Syllabus - Data Communications & Networks

Syllabus - CSC 410 - Lyon College - Spring 2025

Marcus Birkenkrahe

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General Course Information

- Meeting Times: Monday/Wednesday/Friday, 11:00-11:50 AM
- Meeting place: Lyon Building Room 104 (computer lab)
- Professor: Dr. Marcus Birkenkrahe
- Office: Derby Science Building 210
- Phone: (870) 307-7254
- Office hours: By appointment via tinyurl.com/sp25-booking
- Textbooks (optional + free + online):
    1. **Computer Networking: Principles, Protocols and Practice** by Olivier Bonaventure: computer-networking.info
    2. **Beej's Guide to Network Programming Using Internet Sockets** by Brian "Beej" Hall: beej.us/guide/bgnet

Standard and Course Policies

Standard Lyon College Policies are incorporated into this syllabus and can be found at: lyon.edu/standard-course-policies.

The **Assignments and Honor Code** and the **Attendance Policy** are incorporated into this syllabus also and can be found at: tinyurl.com/LyonPolicy.

In addition to these rules, please read and observe my guide to Using AI to code (written in Fall 2024): tinyurl.com/Using-AI-to-code.

Objectives

This course introduces the theory and practice of computer networks. We cover topics such as software protocols, communication hardware, error detection, error handling, and basic network programming. The course focuses on building a solid foundation in networking concepts while offering practical programming assignments to apply the learned concepts.

Student Learning Outcomes

Students who complete CSC 410 "Data Communications & Networks" will be able to:

- Understand the OSI and TCP/IP models and their layers.
- Explain network protocols, addressing, and error handling.
- Demonstrate knowledge of communication hardware components.
- Write and debug basic network applications using sockets.
- Apply error detection and correction techniques.
- Gain familiarity with network configuration and security.

Course Requirements / Prerequisites

- Prerequisite courses: CSC 265 (Algorithms) and CSC 310 (Operating Systems), or permission of the instructor/advisor.
- Basic programming knowledge in C/C++.
- Familiarity with command-line tools.
- Curiosity and willingness to explore practical networking tasks.

Grading System

You should be able to see your current grade at any time using the Canvas gradebook for the course.

WHEN	DESCRIPTION	IMPACT
Weekly	Assignments	25%
Weekly	Multiple choice tests	25%
Monthly	Project Sprint review	25%
TBD	Final exam (optional)	25%

Notes:

- **To pass:** 60% of all available points.
- **Tests:** weekly online quizzes based on classroom lectures and practice.
- **Final exam:** random selection of the known test questions. **Note:** You only have to write the final exam if you want to improve your grade at the end of the course. If the final exam result is below your final grade average up to this point, it will be ignored.

Rubric

Component	Weight	Excellent	Good	Satisfactory	Needs Improvement	Unsatisfactory
Participation and Attendance	0%	Consistently attends and actively participates in all classes.	Attends most classes and participates in discussions.	Attends classes but participation is minimal.	Frequently absent and rarely participates.	Rarely attends classes and does not participate.
Programming assignments	50%	Completes all assignments on time with high accuracy (90-100%).	Completes most assignments on time with good accuracy (80-89%).	Completes assignments but with some inaccuracies or delays (70-79%).	Frequently late or incomplete assignments with several inaccuracies (60-69%).	Rarely completes assignments and shows minimal understanding (0-59%).
Tests	25%	Demonstrates thorough understanding and application of concepts (90-100%).	Shows good understanding with minor errors (80-89%).	Displays basic understanding with some errors (70-79%).	Limited understanding with several errors (60-69%).	Minimal understanding and many errors (0-59%).
Final Exam (Optional)	25%	Demonstrates comprehensive understanding and application of course concepts (90-100%).	Shows strong understanding with minor errors (80-89%).	Displays adequate understanding with some errors (70-79%).	Limited understanding with several errors (60-69%).	Minimal understanding and many errors (0-59%).

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Grading Table

Percentage	LETTER GRADE
100% to 89.5%	A (very good)
$<$ 89.5% to 79.5%	B (good)
$<$ 79.5% to 69.5%	C (satisfactory)
$<$ 69.5% to 59.5%	D (passed)
$<$ 59.5% to 0%	F (FAILED)

Schedule and Workload

For **important dates**, see the 2024-2025 Academic Calendar at: catalog.lyon.edu/202425-academic-calendar.

Workload (estimated):

- Time in class: 48 hrs.
- Time outside of class: 42 hrs.
- Time for tests [1 hrs/test]: 14 hrs.
- Time for home assignments [2 hrs/pgm]: 28 hrs.
- Total number of hrs in term: 90.
- Weekly workload (outside of class): 5.625 (2.625)

Course Outline

- Week 1: Introduction to Computer Networks
- Week 2: OSI and TCP/IP Models
- Week 3: Network Protocols and Addressing
- Week 4: Error Detection and Correction Techniques
- Week 5: Communication Hardware Overview
- Week 6: Socket Programming Basics
- Week 7: Network Configuration and Tools
- Week 8: Midterm Review and Assessment

- Week 9: Advanced Socket Programming
- Week 10: Routing and Switching Concepts
- Week 11: Network Security Basics
- Week 12: Wireless Networking
- Week 13: Network Performance and Optimization
- Week 14: Cloud and Virtual Networking
- Week 15: Project Presentations and Final Review
- Week 16: Final Exam Week