NET 362/460 Syllabus – Principles of Data Communications – Spring 2024

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Office Hours	Thursdays 9:30 – 11 am (or by appointment)	**Website**	d2l.depaul.edu
Class Location	**CDM 220**	**Lecture time**	**Tu/Th 11:50 – 13:20**

--- Any changes made to this syllabus will be announced in class -- This is Version 1: April 1 ---

Course Overview

This course provides a clear theoretical and operational understanding of the fundamental principles of data communications networks, including data encoding, transmission, and compression. Error control, flow control and congestion control will also be considered in detail, along with the quality of service tradeoffs inherent in different transmission and switching formats.

PREREQUISITE(S): (NET 311 or CSC 373) and (IT 263 or NET 261) are prerequisites for this course. It will be assumed that you have already learned about OSI standards, topologies, transmission media, IPv4 addresses, switching and routing before this course.

Resources:

Optional text: **Data Communications and Networking**, 5th edition, Behrouz A. Forouzan, McGraw-Hill, 2012**.**

Grade distribution over required coursework

Task	% of final grade
3 Homework assignments	20 %
1 Quiz	10 %
Midterm exam	30 %
Final exam	30 %
Class participation	10 %

Attendance and required coursework

Students are expected to attend **all class sessions**. At the end of each class, reading material (if any) will be announced, in preparation for the following class. All students are expected to fully attend every class. Asynchronous students are expected to watch the full class recording promptly after it is posted. This is clearly discussed and emphasized in class 1.

The Class participation & discussion grade will be **earned** as follows: students gain **1 %** credit towards their final grade for each lecture _actively_ attended (total of up to 10% of final grade for 10 class sessions). Active attendance means that you will respond if I call on you, **and** actively engage in class discussions. It is critical that you strive to attend all class sessions, and engage with the material in the live class discussions. Asynchronous students are expected to e-mail back their responses per week (i.e. Responses for week 1, 2, 3, etc) at the end of each week, with their answers to all questions directed to class, in addition to any questions/clarifications they may have about the material.

Course policies

General academic policies

All students are required to manage their class schedules each term in accordance with the deadlines for enrolling and withdrawing as indicated in the University Academic Calendar. Information on enrollment, withdrawal, grading and incompletes can be found at: cdm.depaul.edu/enrollment. Note that April 14th 2024 is the last date to drop the class with no penalty.

Mental Health and Academic Assistance

DePaul has great resources just a phone call or email away. Sometimes people feel like their situation isn't the worst possible, so they assume they do not need help, but don't let that prevent you from reaching out! **DePaul University Counseling Services** – mental health is as important as physical health, and DePaul professionals are just a call away: offices.depaul.edu/student-affairs/about/departments/Pages/ucs.aspx (call (773) 325-7779 or 911 for emergency). **Office of the Dean of Students** can help you with a wide range of topics, including figuring out if you should withdraw or apply for an incomplete: offices.depaul.edu/student-affairs/about/departments/Pages/dos.aspx. There are lots of additional, more specific resources listed here with the **Office of Student Affairs**, including crisis hotlines: offices.depaul.edu/student-affairs/support-services/counseling/Pages/Crisis-Hotlines.aspx.

Plagiarism

There is a "zero-tolerance policy" regarding plagiarism. This stands for both the plagiarizer and the person(s) facilitating plagiarism (e.g., allowing someone to plagiarize their work). There's a great resource put together by DePaul University, which you can find here: https://resources.depaul.edu/teaching-commons/teaching-guides/learning-activities/Pages/avoiding-plagiarism.aspx

Academic Integrity

One of the core principles of education is establishing Academic Integrity. These principles should span all of your learning endeavours. For more information on Academic Integrity, especially definitions and norms, please visit: https://resources.depaul.edu/teaching-commons/teaching/academic-integrity/Pages/default.aspx. This will be the basis of all of our interactions in this course. All students are expected to abide by the University's Academic Integrity Policy which prohibits cheating and other misconduct in student coursework. Publicly sharing or posting online any prior or current materials from this course (including exam questions or answers), is considered to be providing unauthorized assistance prohibited by the policy. Both students who share/post and students who access or use such materials are considered to be cheating under the Policy and will be subject to sanctions for violations of Academic Integrity.

Deadlines and submission policies

Assignments are due on D2L by 11:59 pm on the deadline day posted on each assignment, unless otherwise announced. All of your work (exams, assignments, report, etc) must be your original work. Any evidence of departure from Academic Integrity will be reported, and ensuing sanctions will be pursued. You are expected to read, understand and comply with DePaul's policy on Academic Integrity. **Late submissions receive a 10% penalty for every 24 hour delay**.

Missing exams and/or deadlines

Emergencies happen and that is quite understandable. If you miss an exam due to an emergency (e.g., accident, emergency hospitalization, etc) please communicate with me as soon as you can to resolve any outstanding issues. If a major illness hinders you from attending an exam or submitting a deliverable, you need to contact me beforehand via e-mail. Notices received after the deadline will not be accounted for (unless for an emergency). If the illness occurred after the deadline, even if accompanied with a doctor's note, you would receive a zero for that exam/deliverable. Otherwise, missing an exam without prior approval will warrant an automatic zero. Generally, all extensions are considered on a case-by-case basis. Falling sick prior to a deadline does not automatically warrant an extension. If you have any questions or concerns, please don't hesitate in contacting me.

Disability Accommodation

Feel free to speak to me as soon as possible regarding any difficulties you feel you might be encountering in this course, ideally within our first week of classes. If you feel that any given disability is hindering you, or you are not sure and wish for a consult, please reach out to CSD at csd@depaul.edu; they are trained to help out and point you to the appropriate resources.

Grade calculation

Final grades will be calculated as follows: points earned divided by possible points in each category will be multiplied by the contribution percentages shown to yield a total course percentage score between 0% and 100%. Letter grades will be assigned as:

A = 93% - 100%	A- = 90% - 92%	B+ = 87%-89%	B = 83% - 86%	B- = 80% - 82%
C+ = 77% - 79%	C = 73% - 76%	C- = 70% - 72%	D+ = 66% - 69%	D = 60% - 66%	F = 0% - 60%

Class schedule and topics

Week	Class dates	Tentative Topics	Textbook readings
1	April 2 & 4	Course overview Introduction, standards & OSI Topologies & TCP/IP layers	Ch. 1 Ch. 2
2	April 9 & 11	Physical Layer: Data + Analog & Digital Signals Transmission impairments and Circuit capacity	Sec. 3.1 – 3.3 Sec. 3.4 – 3.7
3	April 16 & 18	**In-class Quiz (April 18)** Digital Transmission & Line coding Modulation and Demodulation	Sec. 4.1 Sec. 4.2
4	April 23 & 25	Analog Transmission Multiplexing & Spread Spectrum	Ch. 5 Ch. 6
5	April 30 & May 2	Transmission media **Midterm exam (May 2)**	Ch. 7
6	May 7 & 9	Error Detection and Correction TCP Error & Flow Control	Sec 10.1 – 10.5 Sec. 23.1 – 23.2
7	May 14 & 16	TCP Congestion control and Transport layer services	Sec. 24.1 – 24.3
8	May 21 & 23	Data Compression HDLC and PPP Switching Vs. Routing	Sec. 28.1 – 28.2 11.3 – 11.4 8.1 – 8.3
9	May 28 & 30	Audio and Video Streaming DASH & Hybrid streaming	Sec. 28.3 DASH paper
10	June 4 & 6	Networking for Next Generation Systems Course review and Final Exam preparation	5G paper
11	June 11	**Final Exam: 11:30 AM – 1:45 PM**	

Learning Outcomes

After completing this course, students will be able to:

- Explain data communications foundations and synthesize operational mandates of each layer in the OSI stack.
- Determine information capacity of various types of channels
- Interpret encoded, modulated and multiplexed signals
- Apply various method of data compression
- Analyze TCP Error, flow and congestion control mechanisms, and identify their impact on network operation
- Distinguish basics of Dynamic Adaptive Streaming over HTTP (DASH) and video streaming.
- Explain and interpret impact of data management protocols on Internet operation and scalability.

Exams

All exams will be in person, in class, on paper. The quiz on week 3 will be on D2L using lockdown browser.

Course evaluations

During the course, your feedback on how well the course is running (pace, difficulty, resources, etc) will be solicited. This is a vital component of improving and tailoring this course to your learning objectives. While all students are expected to achieve the learning outcomes highlighted above, each of us inevitably learn differently.

If you have any concerns about how the course is running, or would like to suggest an improvement, feel free to reach out to me. Also, on week 10, we will hold the official course evaluations in class.