

# CPSC5157U COURSE SYLLABUS

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## INSTRUCTOR INFORMATION

INSTRUCTOR NAME: Jianhua YANG

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PHONE: 706-507-8180

OFFICE HOURS AND LOCATION: MTW: 10:00am-2:00pm, CCT440

MEETING TIME AND PLACE: MTW: 2:00pm – 2:50pm, CCT407

## COURSE INFORMATION

COURSE CRN NUMBER/TITLE: 80306/Computer Networks

CREDIT HOURS/PREREQUISITES: 3/ CPSC 3125

### 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

6<sup>th</sup> Edition

James F. Kurose & Keith W. Ross

Pearson / Addison–Wesley, © 2011.

ISBN–10                    0 – 13 – 285620 – 4

ISBN–13                978 – 0 – 13 – 285620 – 1

**Other Required Materials:**     The student will be required to download and use a number of freeware computer tools, such as Ethereal (Wireshark).

### 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 and OBJECTIVES

#### Learning Objectives

1. Become familiar with layered communication architectures (OSI and TCP/IP).
2. Understand the client/server model and key application layer protocols.

3. Learn sockets programming and how to implement client/server programs.
4. Understand the concepts of reliable data transfer and how TCP implements these concepts.
5. Know the principles of congestion control and trade-offs in fairness and efficiency.
6. Learn the principles of routing and the semantics and syntax of IP.
7. Understand the basics of error detection including parity, checksums, and CRC.
8. Know the key protocols for multimedia networking including IntServ and DiffServ for IP.
9. Familiarize the student with current topics such as security, network management, sensor networks, and/or other topics.
10. Increase the ability to write a report to a project or a hand-on exercise and make a presentation.

## Learning Outcomes

Upon successful completion of the courses in this discipline, the student will:

1. Demonstrate oral and written communication skills and increase ability to be effective team members.
  - Strategies:
    - Study of current research topics in computer network
    - Use Wireshark hands-on exercise report writing and presentation
    - Write team project report and make a presentation
    - Summarize research paper in computer network and make a presentation
  - ABET Criteria: A, B, C, F, I, and J
  - CS Program Objectives: 2, 3, and 4
  - Assessment: Project, hands-exercise report writing, research paper summary, oral presentation.
2. Demonstrate the basic knowledge of intranet, internet, and the Internet.
  - Strategies:
    - Study chapter 1 of the textbook
    - Conduct hands-on exercise to design a and set up a local area network
    - Exercise tools to explore intranet and the Internet infrastructure
  - ABET Criteria: A, B, and C
  - CS Program Objectives: 2, 3
  - Assessment: Written assignment, Hands-on lab report, quiz, and network online tools practicing report
3. Demonstrate the knowledge of computer network programming, such as socket programming.
  - Strategies:
    - Study chapter 2, and 3 of the textbook
    - Conduct hands-on socket programming on TCP and UDP
    - Exercise Wireshark hands-on lab
  - ABET Criteria: A, B, C, I and J
  - CS Program Objectives: 2, 3
  - Assessment: Programming assignment, Programming Project, Hands-on labs
4. Demonstrate the understanding of internet model, or OSI model and the TCP/IP protocol suit.
  - Strategies:
    - Study chapter 2, 3, 4, 5
    - Use Wireshark hands-on labs

- Learn network online tools
  - Conduct computer network projects
  - Read some TCP/IP related research papers
  - Read protocol-related RFC files
  - ABET Criteria: A, B, C, E, I, J, and K
  - CS Program Objectives: 2, 3
  - Assessment: Writing assignment, project, exam, hands-on labs
5. Demonstrate the ability to apply computer network knowledge to solving a real world application.
- Strategies:
    - Study one of two of chapter 6, 7, 8, 9 of the textbook
    - Conduct a comprehensive project
    - Conduct a short term internship if possible
    - Conduct a field trip to local IT company, campus IT center
  - ABET Criteria: A, B, C, D, E, F, I, J, and K
  - CS Program Objectives: 1, 2, 3, 4
  - Assessment: Project report, presentation, internship report, or field trip report.

PROGRAM/GEN ED LEARNING OUTCOMES (IF Applicable))

## COURSE ASSESSMENT

### LEARNING ACTIVITIES

#### Course Topics

1. The large-scale structure of the global Internet and its associated protocols;
2. The OSI Reference Model and the Internet Protocol Stack;
3. The Application Layer: Structure and sample applications;
4. The Transport Layer: Its function and services;
5. Reliable data transport and congestion control;
6. The uses of UDP and TCP; the trade-offs between them;
7. The Network Layer: Its function and services;
8. The structure of IP addresses: classful and classless addresses;
9. The DNS (Domain Name Service): "User friendly" names & IP addresses;
10. Routing on the Internet;
11. The Link Layer: Its function and services;
12. Error detection and correction techniques;
13. Collision detection and the Ethernet solution to that problem;
14. Collision avoidance and the Token Ring solution to that problem;
15. Link-layer switches: forwarding and filtering;

#### Course Methods

1. The class will be a lecture course, taught 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**

<b>GRADED LEARNING ACTIVITIES</b>	<b>Percentage</b>	<b>Points</b>
Assignments		10
Hands-on labs		10
Programming Project		10
Tests (five tests)		40
Final Exam		30
<b>TOTAL</b>		<b>100</b>

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

**ADMINISTRATIVE POLICIES AND ACADEMIC RESOURCES**

**CSU DISABILITY POLICY**

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 Office of Disability Services located in Schuster Student Success Center, Room 221, 706-507-8755 as soon as possible. Students taking online courses can contact the Office of Disability services at <http://disability.columbusstate.edu/>. The Office of Disability Services 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

Week	Date	Topics to be covered	Chapter/Slides	Assignments	Laps/Projects	Tests
<b>1</b>	08/17(M)	Class Introduction				
	08/19(W)	The Internet and network edge	Ch1/PPT 1-26			
	08/21 (F)	The Network Core Delay, Jitter, Loss, & Throughput	Ch1/PPT 27-42			
<b>2</b>	08/24(M)	Protocol Layers History	Ch1/PPT 43-66	Assignment 1(S)		
	08/26(W)	Assignment 1-Hints				
	08/28 (F)	<b>Test 1 (Chapter 1)</b>				Test1
<b>3</b>	08/31(M)	Network Applications The Client / Server Model The Web and HTTP	Ch2/PPT 1-20			
	09/02(W)	File Transfer: FTP Electronic Mail: SMTP	Ch2/PPT 21-43			
	09/04 (F)	The Domain Name Service Peer-To-Peer Applications	Ch2/PPT 44-60	Assignment 1(D)		
<b>4</b>	09/07(M)	<b>Labor Day, No Class</b>				
	09/09(W)	Introduction to TCP and UDP Socket Programming with TCP Socket Programming with UDP End-to-end vs. host-to-host	Ch2/PPT 61-75			
	09/11 (F)	Socket Programing Demo.	Ch2			
<b>5</b>	09/14(M)	Programing Project			Project starts	

	09/16(W)	Test 1 - Feedback Assignment 2 - Hints		Assignment 2(S)		
	09/18 (F)	<b>Test 2-Chapter 2</b>				Test2
<b>6</b>	09/21(M)	Transport layer vs. Network Layer Connectionless Transport: UDP	Ch3/PPT 1-20			
	09/23(W)	Reliable Data Transfer Connection-Oriented Transport: TCP	Ch3/PPT 21-43			
	09/25 (F)	Reliable Data Transfer Flow and Congestion Control	Ch3/PPT 44-63	Assignment 2(D)		
<b>7</b>	09/28(M)	Connection Management The TCP "Handshakes"	Ch3/PPT 64-82	Assignment 3(S)		
	09/30(W)	Test 2 feedback Assignment 3 hints				
	10/02 (F)	<b>Test 3-Chapter 3</b>				Test3
<b>8</b>	10/05(M)	Forwarding and Routing Real circuits vs. virtual circuits.	Ch4/PPT 1-19			
	10/07(W)	Routers and Switches	Ch4/PPT 20-43			
	10/09 (F)	Format of an IP packet	Ch4/PPT 44-69	Assignment 3(D)	Lab 1(D)	
<b>9</b>	10/12(M)	IP version 4 address format	Ch4/PPT 70-80			
	10/14(W)	Classful and classless addresses CIDR (Classless Interdomain Routing)IP version 6	Ch4/PPT81-99			
	10/16 (F)	Routing algorithms More on DNS	Ch4/PPT100-130			
<b>10</b>	10/19(M)	Test 3 feedback Assignment 4 hints		Assignment 4(S)		
	10/21(W)	Lab 1 feedback				
	10/23 (F)	<b>Test 4-Chapter 4</b>				Test4
<b>11</b>	10/26(M)	DHCP (Dynamic Host Configuration) NAT (Network Address Translation) Link Layer and Network Layer Link layer services	Ch5/PPT 1-22			
	10/28(W)	Error Detection and Error Correction Managing a Shared Channel	Ch5/PPT 23-40			
	10/30 (F)	The Ethernet and the Aloha net Link Layer Addressing	Ch5/PPT 41-56	Assignment 4(D)	Project Due	
<b>12</b>	11/02(M)	Ethernet Addressing CSMA/CD Ethernet vs. Token Ring	Ch5/PPT 56-79	Assignment 5(S)		
	11/04(W)	Test 4 Feedback Assignment 5 hints				

	11/06 (F)	<b>Test 5-Chapter 5</b>			Lab 2 (D)	Test5
<b>13</b>	11/09(M)	Project Class Demo				
	11/11(W)	Project Class Demo				
	11/13 (F)	Project Class Demo		Assignment 5(D)		
<b>14</b>	11/16(M)	Project Class Demo				
	11/18(W)	Project Class Demo				
	11/20 (F)	Project Class Demo				
<b>15</b>	11/23(M)	<b>Thanksgiving, No Class</b>				
	11/25(W)	<b>Thanksgiving, No Class</b>				
	11/27 (F)	<b>Thanksgiving, No Class</b>				
<b>16</b>	11/30(M)	Test 5feedback				
	12/02(W)	Lab 2 feedback				
	12/04 (F)	Final Exam Study Guide				
<b>17</b>	12/07(M)	Class End				

**Note: S=Start D=Due**