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***CSL5403 Computer Networks Lab***

**L-T-P-Cr: 0-0-3-1**

**Pre-requisites:** Basics of Computer Networks

**Objectives/Overview:**

* To familiarize with Python programming language
* To implement common pre-processing steps in machine learning on real-world datasets.
* To implement/use common unsupervised, unsupervised, reinforcement learning methods on real-world datasets.
* To implement/use common dimensionality reduction techniques and ensemble learning methods on real-world datasets.

**Course Outcomes:**

At the end of the course, a student should:

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| **S.NO** | **Outcome** | **Level of Attainment** |
| CO 1 | Understand the working concepts of Networking and inter – networking Devices. | Familiarity |
| CO 2 | Understand the concepts of different shortest path algorithms.  | Assessment |
| CO 3 | Understand different error detection and correction techniques/algorithms. | Assessment |
| CO 4 | Understand Flow control techniques/algorithms | Assessment |
| CO 5 | Understand the concepts of client – server interaction using connection oriented and connectionless protocols. | Assessment |
| CO 6 | Be exposed to working of routing algorithms | Assessment |
| CO 7 | Understand the proficiency in Traffic Shaping Algorithms | Usage |
| CO 8 | Be exposed to client-server interaction required to design project.  | Usage |

**List of Experiments:**

1. To understand the working concepts of Networking and inter – networking Devices (Hub, Switches, Router, Repeater, etc.)
2. Finding shortest path between any two nodes in a computer network using Dijkstra's, Prim’s and Kruskal’s shortest path algorithm.
3. To understand the working concepts of Cisco packet tracer
4. Implementation of Error detection and corrections algorithm in C / C++ / Java
5. Implementing client – server program using TCP sockets
6. Implementing client – server program using UDP sockets.
7. Implementation of flow control algorithms in a client – server environment using sockets Predict the salary of employees based on their experience using linear regression.
8. Implementation of distance vector and link state routing algorithms.
9. Design and implement Traffic Shaping Algorithms: Leaky Bucket and Token Bucket
10. Configure ARP and ICMP using packet tracer
11. Implementation of encryption algorithm converting plain text to cipher text using C / C++ / Java
12. Design and implement a chat system that allows multiple groups of users to chat. A chat coordinator resides at a well-known network address, uses UDP for communication with chat clients, sets up chat servers for each chat session, and maintains a chat session directory. There is one chat server per chat session. A chat server uses TCP for communication with clients. A chat client allows users to start, join, and leave a chat session. Design and implement the coordinator, server, and client code.
13. Write a program to simulate routing using flooding. Each packet should contain a counter that is decremented on each hop. When the counter gets to zero, the packet is discarded. Time is discrete, with each line handling one packet per time interval. Make three versions of the program: all lines are flooded, all lines except the input line are flooded, and only the (statically chosen) best k lines are flooded. Compare flooding with deterministic routing (k = 1) in terms of both delay and the bandwidth used.
14. Write a program to simulate the behavior of the CSMA/CD protocol over Ethernet when there are N stations ready to transmit while a frame is being transmitted. Your program should report the times when each station successfully starts sending its frame. Assume that a clock tick occurs once every slot time (51.2 microseconds) and0020collision detection and sending of jamming sequence takes one slot time. All frames are the maximum length allowed.
15. Implementation of chat system
16. Implementing client – server program using SCTP
17. Identify nearby Bluetooth devices

**Course Outcomes (COs) contribution to the Programme Outcomes(POs)**

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| **Course outcomes (**6CS120 **Computer Networks Lab)** | **PO-1** | **PO-2** | **PO-3** | **PO-4** | **PO-5** | **PO-6** | **PO-7** | **PO-8** | **PO-9** | **PO-10** | **PO-11** | **PO-12** | **Weightage** |
| CO-1 | H | H | H | M | M | H | M | M | M | H | L | H | 81% |
| CO-2 | H | H | H | M | H | M | H | M | M | H | L | H | 77% |
| CO-3 | H | H | H | M | M | H | L | M | H | H | L | H | 85% |
| CO-4 | H | H | H | M | H | H | M | M | H | H | L | H | 85% |
| CO-5 | H | H | H | M | H | H | M | M | H | H | L | H | 85% |
| CO-6 | H | H | H | M | H | H | M | M | M | H | L | H | 85% |
| CO-7 | H | H | H | M | M | H | H | M | M | H | L | H | 65 |
| CO-8 | H | H | H | M | H | H | M | M | H | H | M | H | 75 |
| Weightage | 100% | 100% | 100% | 80% | 70% | 80% | 70% | 70% | 90 % | 84 | 70% | 100 | 100 |
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