

Department of Computer Science and Engineering
Wright State University

CEG7450 Advanced Computer Networks

SYLLABUS

Fall 2025

Last day of lecture: 12/5

Time/Place	2:30-3:25pm, Russ 150, M,W,F
Instructor	Dr. Bin Wang, Professor, 491 Joshi Research Center Tel: (937) 775-5115, E-mail: <i>send email via Pilot</i> Office hours: 11:00am-1:00pm M, W, F or by appointments
GTA	TBD
Prerequisites	CEG6400; Programming experience in Java, C, C++; Program development tools: editors, compilers, linkers, debuggers; Data structures: arrays, stacks, queues, lists, and binary trees.
Textbooks	<ol style="list-style-type: none">1. (Optional) Dimitrios Serpanos, Tilman Wolf, <i>Architecture of Network Systems</i>2. (Optional) R. Srikant, Lei Ying, <i>Communication Networks: An optimization, control, and stochastic networks perspective</i> <p><i>References:</i></p> <ol style="list-style-type: none">3. High-speed networks and Internets: performance and quality of service, 2nd Ed Computer Networks: A system approach, latest edition, Larry L. Peterson, Bruce S. Davie, Morgan Kaufmann., William Stallings, 2001. Computer Networks, 4th Ed, Andrew S. Tanenbaum, Prentice Hall, 2002.4. Introduction to Wireless and Mobile Systems, D. Agrawal, Q. Zeng, Thomson Brooks/Cole, 2002.5. Computer Networking: A top-down approach, 4th Ed. Kurose & Ross, Pearson, 2010.
Webpage	http://pilot.wright.edu Check daily Pilot for announcements, assignment, homework, questions and answers

Course Objectives

This is a graduate level course on advanced computer communication and networking technologies. The course involves both a reading/lecture/discussion component and a project component. We will read papers on various aspects of advanced computer networking: LAN/WAN technologies, congestion/flow control, link scheduling, routing, internetworking, multicast, wireless technologies, quality of services, peer-to-peer networks, Blockchain and bitcoin, software defined networking, delay-tolerant networking etc. Various technical and research issues involved will be studied.

Students' Responsibilities

As a student in this class, you are expected to:

- 1) read the appropriate materials **prior to** class and come up with questions. Reading materials will be assigned in advance.
- 2) attend class on a regular and timely basis. **Regular class attendance is mandatory** and is essential to success in the course. The student is responsible for all content, handouts, and announcements made in class.
- 3) you are required to actively participate in Q&A.
- 4) you will be required to do a few critical paper reviews. Instructions on how to do a paper review will be given.
- 5) complete and turn in your class assignments timely. You are expected to write your own programs. **Do not** copy from or give your work to others, and **do not** make it possible for others to copy any portions of your work. Violators will receive a **Zero** credit on the assigned project.
- 6) be present for exams at the scheduled times. If there is a catastrophic event that prevents a student from taking an exam, please contact the instructor as soon as possible.
- 7) not disturb the class by talking during lecture, or allowing phones to ring.
- 8) set up an appointment with the instructor or visit during office hours if you have questions regarding course contents, lectures, handouts, and other problems.

Course Evaluation To complete and pass the course, students will receive a final course grade comprised of the weighted score earned on all required course assignments and exams.

Methods:	% of final grade
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| 1. Paper student group presentation: | 10% |
| 2. Labs: | 30% |
| 3. 4 paper reviews: | 20% |
| 4. Midterm exam: | 15% |
| 5. Attendance: | 5% |
| 6. Final exam: | 20% |

(12/12 Friday, 2:45pm-4:45pm)

Total	100%
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Grading scale:

90-100	A
80-89.9	B
70-79.9	C
60-69.9	D
Below 60	F

Re-grading policy: If you have questions about the way an assignment or exam was graded, you must submit **in writing** a regrading request detailing the rationale for regrading.

Late Submission of Assignments **Late assignments will not be accepted after the due date.** Partial credit will be given to students who turn in partially completed assignments.

Special considerations will be given for students who have a medical excuse for late submission (written proof of illness is required). These considerations may extend to medical emergencies involving children or other family members. Such consideration is at the discretion of the instructor and will be as reasonable and fair as possible. Special consideration may also be given for employment conflicts (e.g. military duty, travel) if brought to the attention of the instructor **prior to** the due date for an assignment.

Course requirements for other courses are **NOT** a valid reason for special consideration.

Missed Exam Missed exams can be made up only under extenuating circumstances such as medical emergencies and work conflicts as mentioned above. Please see the instructor as soon as possible if you know you will be unable to attend an exam. You are expected to schedule your departure for any end of quarter travel after your final exam.

Plagiarism

Students are members of a learning community committed to the search for knowledge and truth. Essential to that search is the faithful adherence by all students to the highest standards of honesty and integrity. A grade of “0” or “F” will be assigned to examinations or assignments on which cheating, plagiarism or any other form of academic dishonesty is committed or determined to have occurred. For the detail, see Wright State University Student Handbook under “Academic Dishonesty”.

NOTE: If a program that you turn in is taken from a pay-for-answers website such as Chegg or CourseHero, you will receive an F in this course (the entire course, not just that assignment).

The following is the lecture contents and schedule.

Lecture Outline

Week	Topics/Activities	Reading
1	Overview, Network Taxonomy, Router Architecture	Chapter 1
2	TCP Congestion Control, RED, ECN	References
3	End-to-end argument, Internet Architecture	References
4	TCP/IP (IPv4, v6, IP security issues, NAT)	Chapter 2,3
5	Integrated Services (RSVP, admission control)	References
6	Packet Scheduling, GPS, priority, traffic model	References
7	Packet Scheduling: WFQ, WF2Q+, Virtual Clock, DRR, SCFQ, STFQ etc	References
8	Differentiated Services (DiffServ, RIO)	References
9	Core-stateless Fair Queuing	References
10	Multicast (DVMRP, CBT, mobile IP)	References
11	Quality of Service Routing, unicast, multicast	References
12	BGP, Delay-tolerant networking	References
13	Software Defined Networking, virtualization	References
14	Peer-to-peer Network, VoIP, bitcoin, skype, optical networks	References
15	Review and Final exam	
16		

Supplemental Reading Topics

Traffic engineering
Network analytics using machine learning and AI techniques
Social network implementation and security issues
Blockchain
Cryptocurrency: Ethereum and smart contract