

**Master Course Syllabus**  
School of Engineering and Computer Science  
Washington State University Vancouver  
**CS 455**  
**Introduction to Computer Networks**  
3 Semester Hours  
(3 lecture hours)

**Catalog Description**

Concepts and implementation of computer networks; architectures, protocol layers, inter-networking and addressing case studies.

**Prerequisite Courses**

- CS 360 with a C or better

**Prerequisite Topics**

- Programming Proficiency
- Mathematical proof techniques
- Basic digital logic
- Use of Unix environment for coding, compilation, debugging and testing
- Use of Unix operating system API, particularly low level I/O and file system access

**Measured Course Outcomes**

Students taking this course will:

1. Describe sub problems in layers in the TCP/IP stack. (Contributes to performance criterion 1-a.)
2. Implement and debug network algorithms with modern programming languages and platforms. (Contributes to performance criterion 2-b.)
3. Analyze network protocols with mathematical techniques. (Contributes to performance criterion 6-a.)

**Covered Course Outcomes**

1. Design Abstract Data Type (ADT) for the network protocols in layers encapsulation providing appropriate composition and encapsulation. (Contributes to performance criterion 2-a.)

**Required Textbooks**

*Computer Networking - a top-down approach featuring the Internet*, by James F. Kurose, Keith W. Ross  
or  
*Computer Networks*, by Tanenbaum and Wetherall.

**Reference Material**

*UNIX Network Programming Volume 1*, by W. Richard Stevens, 2nd Edition, Prentice Hall, 1998. ISBN: 0-13-949876-1

## Major Topics Covered in the Course

1. Concepts and evolution of computer networks
2. Network architectures
3. Lectures and assignments will work through the protocol stack addressing both idealized and industry standard protocols: i. Physical Layer ii. Data Link Layer (including Medium Access Control sublayer) iii. Network Layer iv. Transport Layer v. Application Layer
4. Network system design and programming
5. Current issues and emerging technologies related to computer networks

## Projects

Programming Project Area	Weeks
Network algorithm programming	2
Network system programming	3

## Design, Implementation and Analysis

The main areas where students are involved in problem analysis are:

- Students are given 5-8 non-programming assignments requiring their analysis of bandwidth limitations, protocols, error detection, etc. Solutions to many of the non-programming assignment problems are of a mathematical nature involving proofs or mathematical derivations.
- Students are expected to use or extend example analyses from lectures to find answers to the problems.
- For the programming projects, students are usually given requirements for the programs but must perform sufficient analyses of the requirements to arrive at an effective program design.

Programming projects require the student to perform substantial design to arrive an implementation that fulfills the functional requirements and is both robust and well organized.

## CS2013

This course provides coverage of CS2013 knowledge areas. Values listed are minimum course hours dedicated to the topic, percentages indicate the fraction of CS2013 knowledge area topics covered (acceptable values are: <25%, 25-75%, >75%, or 100%).

Area	Tier 1	Tier 2	Elective
NC/Introduction	2 (100%)		
NC/Networked Applications	3 (100%)		
NC/Reliable Data Delivery		4 (100%)	
NC/Routing And Forwarding		4 (100%)	
NC/Local Area Networks		4 (100%)	
NC/Resource Allocation		2 (>75%)	
NC/Mobility		3 (25-75%)	

<b>Area</b>	<b>Tier 1</b>	<b>Tier 2</b>	<b>Elective</b>
NC/Social Networking			3 (25-75%)

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Course Coordinator:	Ben McCamish
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