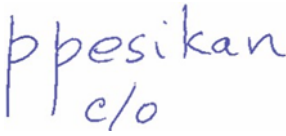# Course Outline

School:	Eng. Tech. & Applied Science
Department:	Information and Communication Engineering Technology (ICET)
Course Title:	Networking for Sftwr Dvlprs
Course Code:	COMP 216
Course Hours/Credits:	56
Prerequisites:	COMP 123, COMP 301
Co-requisites:	N/A
Eligible for Prior Learning, Assessment and Recognition:	N/A
Originated by:	Narendra Pershad
Creation Date:	Fall 2020
Current Semester:	Winter 2021
Approved by:	ppesikan c/o

_____
Chairperson/Dean

Students are expected to review and understand all areas of the course outline.

Retain this course outline for future transfer credit applications. A fee may be charged for additional copies.

This course outline is available in alternative formats upon request.

Acknowledgement of Traditional Lands

Centennial is proud to be a part of a rich history of education in this province and in this city. We acknowledge that we are on the treaty lands and territory of the Mississaugas of the Credit First Nation and pay tribute to their legacy and the legacy of all First Peoples of Canada, as we strengthen ties with the communities we serve and build the future through learning and through our graduates. Today the traditional meeting place of Toronto is still home to many Indigenous People from across Turtle Island and we are grateful to have the opportunity to work in the communities that have grown in the treaty lands of the Mississaugas. We acknowledge that we are all treaty people and accept our responsibility to honor all our relations.

Course Description

Students in this course will gain hands-on experience by applying knowledge of network protocols and components to the development and maintenance of software applications. Coursework emphasizes network stacks, socket-based network applications, and developing client applications that interface with various intelligent devices.

Program Outcomes

Successful completion of this and other courses in the program culminates in the achievement of the Vocational Learning Outcomes (program outcomes) set by the Ministry of Colleges and Universities in the Program Standard. The VLOs express the learning a student must reliably demonstrate before graduation. To ensure a meaningful learning experience and to better understand how this course and program prepare graduates for success, students are encouraged to review the Program Standard by visiting http://www.tcu.gov.on.ca/pepg/audiences/colleges/progstan/. For apprenticeship-based programs, visit http://www.collegeoftrades.ca/training-standards.

Course Learning Outcomes

The student will reliably demonstrate the ability to:

1. Build command line interfaces or gui based network utilities and programs.
2. Describe and explain the purposes of the various network devices in a real-world network.
3. Explain the responsibilities of the different layers of the TCP/IP software stack and the protocols and their vulnerabilities that uses it.
4. Investigate the structure of common network packages and traffic to troubleshoot network problems.
5. Design and code programs to connect to remote servers in order to download data or to consume services.
6. Use sockets to complete tasks that cannot be done with pre-built utilities/software.
7. Plan, build and deploy an intelligent IoT solution that incorporates security, connectivity and bottlenecks considerations.

Essential Employability Skills (EES)

The student will reliably demonstrate the ability to*:

1. Communicate clearly, concisely and correctly in the written, spoken, and visual form that fulfills the purpose and meets the needs of the audience.

2.   Respond to written, spoken, or visual messages in a manner that ensures effective communication.
4.   Apply a systematic approach to solve problems.
5.   Use a variety of thinking skills to anticipate and solve problems.
10.   Manage the use of time and other resources to complete projects.

There are 11 Essential Employability Skills outcomes as per the Ministry Program Standard. Of these 11 outcomes, the following will be assessed in this course.

Global Citizenship and Equity (GC&E) Outcomes

N/A

Methods of Instruction

Pre-recorded or interactive lectures

Interactive lab sessions,

Demonstrations,

Hands-On Exercises

Collaborative assignments and projects

Text and other Instructional/Learning Materials

Text Book(s):

Learning Python Networking - Second Edition

by Jose Manuel Ortega, Dr. M. O. Faruque Sarker, Sam Washington

Publisher: Packt Publishing

Release Date: March 2019

ISBN: 9781789958096

Online Resource(s):

https://learning.oreilly.com/videos/introduction-to-python/9780135707333

https://learning.oreilly.com/videos/python-fundamentals/9780135917411

https://learning.oreilly.com/library/view/learning-python-networking/9781789958096/

Classroom and Equipment Requirements

A computer with a reasonable amount of computing power with a reliable connection to the internet.

You must also have Administrator's access to your machine

Evaluation Scheme

⇨ Labs: There will be about 10 labs, after each topic.
⇨ Assignments: There will be 3 assignments in week 1, 3 and 9.
⇨ Test 1: This test will evaluate materials up to week 6
⇨ Test 2: The final examination will cover everything in the course but emphasizing the last 7 weeks.

Evaluation Name	CLO(s)	EES Outcome(s)	GCE Outcome(s)	Weight/100
Labs	1, 2, 3, 4, 5, 6, 7	1, 2, 4, 5, 10		20
Assignments	1, 2, 3, 4, 5, 6, 7	1, 2, 4, 5, 10		30
Test 1	1, 2, 3, 4	4, 5		25
Test 2	4, 5, 6, 7	1, 2, 10		25
Total				100%

If students are unable to write a test they should immediately contact their professor or program Chair for advice. In exceptional and well documented circumstances (e.g. unforeseen family problems, serious illness, or death of a close family member), students may be able to write a make-up test.

All submitted work may be reviewed for authenticity and originality utilizing Turnitin®. Students who do not wish to have their work submitted to Turnitin® must, by the end of the second week of class, communicate this in writing to the instructor and make mutually agreeable alternate arrangements.

When writing tests, students must be able to produce official Centennial College photo identification or they may be refused the right to take the test or test results will be void.

Tests or assignments conducted remotely may require the use of online proctoring technology where the student's identification is verified and their activity is monitored and/or recorded, both audibly and visually through remote access to the student's computer and web camera. Students must communicate in writing to the instructor as soon as possible and prior to the test or assignment due date if the they require an alternate assessment format to explore mutually agreeable alternatives.

Student Accommodation

The Centre for Accessible Learning and Counselling Services (CALCS) (http://centennialcollege.ca/calcs) provides programs and services which empower students in meeting their wellness goals, accommodation and disability-related needs. Our team of professional psychotherapists, social workers, educators, and staff offer brief, solution-focused psychotherapy, accommodation planning, health and wellness education, group counselling, pscyho-educational workshops, adaptive technology, and peer support. Walk in for your first intake session at one of our service locations (Ashtonbee Room L1-04, Morningside Room 190, Progress Room C1-03, The Story Arts Centre Room 285, Downsview Room 105) or contact us at calcs@centennialcollege.ca, 416-289-5000 ext. 3850 to learn more about accessing CALCS services.

Use of Dictionaries

- Any dictionary (hard copy or electronic) may be used in regular class work.
- Dictionary use is not permitted in test or examination settings.

Program or School Policies

N/A

Course Policies

N/A

College Policies

Students should familiarize themselves with all College Policies that cover academic matters and student conduct.

All students and employees have the right to study and work in an environment that is free from discrimination and harassment and promotes respect and equity. Centennial policies ensure all incidents of harassment, discrimination, bullying and violence will be addressed and responded to accordingly.

Academic honesty is integral to the learning process and a necessary ingredient of academic integrity. Academic dishonesty includes cheating, plagiarism, and impersonation. All of these occur when the work of others is presented by a student as their own and/or without citing sources of information. Breaches of academic honesty may result in a failing grade on the assignment/course, suspension or expulsion from the college.

For more information on these and other policies, please visit www.centennialcollege.ca/about-centennial/college-overview/college-policies.

Students enrolled in a joint or collaborative program are subject to the partner institution's academic policies.

PLAR Process

N/A

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Semester:	Fall 2021	Professor Name:	See eCentennial course shell
Section Code:	ALL	Contact Information:	See eCentennial course shell
Meeting Time & Location:	See myCentennial timetable	Office Hours:	To be announced in the first week of class
Delivery Method:	On-line		

This course outline has been modified to reflect the 13-week online delivery of courses in the Summer/Fall 2020 or Winter 2021 semester. Total course hours may be less than as indicated on the cover page as a result of the reduced semester length due to COVID-19.

Topical Outline (subject to change):

Week	Topics	Readings/Materials	Weekly Learning Outcome(s)	Instructional Strategies	Evaluation Name and Weight	Evaluation Date
1	Python Language basics	Handouts	Understand the different ways that you can execute python statements. Use the python interpreter to evaluate expressions. Understand Python data types such as numeric, string, bool and sequences. Use controls structures such as if, while and for loops and functions.	Discussions and Online reading	Assignment 1	Week 3
2	Python Language	Handouts	Design and construct classes. Make classes friendlier by implementing properties, and overloading the __str__ method Write code that handles Exceptions. Assemble code into modules and modules into packages.	Discussions and Online Readings	Lab	
3	Advanced Python Language	Handouts	Develop simple cli and gui applications. Construct Multi-threaded applications.	Discussions and Online Readings	Assignment 2	Week 9
4	Network Basics	Handouts	Survey of common hardware devices. Router, layer-2/3 switches, access points, Modems, NICs, Firewalls	Discussions and Online Readings	Lab	

Week	Topics	Readings/Materials	Weekly Learning Outcome(s)	Instructional Strategies	Evaluation Name and Weight	Evaluation Date
			Understand the TCP/IP stack Define network interfaces. Understand the network protocol stack. Capture and inspect packets with Wireshark. Learn about some common python libraries for network programming.			
5	HTTP Client and Server Programming	Chapter 2	Understand the HTTP Request and HTTP Response objects. Consume REST APIs. Handle HTTP Basic and Digest Authentication with requests. Extract information from web pages.	Discussions and Online Readings	Lab	
6	Working with Emails	Chapter 4	Send and retrieve email via code	Discussions and Online Readings	Lab	
7	Test 1	Previous 6 weeks material	Revision	Discussions and Online Readings	Test 1	Test 1 in the last class of the week
8	Interacting with Remote Systems	Chapter 5	Understand and use the FTP protocol Understand and use the SSH protocol Securing the SSH protocol	Discussions and Online Readings		
9-10	Sockets	Chapter 10	Explain what is a socket. Getting information about ports, protocols, and domains Creating a TCP client Examine Banner with the socket module Port scanning with sockets Inspecting the communications between the client and the server. Compare UDP and TCP sockets Create a simple UDP client and UDP server Use non-blocking and asynchronous socket I/O The client-server model with multiple connections HTTPS and securing sockets with TLS Implementing the SSL client	Discussions and Online Readings	Assignment 3	Week 13

Week	Topics	Readings/Materials	Weekly Learning Outcome(s)	Instructional Strategies	Evaluation Name and Weight	Evaluation Date
			Inspecting standard SSL client and server communication Building a multiprocessing-based TCP server Building asynchronous network applications			
11-13	IoT	Handouts	Distinguish between an IoT Solution and other server-client solutions Understand when IoT solution is applicable Implement an IoT solution Understand what are sensors and actuators Build a sensor device simulator Develop client applications that interface with various intelligent devices. IoT Security	Discussions and Online Readings	Final Project	Project due in the last week