Description of Course CSE 322

PART A: General Information

1	**Course Title**	: COMPUTER NETWORKS SESSIONAL
2	**Type of Course**	: SESSIONAL
3	**Offered to**	: DEPARTMENT OF CSE
4	**Pre-requisite Course(s)**	: NONE

PART B: Course Details

1. Course Content (As approved by the Academic Council)

Computer Networks; Protocol hierarchies; Data link control: Link layer and services; Multiple access protocol: Standards IEEE 802.*; Hubs, Bridges, and Switches, Fast Ethernet; Routing architecture and algorithms; IPV4, IPV6, ARP, RARP, DHCP, BGP; Introduction to transport layer: UDP,TCP; Principles of Reliable data transfer, Principles of congestion control, TCP, Congestion control; Application layer services: Web, HTTP, FTP, SMTP, DNS architecture; IoT fundamentals: Edge devices, Wireless communication, Routing, IoT applications; IoT advanced: Edge cloud IoT platforms, Load balancing, Energy management, IoT security; Datacenter topology.

2. Course Objectives

The students are expected to:

i. Understand architectures of different types of computer networks.
ii. Develop contemporary and new protocols of computer networks.
iii. Identify applications of computer networks with determining suitable alternatives of the networks.

3. Knowledge required

Technical

- Socket Programming

4. Course Outcomes (COs)

CO No.	CO Statement After undergoing this course, students should be able to:	Corresponding PO(s)*	Domains and Taxonomy level(s)**	Delivery Method(s) and Activity(-ies)	Assessment Tool(s)
CO1	**Understand** architectures of different types of computer networks.	PO8	C2, P1	Lecture, Demonstration, and hands-on	Assignments or Projects, and Final Exam
CO2	**Design** and **Analyze** contemporary and new protocols of computer networks.	PO1, PO2, PO3, PO5, and PO9	C6, A5	Lecture, Demonstration, and hands-on	Assignments or Projects, and Final Exam
CO3	**Evaluate** computer networks with determining suitable alternatives of the networks	PO3, PO11	C5, P7	Lecture, Demonstration, and hands-on	Assignments or Projects, and Final Exam

***Program Outcomes (POs)**

PO1: Engineering knowledge; PO2: Problem analysis; PO3: Design/development of solutions; PO4: Investigation; PO5: Modern tool usage; PO6: The engineer and society; PO7: Environment and sustainability; PO8: Ethics; PO9: Individual work and teamwork; PO10: Communication; PO11: Project management and finance; PO12: Life-long learning.

****Domains**

C-Cognitive: C1: Knowledge; C2: Comprehension; C3: Application; C4: Analysis; C5: Synthesis; C6: Evaluation
A-Affective: A1: Receiving; A2: Responding; A3: Valuing; A4: Organizing; A5: Characterizing
P-Psychomotor: P1: Perception; P2: Set; P3: Guided Response; P4: Mechanism; P5: Complex Overt Response; P6: Adaptation; P7: Organization

5. Mapping of Knowledge Profile, Complex Engineering Problem Solving, and Complex Engineering Activities

COs	K1	K2	K3	K4	K5	K6	K7	K8	P1	P2	P3	P4	P5	P6	P7	A1	A2	A3	A4	A5
CO1		√	√	√	√	√				√										
CO2		√	√	√	√	√			√	√	√						√	√		
CO3		√	√	√	√	√		√	√				√		√		√	√		√

K-Knowledge Profile:

K1: A systematic, theory-based understanding of the natural sciences applicable to the discipline; **K2:** Conceptually based mathematics, numerical analysis, statistics and the formal aspects of computer and information science to support analysis and modeling applicable to the discipline; **K3:** A systematic, theory-based formulation of engineering fundamentals required in the engineering discipline; **K4:** Engineering specialist knowledge that provides theoretical frameworks and bodies of knowledge for the accepted practice areas in the engineering discipline; much is at the forefront of the discipline; **K5:** Knowledge that supports engineering design in a practice area; **K6:** Knowledge of engineering practice (technology) in the practice areas in the engineering discipline;

K7: Comprehension of the role of engineering in society and identified issues in engineering practice in the discipline: ethics and the engineer's professional responsibility to public safety; the impacts of engineering activity; economic, social, cultural, environmental and sustainability; **K8:** Engagement with selected knowledge in the research literature of the discipline

P-Range of Complex Engineering Problem Solving:

P1: Cannot be resolved without in-depth engineering knowledge at the level of one or more of K3, K4, K5, K6, or K8, which allows a fundamentals-based, first principles analytical approach; **P2:** Involve wide-ranging or conflicting technical, engineering, and other issues; **P3:** Have no obvious solution and require abstract thinking, originality in analysis to formulate suitable models; **P4:** Involve infrequently encountered issues; **P5:** Are outside problems encompassed by standards and codes of practice for professional engineering; **P6:** Involve diverse groups of stakeholders with widely varying needs; **P7:** Are high-level problems including many component parts or sub-problems

A-Range of Complex Engineering Activities:

A1: Involve the use of diverse resources (and for this purpose, resources include people, money, equipment, materials, information and technologies); **A2:** Require resolution of significant problems arising from interactions between wide-ranging or conflicting technical, engineering or other issues; **A3:** Involve creative use of engineering principles and research-based knowledge in novel ways; **A4:** Have significant consequences in a range of contexts, characterized by difficulty of prediction and mitigation; **A5:** Can extend beyond previous experiences by applying principles-based approaches

6. Lecture/ Activity Plan

Week	Lecture Topics	Corresponding CO(s)
Week 1	Lecture on Packet Tracer- Basic Networking, VLAN	CO1
Week 2	Lecture 2 on Packet Tracer- NAT, ACL	CO1
Week 3	In-class assignment on Packet Tracer	CO1
Week 4	Lecture on Socket Programming + Declaration of Assignment on Socket Programming	CO1
Week 5	Lecture on NS2 Environment Setup + Q/A Session in Lab + Declaration of assignment on NS2 + Declaration of project	CO1, CO2, and CO3
Week 6	Evaluation of Assignment on Socket Programming	CO1
Week 7	Evaluation on NS2 Bootstrapping/Setup	CO1
Week 8	Project Proposal	CO2
Week 9	Evaluation of Assignment on NS2	CO1
Week 10	Demonstration on Wireshark	CO1
Week 11	Advanced topics on networking	CO1, CO2
Week 12	NS2 Project Evaluation	CO2, CO3
Week 13	Quiz	CO1, CO2, and CO3

7. Assessment Strategy

- Class Attendance: Class attendance will be recorded in every class.
- Online/ Offline Assignments: There will be 3/4 online or offline assignments
- Projects: There will be a project related to topics covered in the sessional
- Final Quiz: A comprehensive Final Quiz will be held at the end of the semester as per the institutional ordinance.

8. Distribution of Marks

Attendance:	10%
Online Assignment:	25%
Offline Assignment	25%
Final Project:	20%
Final Quiz:	20%
Total:	**100%**

9. Textbook/ Reference

a. Computer Networks by Andrew S. Tanenbaum (5th edition)