

**COMP2602 Computer Networks (Sept 2022/6th Run)**  
**COURSE OUTLINE**  
**Semester 1 2022/2023 Academic Year**

**Prerequisite: COMP 1600**  
**or COMP 1401**  
**Credits: 3**

**Lecturer: Dr. Michael Hosein**  
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**Coursework Submission:** Via My Elearning  
**Notes:**

- Students are expected to attend all lectures and tutorials
- All students are expected to have access to My Elearning early in the semester. If you do not have access to My Elearning, you are expected to find out about and obtain the necessary files/information.
- Software needed: Python compiler (<https://www.python.org/downloads/>)

## **COURSE DESCRIPTION**

This course examines some of the important concepts related to computer networks, e.g., the network edge and core, routers, the ISO and TCP/IP reference models for computer communication and networking protocols. Many use the Internet and local area networks every day but are not fully aware as to what goes on “behind-the-scenes” to make this network communication possible. Students explore what happens to the data in the computer before it is prepared for transmission, how protocols work to transmit the data and how it is received at other computers. Error control and recovery methods for lost or corrupted data are also investigated. A layered model for computer communications is thoroughly examined. Students will write networking programs and test them on a local area network or on the Internet.

## **COURSE RATIONALE**

This course is important because students need to understand the underlying principles behind the development of today’s networks, especially the Internet.

## **COURSE CONTENT**

1. Computer Networks and the Internet: The Internet. Network edge and core. Network access and physical media. Protocol layers and their Service models.
2. The Application Layer: Principles of application layer protocols. FTP, Email, SMTP, DNS etc. Socket programming with TCP and UDP.
3. The Transport Layer: Transport-layer services. Multiplexing and demultiplexing. UDP and TCP. Reliability. Congestion control.
4. The Network Layer and Routing: Service models. Routing. IP. Mobility.
5. Link Layer and Local Area Networks: Services. Error detection and correction. Multiple access protocols. Ethernet. Network hardware. Wireless links. PPP. Frame Relay.
6. Introduction to Network Design: The network design and implementation process. Stages: Feasibility Study, preparing network design plan, understanding current network, defining new network requirements, identifying geographic scope, calculating circuit requirements,

identifying security and control measures, designing network configurations, determining network costs, network implementation.

## **COURSE LEARNING OUTCOMES**

Upon the successful completion of this course, the student will be able to:

1. Describe the components and infrastructure that form the basis of most computer networks
2. Explain the technical aspects of data communications on the Internet
3. Write networking programs in an appropriate programming language.
4. Propose network designs based on case studies in organizations
5. Design finite-state machine (FSM) diagrams for high level network error checking and recovery protocols
6. Demonstrate inter-personal skills, teamwork, and effective use of appropriate technology associated with field of computer studies

## **TEACHING STRATEGIES**

The course will be taught via interactive lectures, tutorials and group work. Students will be expected to work in groups as well as individually in tutorials and for some lecture discussions.

**COURSE ASSESSMENT** (All assessments subject to review if COVID etc. arrangements are changed)

### **Coursework 50%**

2 Assignments 20%

2 in-course examinations 30% (Exam 1 -15%, Exam 2 -15%)

### **Final Examination One 2-hour written paper 50%**

### **Required Reading**

- Computer Networking A Top-Down Approach featuring the Internet, J. Kurose and K. Ross.  
Publisher: Addison Wesley. 8th edition. Global edition.

**ISBN-13:** 978-1292405469

**ISBN-10:** 1292405465

- Computer Networks 5th edition (2010). Andrew S. Tanenbaum and David J. Wetherall.  
Publisher: Prentice Hall. ISBN-10: 0132126958. ISBN-13: 978-0132126953

### **Other Readings**

- Data and Computer Communications by William Stallings. 10th edition (2013). Publisher: Prentice Hall. **ISBN-13:** 978-0133506488
- Internet RFCs and other online technical documents

## COURSE CALENDAR

The following is a **tentative** course schedule that is expected to remain the same.

Adjustments may occur and are announced in lectures and generally on My *Elearning* . **It is the student's responsibility for obtaining updated information regarding changes.**

Week	Content
1	Computer Networks and the Internet: The Internet. Network edge and core. Network access and physical media.
2	Protocol layers and their Service models.
3	The Application Layer: Principles of application layer protocols. FTP, Email, SMTP. DNS.
4	Socket programming with TCP and UDP. Programming labs.
5	The Transport Layer: Transport-layer services. Multiplexing and demultiplexing. UDP and TCP. <b>Give out Assignment 1.</b>
6	UDP and TCP continued. Reliability. Congestion control.
7	The Network layer and Routing: Service models. Routing. IP. Mobility. <b>In-course exam 1 (15%). Give out Assignment 2.</b>
8	Link Layer and Local Area Networks: Services. Error detection and correction. Multiple access protocols.
9	Ethernet. Network hardware. Wireless links. PPP. Frame Relay.
10	Introduction to Network Design: The network design process. The network design and implementation process. Stages: Feasibility Study, preparing network design plan, understanding current network, defining new network requirements. <b>In-course exam 2 (15%).</b>
11	Identifying geographic scope, calculating circuit requirements, identifying security and control measures, designing network configurations.
12	Determining network costs, network implementation. Review.