

CPSC5157U COURSE SYLLABUS SUMMER 2018

INSTRUCTOR INFORMATION

INSTRUCTOR NAME: Jianhua YANG

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OFFICE HOURS AND LOCATION: MTWR: 11:00am – 12:00pm, CCT440

MEETING TIME AND PLACE: MTWR: 12:00pm – 01:25pm, CCT123

COURSE INFORMATION

COURSE CRN NUMBER/TITLE: 50792/Computer Networks

CREDIT HOURS/PREREQUISITES: 3/ CPSC 2108

COURSE DESCRIPTION

LOCAL AREA NETWORKS, WIDE AREA NETWORKS, AND INTERNETS. PROTOCOLS AND THE ISO OPEN SYSTEMS INTERCONNECT REFERENCE MODEL. DESIGN, ANALYSIS, AND PERFORMANCE EVALUATION. EMPHASIS ON DATA LINK, NETWORK, AND TRANSPORT PROTOCOLS.

REQUIRED TEXTBOOK AND MATERIALS

Computer Networking: A Top–Down Approach

7th Edition

James F. Kurose & Keith W. Ross

Pearson / Addison–Wesley, © 2017.

ISBN–10 0 – 13 – 359414 – 9

ISBN–13 978 – 0 – 13 – 359414 – 0

Other Required Materials: 1. Wireshark 2. NetLab

Additional textbooks and References

1. Andrew S. Tanenbaum , Computer Networks, Prentice Hall.
2. W. Stallings. Data and Computer Communications. Prentice Hall.
3. J. Walrand. Communication Networks: First Course. Aksen Associates.
4. D. Comer. Internetworking with TCP/IP, Volume I, Prentice Hall.
5. W. Stevens. TCP/IP Illustrated: The Protocols, Vol 1. Addison-Wesley.
6. D. Comer. Computer Networks and Internets. Prentice Hall.
7. L. Peterson and B. Davie. Computer Networks: A Systems Approach. Morgan Kaufman.

LEARNING OUTCOMES

COURSE LEARNING OUTCOMES

1. Articulate the organization of the Internet, list and define the appropriate network terminology.
2. Be able to describe the layered structure of a typical networked architecture (OSI and TCP/IP).
3. Identify the different types of complexity in a network, such as edges, core, etc.
4. List the differences and the relations between names and addresses in a network, and define the principles behind naming scheme and resource location.

5. Understand socket programming, and implement a simple client-server socket-based application.
6. Describe the operation of reliable delivery protocols, and list the factors that affect the performance of reliable delivery protocols.
7. Understand the organization of network layer, how packets are forwarded in an IP network, and be able to list the scalability benefits of hierarchical addressing.
8. Become familiar with how frames are forwarded in an Ethernet network, the differences and the interrelations between IP and Ethernet.
9. Describe how resources can be allocated in a network, and the congestion problem in a large network.
10. Compare and contrast fixed and dynamic allocation techniques, and current approaches to congestion.
11. Articulate the organization of a wireless network, and describe how wireless networks support mobile users.
12. Understand the basic concepts and techniques of computer network security, and describe the popular cybersecurity protocols in secured computer network communication, such as SSL, IPsec, and WEP.

COURSE ASSESSMENT

Course Topics

1. Introduction to organization of the Internet, and switching techniques including circuit and packet switching.
2. Physical pieces of a network, including hosts, routers, switches, ISPs, wireless, LAN, access point, and firewalls.
3. Layering design and principles, as well as the roles of the different layers.
4. Naming, IP address scheme, distributed applications, and the application layer protocols including HTTP, FTP, SMTP, and DNS.
5. Multiplexing and socket programming with TCP and UDP.
6. TCP protocol, and the techniques of error control, flow control and pipelining.
7. Routing vs. forwarding, Internet Protocol (IPv4 vs. IPv6), and hierarchical addressing
8. Routing algorithms in a AS, and the algorithm among different ASs.
9. SDN, ICMP, and SNMP.
10. Multiple access control protocols, Ethernet, switching, and local area networks.
11. Error-detection and –correction techniques including parity checks, checksum, and CRC
12. Need for resource allocation; fixed allocation (TDM, FDM, WDM) vs. dynamic allocation
13. Principles of congestion control, and approaches to congestion.
14. Principles of cellular networks, 802.11 networks, and issues in supporting mobile nodes.
15. Introduction to security in computer networks.

Course Methods

1. The class will be a lecture course, taught in face to face.
2. Laboratory experiences will be part of the course.
3. Students will be expected to complete hands-on exercises and a series of programming assignments.

Student Responsibilities

1. Attend class regularly (if so enrolled) and participate in all class discussions.
2. Complete all reading assignments and all homework assignments.
3. Ask the instructor questions.
4. Send the instructor e–mail with both comments and questions.

Instructor Responsibilities

1. Give lectures on the course material.
2. Assign appropriate homework that illustrates the concepts of the course, and grade and return the homework in a timely manner with adequate explanation.
3. Give tests over the material and grade and return the tests in a timely manner
4. Provide a website that supports the course.

5. Provide at least four hours of office time primarily designated for assistance of students in this class, at times expected to be convenient for the students. It is expected that the instructor be available to the students during these hours.
6. Reply promptly (within one business day) to all student e-mail communications.

COURSE EVALUATION

GRADED LEARNING ACTIVITIES	Percentage	Points
Assignments		30
Hands-on labs		10
Programming Project		10
Midterm Exam		20
Final Exam		30
TOTAL		100

Percentage Range	Final Grade
90-100%	A
80-89%	B
70-79%	C
60-69%	D
59% and below	F

ADMINISTRATIVE POLICIES AND ACADEMIC RESOURCES

CSU DISABILITY POLICY (ADA AND 504 STATEMENT)

If you have a documented disability as described by the Americans with Disabilities Act (ADA) and the Rehabilitation Act of 1973, Section 504, you may be eligible to receive accommodations to assist in programmatic and/or physical accessibility. We recommend that you contact the Center for Accommodation and Access located in Schuster Student Success Center, Room 221, [706-507-8755](tel:706-507-8755) as soon as possible. The Center for Accommodation and Access can assist you in formulating a reasonable accommodation plan and in providing support. Course requirements will not be waived but accommodations may be able to assist you to meet the requirements. Technical support may also be available to meet your specific need.

ACADEMIC INTEGRITY

All students are expected to recognize and uphold standards of intellectual and academic integrity. As a basic and minimum standard of conduct in academic matters that students be honest and that they submit for credit only the products of their own efforts. Both the ideals of scholarship and the need for fairness require that all dishonest work be rejected as a basis for academic credit. They also require that students refrain from any and all forms of dishonorable or unethical conduct related to their academic work.

Students are expected to comply with the provisions of Section III, "Student Responsibilities," of the Columbus State University Student Handbook. This specifically includes the sections on "Academic Irregularity," and "Conduct Irregularity." In particular, the Columbus State University Student Handbook states:

"No student shall give or receive assistance in the preparation of any assignment, essay, laboratory report, or examination to be submitted as a requirement for any academic course in such a way that the submitted work can no longer be considered the personal effort of the student submitting the work."

Examples of Academic Dishonesty include but are not limited to: Plagiarism (see definition below), giving or receiving unauthorized assistance on exams, quizzes, class assignments or projects, unauthorized collaboration, multiple submissions (in whole or part) of work that has been previously submitted for credit.

Plagiarism is any attempt to represent the work or ideas of someone else as your own. This includes purchasing or obtaining papers from any person and turning them in as your own. It also includes the use of paraphrases or quotes from a published source without properly citing the source. All written assignments may be submitted for textual similarity review to Turnitin.com for the detection of plagiarism.

Please be aware that anyone caught cheating or plagiarizing in this class will receive a "0" for the assignment/exam and may receive a "0" for the course.

STUDENT COMPLAINT PROCESS

Information and resources for student complaints and academic appeals are located at the following link on the Columbus State University website <http://aa.columbusstate.edu/appeals/>.

COURSE ATTENDANCE POLICY

Every student is required to present each class. Student cannot miss more than three classes without any excuse.

TECHNICAL RESOURCES

HARDWARE REQUIREMENTS

[How do I know if my computer will work with D2L?](#)

SOFTWARE REQUIREMENTS

An- office suite such as Microsoft Office or Open Office

- To open PDF files you might need Acrobat Reader
- Browser Plugins (Pdf files, QuickTime files, Mp4 files) can be usually be obtained at the browsers website.

[Google Chrome](#)

[Firefox](#)

[Safari](#)

[Internet Explorer](#) (Caution: IE is often problematic for D2L-CougarVIEW)

If you need technical support or need assistance configuring your computer, you can refer to the link located in the "Support Resources" widget located on your "My Home" and your "Course Home" pages. If you cannot solve your problem after reviewing the knowledge base help pages, you can call help center 24-7 and talk to a Help Center agent. The number is 1-855-772-0423.

Library Resource Statement

COLLEGE SPECIFIC SECTION

N/A

COURSE SCHEDULE

Tentative Topic Schedule

(For exact due date of Assignments, Labs, Project, please refer to D2L Dropbox)

Week	Date	Topics to be covered	Chapter	Assignments	Labs	Project	Support Learning Outcomes
1	06/13(W)	1. Class Introduction	Chapter 1				
	06/14(R)	2. Introduction to organization of the Internet 3. Switching techniques	Chapter 1 (1-41)				LO1
2	06/18(M)	1. Physical pieces of a network 2. Layering design and its principles 3. the roles of the different layers (OSI and Internet models)	Chapter 1 (42-76)	A1			LO2, LO3
	06/19(T)	1. Principles of Network applications 2. The web and HTTP 3. Email and SMTP	Chapter 2 (1-43)				LO4
	06/20(W)	1. DNS 2. Peer-to-Peer applications 3. Video streaming and Content distribution networks	Chapter 2 (44-80)				LO4
	06/21 (R)	1. Socket programming with UDP 2. Socket programming with TCP	Chapter 2 (81-106)			Project Starts	LO5
3	06/25(M)	Socket programming demo with TCP	Chapter 2	A2			LO5
	06/26(T)	1. Introduction to Transport Layer services 2. Multiplexing and De-multiplexing 3. UDP	Chapter 3 (1-37)				LO6
	06/27(W)	1. Principles of reliable data transfer 2. TCP	Chapter 3 (38-72)		Lab 1		LO6
	06/28 (R)	1. Principles of congestion control 2. TCP congestion control	Chapter 3 (73-108)	A3			LO6
4	07/02(M)	1. Introduction to Network Layer 2. Router	Chapter 4 (1-34)				LO7
	07/03(T)	1. IPv4, IPv6, and Addressing. 2. Generalized forwarding and SDN	Chapter 4 (35-75)	A4			LO7
	07/04(W)	Independence Day (No Class)					
	07/05 (R)	1. Routing Algorithms: LS, DV 2. OSPF, BGP	Chapter 5 (1-40)				LO7

5	07/09(M)	1. SDN Control Plane 2. ICMP 3. Network Management and SNMP	Chapter 5 (41-86)	A5			LO7
	07/10(T)	1. Introduction to Data Link Layer 2. Error detection and correction 3. Multiple access links and protocols	Chapter 6 (1-28)				LO8
	07/11(W)	1. Switched local area networks 2. Link Virtualization	Chapter 6 (29-70)				LO9
	07/12 (R)	1. Data center networking 2. A day in the life of a Web Page Request (Optional) 3. Midterm Exam Study Guide	Chapter 6 (71-87)	A6	Lab 2		LO10
6	07/16(M)	Midterm Exam	Cover: Chapter 1 to Chapter 3				
	07/17(T)	1. Wireless links and network characteristics 2. WiFi: 802.11 Wireless LANs	Chapter 7 (1-28)				LO11
	07/18(W)	1. Cellular Internet Access 2. Mobility Management: Principles	Chapter 7 (29-60)				LO11
	07/19 (R)	1.Mobile IP 2. Managing Mobility in Cellular Networks	Chapter 7 (61-75)	A7			LO11
7	07/23(M)	1. Introduction to Network security 2. Principles of Cryptography	Chapter 8 (1-43)			Project Ends	LO12
	07/24(T)	3. Message Integrity and Digital Signatures	Chapter 8 (44-81)				LO12
	07/25(W)	1. End-Point Authentication 2. Securing E-Mail 3. SSL	Chapter 8 (82-116)				LO12
	07/26 (R)	1. IPsec and VPN 2. Securing Wireless LANs 3. Operational Security: Firewalls and Intrusion Detection Systems	Chapter 8 (117-130)	A8			LO12
8	07/30(M)	Final Exam Study Guide					
	07/31(T)	Last Class					
	08/01-03	Final Exam					