	3	1	-
CO3	3	1	-	-	2	-	-	-	-	-	-	-	2	2	-
CO4	1	-	2	3	-	-	-	-	-	-	-	-	2	3	2
CO5	1	-	-	-	3	-	-	-	-	-	-	-	3	1	1

High-3 Medium-2 Low-1

UNIT I: Block Chain **9 Hours**

Blockchain - Blockchain Application Example-Escrow, Blockchain Stack - FromWeb2.0 to Decentralized Web - Doman-specific blockchain Applications-benefits and challengesBlockchain Application Components-Design Methodology – Templates.

UNIT II: Introduction - Ethereum network **9 Hours**

Introduction - Ethereum network - Ethereum Ecosystem: Keys, Addresses, Transaction, Messages, Ether, Ethereum Virtual Machine - EthereumBlockchainEthereum Development Tools - Ethereum Clients - Ethereum Languages - TestRPC - Mist Ethereum Wallet - MetaMask - Web3 – Truffle.

UNIT III: Understanding Solidity **9 Hours**

Understanding Solidity - Decoding components of a smart contract - solidity compilerworking of solidity - syntax - variable types - naming rules - common solidity use cases.

UNIT IV: Dapps **9 Hours**

Dapps - Implementing Dapps - Case studies: crowdfunding, Event Registration, Document Verification, Call option - Interest plate swap - Industrial IoT.

UNIT V: Consensus mining block **9 Hours**

Consensus mining block validation setting up a mining node state storage in Ethereum-Whisper protocol - Routing approaches - API-Case study: smart switch DappInternet of Things: Physical, Device, Network, Management and Application layers - IoTBlockchain Experiment - Government: Border Control, Voting, Citizen Identification – Health.

Total: 45 Hours

Reference(s)

1. Imran bashir, Mastering Blockchain: Distributed ledger technology, decentralization, and smart contracts explained, 2018, 2nd edition, Packt publishing, Birmingham-Mumbai Proceedings of the 64th Academic

Council (16.12.2021)
2. Alessandro Parisi, Securing Blockchain Networks like Ethereum and Hyperledger Fabric: Learn advanced security configurations and design principles to safeguard Blockchain networks, 2020, 1th edition, Packt publishing, Birmingham-Mumbai.

List of e-Learning Resources:

1. https://nptel.ac.in/

Subject Tr. **Academic Coordinator** **HoD** **Sr. Faculty Nominated by DOAA**

Mandsaur University

Bachelor of Technology (Computer Science and Engineering)

Semester-V

L-2 T-1 P-0 C-3

CSE1041 TR1: Deep Learning

Course Objectives

1. To learn the basics of neural networks and compare different deep learning models.
2. To Learn the Recurrent and Recursive networks in Deep Learning.
3. To learn the basics of deep reinforcement Learning models and types of Networks.
4. To Learn Deep Learning Models such as CNN, RNN, GAN.

Course Outcomes (COs)

6. Understand the performance of deep learning models with respect to the bias-variance tradeoff, overfitting and underfitting, estimation of test error and understand the basic concepts of deep learning.
7. Apply the main parameter such as activation function and hyperparameter of neural network and understand the concept and working of neural network.
8. Apply the basic architecture and working of convolution neural networks (CNN) with importance in Deep Learning models.
9. Analyze the concept, types and working of recurrent and recursive neural networks.
10. Evaluate the deep learning generative models and understand reinforcement learning process.

Articulation Matrix

CO/PO/PSO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	2	-	-	-	-	-	1	-	-	-	3	-	-
CO3	-	2	3	2	-	-	-	-	-	-	-	-	3	-	-
CO4	2	2	2	2	-	-	-	-	-	1	-	-	2	-	-
CO5	2	2	1	2	2	-	-	-	2	-	-	-	2	-	

High-3 Medium-2 Low-1

UNIT I: Foundations of Deep Learning **9 Hours**

Basic definition of machine learning and deep learning. Basic Terms: bias, variance, tradeoff, hyper parameters, under/over fitting regularization. Limitations of machine learning, History of deep learning, Advantage and challenges of deep learning. Learning representations from data, Understanding how deep learning works in three figures, Common Architectural Principles of Deep Network, Architecture Design, Applications of Deep learning.

UNIT II: Introduction to Neural Networks **9 Hours**

The Biological Neuron, The Perceptron, Multilayer Feed-Forward Networks, Training Neural Networks: Backpropagation and Forward propagation **Activation Functions**: Linear, Sigmoid, Tannh, Hard Tanh, SoftMax, Rectified Linear, Loss Functions: Loss Function Notation, Loss Functions for Regression, Loss Functions for Classification, Loss Functions for Reconstruction. **Hyperparameters**: Learning Rate, Regularization, Momentum, Sparsity. Deep Feedforward Networks – Example of Ex OR, Hidden Units, cost functions, error backpropagation, Gradient-Based Learning.

UNIT III: Convolution Neural Network (CNN) **9 Hours**

Introduction, CNN architecture overview, The Basic Structure of a Convolutional Network- Padding, Strides, Typical Settings, the ReLU layer, Pooling, Fully Connected Layers, The Interleaving between Layers, Local Response Normalization, Training a Convolutional Network.

UNIT IV: Recurrent Neural Network (RNN) **9 Hours**

Recurrent and Recursive Nets: Unfolding Computational Graphs, Recurrent Neural Networks, Bidirectional RNNs, Encoder-Decoder Sequence-to-Sequence Architectures, Deep Recurrent Networks, Recursive Neural Networks, The Challenge of Long-Term Dependencies, Echo State Networks, Leaky Units and Other Strategies for Multiple Time Scales, The Long Short-Term Memory and Other Gated RNNs, Optimization for Long-Term Dependencies, Explicit Memory.

UNIT V: Deep Generative Models **9 Hours**

Introduction to deep generative model, Boltzmann Machine, Deep Belief Networks, Generative adversarial network (GAN), Introduction of deep reinforcement learning, Markov Decision Process, basic framework of reinforcement learning, challenges of reinforcement learning.

Total: 45 Hours

Text Books:

1. Goodfellow, I., Bengio, Y.,,Courville, A, ―Deep Learning‖, MIT Press, 2016.
2. Josh Patterson & Adam Gibson, ―Deep Learning.
3. CharuAgarwal, ―Neural Networks and deep learning‖, A textbook.
4. Nikhil Buduma, ―Fundamentals of Deep Learning‖, SPD.
5. Francois chollet, ―Deep Learning with Python.

Reference Books:

1. Richard S. Sutton and Andrew G. Barto, ―Reinforcement Learning: An Introduction.
2. ―Deep Learning from Scratch: Building with Python from First Principles‖O'Reily by SethWeidman.
3. Francois Duval, ―Deep Learning for Beginners, Practical Guide with Python and Tensorflow.

List of e-Learning Resources:

3. https://nptel.ac.in/
4. https://www.coursera.org/
5. http://csis.pace.edu/ctappert/cs855-18fall/DeepLearningPractitionersApproach.pdf
6. https://www.dkriesel.com/_media/science/neuronalenetze-en-zeta2-1col-dkrieselcom.pdf

Subject Tr. **Academic Coordinator** **HoD** **Sr. Faculty Nominated by DOAA**

Mandsaur University

Bachelor of Technology (Computer Science and Engineering)

Semester-V

L-0 T-0 P-2 C-1

CSE1041 PR1: Deep Learning

Course Objectives

5. To learn the basics of neural networks and compare different deep learning models.
6. To Learn the Recurrent and Recursive networks in Deep Learning.
7. To learn the basics of deep reinforcement Learning models and types of Networks.
8. To Learn Deep Learning Models such as CNN, RNN, GAN.

Course Outcomes (COs)

11. Understand the performance of deep learning models with respect to the bias-variance tradeoff, overfitting and underfitting, estimation of test error and understand the basic concepts of deep learning.
12. Apply the main parameter such as activation function and hyperparameter of neural network and understand the concept and working of neural network.
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CO2	-	3	2	-	-	-	-	-	1	-	-	-	3	-	-
CO3	-	2	3	2	-	-	-	-	-	-	-	-	3	-	-
CO4	2	2	2	2	-	-	-	-	-	1	-	-	2	-	-
CO5	2	2	1	2	2	-	-	-	2	-	-	-	2	-	

High-3 Medium-2 Low-1

PRACTICAL'S

1. Implement an application of Union, Intersection and Complement operations in Deep Learning.
2. Implement an application Program to show the working of Artificial Neural Network.
3. Implementation of different activation functions applications using train Neural Network.
4. Implementation the basic application of different Learning Rules with working model.
5. Implementation the working model Perceptron Networks. Using large data sets
6. Implementation of Pattern matching using different rules.

Implementation the application of deep learning in healthcare.

7. Implementation the application of deep learning in business analysis.

Text Books:

1. Goodfellow, I., Bengio, Y.,,Courville, A, ―Deep Learning‖, MIT Press, 2016.
2. Josh Patterson & Adam Gibson, ―Deep Learning,2017
3. CharuAgarwal, ―Neural Networks and deep learning‖, A textbook.
4. Nikhil Buduma, ―Fundamentals of Deep Learning‖, SPD.
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7. https://nptel.ac.in/
8. https://www.coursera.org/
9. http://csis.pace.edu/ctappert/cs855-18fall/DeepLearningPractitionersApproach.pdf
10. https://www.dkriesel.com/_media/science/neuronalenetze-en-zeta2-1col-dkrieselcom.pdf

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