A POLYTECHNIC INSTITUTION

Course Outline

School of Computing and Academic Studies
Program: Computer Systems Technology
Option: Bachelor of Technology, Computer Systems

COMP 7005
Computer Networks and Protocols

Start Date: September 5, 2017 **End Date:** December 15, 2017

Total Hours: **Total Weeks:** **Term/Level:** **Course Credits:**
Hours/Week: 3.75 **Lecture:** 1.25 **Lab:** 2.5

Prerequisites
Course No. Course Name
Diploma of Technology in Computer Systems (or equivalent) or permission of instructor and program head.

COMP 7005 is a Prerequisite for:
Comp 8005 Data Communication Applications

■ Course Description

This course will cover the advanced elements of Data Communication and Network Architecture. The TCP/IP protocol suite and its application within the Internet architecture will be examined in depth, and in a practical manner. Also covered will be advanced topics such as Wireless Data Communication, and Security Protocols, and Cryptology. Students will be introduced to the Berkeley socket API, and the basics of Client/Server programming will be introduced.

■ Evaluation

Final Examination	30%	Comments:
Midterm	20%	
Assignments	20%	
Final Project	30%	
TOTAL	100%	

■ Course Learning Outcomes/Competencies

Upon successful completion, the student will:

1. Have an in-depth understanding of Data Communication protocols with an emphasis on practical applications.
2. Understand and analyze Peer-to-Peer protocols, Routing algorithms, and Network congestion issues.
3. Have a detailed understanding of the TCP/IP protocol suite and analyze the various components of the protocol suite in a practical manner.
4. Use the TCP/IP socket API to design and implement basic Client/Server applications.
5. Have a detailed understanding of Wireless and Mobile networks.
6. Understand the basics of Network Security be able to analyze and evaluate security protocols for potential use within an organization.
7. Acquire a solid foundation for pursuing more advanced courses such as COMP 8005 and COMP 8505.

■ Verification

I verify that the content of this course outline is current.

Aman Abdulla	September 1, 2017
Authoring Instructor	Date

I verify that this course outline has been reviewed.

Program Head/Chief Instructor	Date

I verify that this course outline complies with BCIT policy.

Dean/Associate Dean	Date

Note: Should changes be required to the content of this course outline, students will be given reasonable notice.

■ Instructor(s)

Aman Abdulla	Office Location:	SW2-323	Office Phone:	604-432-8837
	Office Hrs.:		E-mail Address:	aabdulla@milliways.bcit.ca

■ Learning Resources

Required:

Computer Networking – 7th Edition
A Top-Down Approach
Kurose & Ross
Addison-Wesley

Recommended:

Data and Computer Communications – 9th Edition
William Stallings
Prentice-Hall

▪ The Information for Students

Assignments: Late assignments, lab reports or projects will **not** be accepted for marking. Assignments must be done on an individual basis unless otherwise specified by the instructor.

Makeup Tests, Exams or Quizzes: There will be **no** makeup tests, exams or quizzes. If you miss a test, exam or quiz, you will receive zero marks. Exceptions may be made for **documented** medical reasons or extenuating circumstances. In such a case, it is the responsibility of the student to inform the instructor **immediately**.

Ethics: BCIT assumes that all students attending the Institute will follow a high standard of ethics. Incidents of cheating or plagiarism may, therefore, result in a grade of zero for the assignment, quiz, test, exam, or project for all parties involved and/or expulsion from the course.

Attendance: The attendance policy as outlined in the current BCIT Calendar will be enforced.

The following statements are in accordance with the BCIT Policies 5101, 5102, 5103, and 5104, and their accompanying procedures. To review these policies and procedures, please refer to: www.bcit.ca/about/administration/policies.shtml

Attendance/Illness:
In case of illness or other unavoidable cause of absence, the student must communicate as soon as possible with his/her instructor or Program Head or Chief Instructor, indicating the reason for the absence. Prolonged illness of three or more consecutive days must have a BCIT medical certificate sent to the department. Excessive absence may result in failure or immediate withdrawal from the course or program. Please see Policy 5101 — Student Regulations, and accompanying procedures: http://www.bcit.ca/files/pdf/policies/5101.pdf

Academic Misconduct:
Violations of academic integrity, including dishonesty in assignments, examinations, or other academic performances are prohibited and will be handled in accordance with Policy 5104 — Academic Integrity and Appeals, and accompanying procedures: http://www.bcit.ca/files/pdf/policies/5104.pdf

Attempts:
Students must successfully complete a course within a maximum of three attempts at the course. Students with two attempts in a single course will be allowed to repeat the course only upon special written permission from the Associate Dean. Students who have not successfully completed a course within three attempts will not be eligible to graduate from their respective program.

Accommodation:
Any student who may require accommodation from BCIT because of a physical or mental disability should refer to BCIT's Policy on Accommodation for Students with Disabilities (Policy #4501), and contact BCIT's Disability Resource Centre (SW1-2300, 604-451-6963) at the earliest possible time. Requests for accommodation must be made to the Disability Resource Centre, and should not be made to a course instructor or Program area.

Any student who needs special assistance in the event of a medical emergency or building evacuation (either because of a disability or for any other reason) should also promptly inform their course instructor(s) and the Disability Resource Centre of their personal circumstances.

■ Assignment Details

Will be provided in class.

Schedule

Topic Number	Outcome/Material Covered	
1	**Computer Networks and the Internet:** • Components of a computer network • Network core • Access Networks and Physical Media • ISPs and Internet backbones • Delay and Loss in Packet-Switched networks • Layered Architectures and Service Models	**Chapter 1**
2	**Application Layer:** • Principles of Network Applications • Web and HTTP • SMTP (E-mail) • DNS • P2P File Sharing • Socket Programming API (TCP & UDP)	**Chapter 2, Notes and code examples**
3	**Transport Layer:** • Introduction to Transport Layer Services • Multiplexing and Demultiplexing • Connectionless Transport: UDP • Principles of Reliable Data Transfer • Connection-Oriented Transport: TCP • Principles of Congestion Control • TCP Congestion Control	**Chapter 3**
4	**Network Layer:** • Forwarding and Routing • Virtual Circuit and Datagram Networks • Router Architecture • IP: Forwarding and Addressing in the Internet • Routing Algorithms • Routing in the Internet • Broadcast and Multicast Routing	**Chapter 4**
5	**Link Layer and LANs:** • Multiple Access Protocols • Link Layer Switches • VLANs • Link Virtualization	**Chapter 5**
6	**RF Principles** • RF wave propagation RF Propagation Models • Antenna types • Link Budget Calculations	**Course notes**

Topic Number	Outcome/Material Covered	
7	**Wireless Networks – IEEE 802.11:** • Wi-Fi: 802.11 wireless LANs • 802.11 Medium Access Control • 802.11 Frame Types	**Notes & Chapter 6**
8	**Wireless and Mobile Networks:** • Wireless Links and Network Characteristics • Wi-Fi: 802.11 wireless LANs • Cellular internet access • Mobility management • Mobile IP • Managing mobility in cellular networks • Bluetooth Technology	**Notes & Chapter 6**
9	**Security and Cryptography:** • Security Protocols • Cryptographic Algorithms • Authentication & Integrity • Key Distribution and Certificates	**Chapter 8, Course notes & code examples**

***Topics may be omitted, replaced or added at the discretion of the instructor.**

- Notes will be posted on my Web server which you may access using the following URL:

  http://milliways.bcit.ca/c7005/