

TDC 362 Syllabus – Principles of Data Communications – Winter 2020

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| Instructor | Dr. Sharief Oteafy | Phone | 312 362-8127 |
| Office | CDM 846 | E-mail | soteafy@depaul.edu |
| Office Hours | Thursdays 11:30 – 1 pm (or by appointment) | Website | d2l.depaul.edu |
| Class Location | LEWIS 1509 | Lecture time | Thursdays 5:45 pm – 9 pm |

--- Any changes made to this syllabus will be announced in class -- This is Version 1: Jan 2020 ---

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): IT 263 or TDC 361 is a prerequisite 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:

Required text: **Data Communications and Networking**, 4th edition, Behrouz A. Forouzan, McGraw-Hill, 2007.

Grade distribution over required coursework

| Task | % of final grade |
|------------------------|------------------|
| 4 Homework assignments | 35 % |
| 1 Quiz | 5% |
| Midterm exam | 25 % |
| Final exam | 30 % |
| Class participation | 5 % |

Coursework

Course topics expected to be covered in each class and the corresponding readings in the textbook course are listed in the course schedule on page 3. Note that this is a tentative schedule, which may be adjusted as we advance through the course, depending – for example – on discussions arising in class.

The Class Participation grade will be earned as follows: students gain 0.5% credit towards their final grade for each lecture actively attended (total of up to 5.0% 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.

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 **January 17th 2020** is the last date to drop the class with no penalty.

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. It is a viable component in the classroom, one by which learning objectives could be honestly and efficiently met. The principles of academic integrity should span all of your learning endeavours, within and beyond this course. For more information on Academic Integrity, especially definitions and norms, please visit: <https://offices.depaul.edu/academic-affairs/faculty-resources/academic-integrity/Pages/resources.aspx>. This will be the basis of all of our interactions in this course. If you have any questions or concerns, feel free to drop by and see me.

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, which you can reach from the aforementioned website. **Late submissions receive a 10% penalty for every 24 hour delay past the deadline.**

Missing exams and/or deadlines

Emergencies happen and that is quite understandable. If you miss an exam due to a certain 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 (assignment), you need to contact me beforehand via e-mail. Notices received after the deadline will not be accounted for (unless for an emergency as highlighted above). 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. Kindly refer to DePaul's Center for Students with Disabilities website <https://offices.depaul.edu/student-affairs/about/departments/Pages/csd.aspx>. 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. All of us at DePaul have the common goal of helping you learn, and achieve your potential.

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:

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|----------------|----------------|----------------|----------------|----------------|
| A = 90% - 100% | A- = 88% - 90% | B+ = 86%-88% | B = 80% - 86% | B- = 78% - 80% |
| C+ = 76% - 78% | C = 70% - 76% | C- = 68% - 70% | D+ = 66% - 68% | D = 60% - 66% |
| | | F = 0% - 60% | | |

Class schedule and topics

| Week | Class date | Tentative Topics | Textbook readings | Tentative Assignment dates (on the week of) |
|------|------------|--|--|--|
| 1 | Jan 9 | Course overview Introduction, standards & OSI Topologies & TCP/IP layers | Ch. 1 Ch. 2 | |
| 2 | Jan 16 | Physical Layer: Data + Analog & Digital Signals Transmission impairments and Circuit capacity | Sec. 3.1 – 3.3 Sec. 3.4 – 3.7 | HW 1 posted |
| 3 | Jan 23 | In-class Quiz Digital Transmission & Line coding Modulation and Demodulation | Sec. 4.1 Sec. 4.2 | HW 1 due & HW 2 posted |
| 4 | Jan 30 | Analog Transmission Multiplexing & Spread Spectrum | Ch. 5 Ch. 6 | HW 2 due |
| 5 | Feb 6 | Transmission media Midterm exam | Ch. 7 | |
| 6 | Feb 13 | Error Detection and Correction TCP Error & Flow Control | Sec 10.1 – 10.5 Sec. 23.1 – 23.2 | HW 3 posted |
| 7 | Feb 20 | TCP Congestion control and Transport layer services | Sec. 24.1 – 24.3 | HW 3 due |
| 8 | Feb 27 | Data Compression HDLC and PPP Switching Vs. Routing | Sec. 28.1 – 28.2 11.3 – 11.4 8.1 – 8.3 | HW 4 posted |
| 9 | March 5 | Audio and Video Streaming DASH & Hybrid streaming | Sec. 28.3 DASH paper | HW 4 due |
| 10 | March 12 | Networking for Next Generation Systems Course review and Final Exam preparation | 5G paper | |
| 11 | March 19 | Final Exam | | |

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.

Course evaluations and discourse

During the course, your feedback on how well the course is running (pace, difficulty, resources, etc) will be solicited. This is a vital component in 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. This course is designed to meet the aforementioned learning outcomes, and I will endeavor to incorporate different activities (e.g., Kinesthetic learning) to improve the learning experience.

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.