

CS3201: COMPUTER NETWORKS

Effective Term

Semester A 2024/25

Part I Course Overview

Course Title

Computer Networks

Subject Code

CS - Computer Science

Course Number

3201

Academic Unit

Computer Science (CS)

College/School

College of Computing (CC)

Course Duration

One Semester

Credit Units

3

Level

B1, B2, B3, B4 - Bachelor's Degree

Medium of Instruction

English

Medium of Assessment

English

Prerequisites

Nil

Precursors

CS2310 Computer Programming or
CS2311 Computer Programming or
CS2315 Computer Programming or
CS2334 Data Structures for Data Science or
CS2360 Java Programming

Equivalent Courses

Nil

Exclusive Courses

Nil

Part II Course Details

Abstract

This course aims to introduce fundamental concepts in data communication and computer networks. The framework of the course is the 5-layer architecture, with the lower layers up to and including the transport layer as the main focus. Examples will be drawn liberally from the Internet to illustrate abstract concepts so that students can understand how a computer network actually works.

Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Identify and describe the key transmission level technologies used in modern communication networks.	20			
2	Apply the concepts of layered architecture in assessing the placement of network devices, protocols and services.	15			
3	Explain the working of error control and medium access control protocols in the data link layer and apply them to both wired and wireless local area networks.	15			
4	Explain the role of routing, congestion and flow control, naming and internetworking in the context of a global network such as the Internet, and the common protocols used to implement these functions.	25			
5	Compare the services provided by the UDP/TCP transport layer protocols and explain the mechanisms used to provide a reliable data transport service on an unreliable IP network.	10			
6	Analyze the application of network technologies in designated scenarios and explore how these technologies can be deployed to support the Quality of Service requirements of current and future applications.	15	x	x	

A1: Attitude

Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability

Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

A3: Accomplishments

Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

Learning and Teaching Activities (LTAs)

LTAs		Brief Description	CILO No.	Hours/week (if applicable)
1	Lecture	Explain key concepts.	1, 2, 3, 4, 5, 6	3 hours/week
2	Tutorials	The tutorials provide an opportunity for the students to discuss and deepen their understanding of material learned during the lecture. In particular, questions will be formulated in the form of specific scenarios to help the students to apply concepts learned and to encourage them to propose creative solutions.	1, 2, 3, 4, 5	1 hour/week started from week 2

Assessment Tasks / Activities (ATs)

ATs		CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Assignments	1, 2, 3, 4, 5, 6	18	
2	Quiz	1, 2, 3	12	

Continuous Assessment (%)

30

Examination (%)

70

Examination Duration (Hours)

2

Additional Information for ATs

For a student to pass the course, at least 30% of the maximum mark for the examination must be obtained.

Assessment Rubrics (AR)**Assessment Task**

Assignments

Criterion

Ability to apply concepts learned in lectures to solve problems in data communications and computer networks.

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

Quiz

Criterion

Ability to solve short questions in data communications and computer networks.

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

Examination

Criterion

Ability to apply concepts learned in lectures to solve problems in data communications and computer networks, including modelling, analysis of performance, specification evaluation of appropriate technology for specific network scenarios.

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Part III Other Information

Keyword Syllabus

Data transmission. Coding. Modulation techniques. Common network devices and configurations. Layered network architecture: The OSI and Internet TCP/IP reference models. Data link layer: error control and flow control issues. Sliding window protocols. LANs and medium access protocols. Network layer issues: addressing, routing, congestion and flow control. Internetworking. Transport layer issues. Case study based on TCP/UDP and IP protocols.

Reading List

Compulsory Readings

Title	
1	Tanenbaum A. and Wetherell D. J. (2010). Computer Networks. Prentice Hall, 5th edition.

Additional Readings

Title	
1	Kurose, J. F. and Ross, K. W. (2012). Computer Networking: A Top Down Approach. Addison- Wesley, 6th edition.
2	Stallings, W. (2013). Data and Computer Communications. Prentice Hall, 10th edition.
3	Comer, D. (2014). Computer Networks and Internets. Prentice Hall, 6th edition.
4	Forouzan, B. A. (2013). Data Communications and Networks. McGraw Hill, 5th edition.