# Data Communication and Computer Networks
## CS 391 - Spring 2018
### Credits: 3 hours

**Class Meetings:** MWF 9:10AM-10:10AM in HS 309
**Prerequisites:** A grade of C or better in CS 212, CS 251, and CS 271
**Class Web Page:** UWO D2L site

**Instructor:** David Furcy                      **Office:** Halsey 221
**Email:** furcyd@uwosh.edu
**Office Hours:** MWF 10:10-11:10AM, TuTh 9:30-11:00AM or by appointment

**Textbook:**                                              **Computer Networking – A Top-Down Approach**
                                             James F. Kurose and Keith W. Ross
                                             6th Edition, 2012, Pearson

**Wi-Fi-enabled Device:** Since we will use a web-based clicker-like system for unannounced quizzes, you are **required** to bring a **charged** WiFi-enabled device (smartphone, tablet, or laptop) to each class meeting.

**Tests:** There will be two tests, around the middle and end of the semester, respectively. Specific dates will be announced at least 10 days in advance.

## Course Description

An introductory course which covers the basic concepts in data communication and computer networks. Topics covered will include the nature of data communication, characteristics of computer networks, the ISO-OSI network protocol layers, error detection and correction codes, and network performance considerations.

## Actual Topic Coverage

- Introduction to the Internet and its underlying foundations
- The layered architecture and the purpose of each layer: application, transport, network, link, and physical layers
- Overview of common network application protocols (e.g., email, Telnet, FTP, and HTTP)
- Description of the various protocols in the TCP/IP protocol suite and how internet routing works
- Wireless and mobile networks, security in computer networks (time permitting)

**If you have special needs, please come and talk to me as soon as possible so I can accommodate your needs right away.**

## Learning Outcomes

- Be able to evaluate the performance of a single link, logical process-to-process (end-to-end) channel, and a network as a whole in terms of latency, bandwidth, and throughput.
- Be able to differentiate among and discuss the levels of addresses (physical, logical, port, etc.) used by the TCP/IP protocols.
- Understand the concept of reliable and unreliable transfer protocol of data and how TCP and UDP implement these concepts, to understand the client/server model and socket API with their implications.
- Demonstrate an understanding of the significance and purpose of protocols and standards and their key elements and use in networking.
- Understand the purpose of network layered models, network communication using a layered architecture, and be able to compare and contrast the Open System Interconnect (OSI) and the Internet models.
- Be able to distinguish between the different types of bit errors and explain the concept of bit redundancy and how it is generally achieved in the facilitation of error detection and the main methods of error correction.
- Understand internetworking principles and how the Internet protocols IPv4, IPv6 and ICMP operate.
- Understand routing principles and algorithms, such as distance vector and link state, RIP, OSPF, and BGP.
- Explain the differences between control and congestion control at the transport layer as well as how these functions are implemented in TCP.
- Describe how popular application-level protocols (such as HTTP, SMTP, DNS) work.

## Course Grading Policy

Your final grade for this course will be based on 6 components: daily quizzes, daily class preparation and participation (CPP), homework assignments, programming assignments, a midterm exam, and a final exam. Your overall numerical grade for the course will be computed as the weighted sum of the component grades using the following weights:

| Component | Weight |
|---|---|
| Quizzes (all equally weighted) | 15% |
| Class preparation and participation (CPP) | 15% |
| Homework assignments (all equally weighted) | 15% |
| Programming assignments (all equally weighted) | 25% |
| Midterm exam | 15% |
| Final exam | 15% |

Finally, your letter grade for the course will be computed as follows:

| Numerical Score | Grade | Numerical Score | Grade |
|---|---|---|---|
| $\geq 92$ | A | $\geq 72$ | C |
| $\geq 90$ | A- | $\geq 70$ | C- |
| $\geq 88$ | B+ | $\geq 68$ | D+ |
| $\geq 82$ | B | $\geq 62$ | D |
| $\geq 80$ | B- | $\geq 60$ | D- |
| $\geq 78$ | C+ | $< 60$ | F |

While this overall grading scheme is fixed, I will be happy to discuss any issue you may have with individual grades. If you notice a mistake or have a question regarding a specific grade, please come and talk to me *as soon as possible*. Do not wait until the end of the semester to bring up grading issues. Also, I will *not* be available to discuss grades after the end of the final week.

## Attendance and Participation

You are expected to not only attend **every** class meeting but also to come **prepared** for and **participate** actively in it. Necessary preparation requires you to have studied and assimilated the material covered in previous sessions, to have met with the instructor outside of class to discuss any questions you may have, to have completed the reading assignments, and to have completed all other assignments on time.

Recall that this component of the course accounts for 15% of your grade (much more, really, since it will more or less directly impact your performance in the course as a whole). It will be assessed based on the quality of your answers to daily questions administered via a web-based clicker-like system. These questions will be based on your remembering and understanding of the material in previous reading materials as well as in-class discussions. **Make sure to complete the reading assignment, and to bring your device, EACH DAY**. There is no way to cover all of the materials related to this course in face-to-face meetings. Therefore, **you are responsible for doing your own reading and research**. **Class time will focus on answering your questions, not on lecturing from scratch.**

**It is hard to imagine how a student could do well in this course while missing classes or attending them unprepared.** On the positive side, I have high expectations for my students and will always support and encourage you. I strongly encourage you to ask any question or raise any issue you have with the course either during class or in my office hours. I will also gladly meet with you by appointment. Send me email to make an appointment. While I will meet with you as soon as my schedule permits, do not expect me to be widely available just before an exam or the due date for an assignment since you may not be the only one needing help at the last minute.

## Late Submissions

I will describe the submission procedure for your assignments when the time comes. However, let me point out right away that each one of them will come with a deadline (day and time) after which any submission will be considered late. The late-submission policy works as follows:

| Turned in | Penalty |
|---|---|
| On the due date but after the deadline | 10% |
| One day after the due date | 30% |
| Two days after the due date | 60% |
| Three or more days after the due date | 100% |

Note that assignments that are more than two days late receive no points. Weekend days and holidays count as "regular days" when computing late penalties. Each (late) day starts precisely at midnight. Extensions on assignments may be granted at the discretion of the instructor if you provide a valid justification (in the form of a written excuse from a medical doctor or the Dean of

Students Office) before the due date. Late submissions can easily be avoided by starting to work on the assignment right away and asking for help early if you get stuck.

If you miss a scheduled exam, you **may** be able to take a make-up exam provided you give the instructor a valid justification (see above), ahead of time if possible. Only one make-up exam will be given. It will be a comprehensive exam scheduled at the end of the semester. If you miss a quiz, you **may** be able to take a make-up quiz, provided you give the instructor a valid justification (in writing) for your absence.

**Collaborating versus Cheating**

While it is acceptable to discuss the problem statement, premises, goals, constraints, etc., of the assignments with others, you must submit your OWN work EXCLUSIVELY. You may not "borrow" any piece of code or design or written answer of any length from anybody else, unless you can live with a zero and the other potential academic sanctions of cheating (see the UWO Student Discipline Code - Chapter UWS 14).

In conclusion, remember that computer science classes require a lot of work in addition to active participation in class. It takes considerable practice to develop the technical and analytical skills targeted by this course. You will need to spend **at least (and typically much more than) three hours of effort outside of class for each in-class hour**. Having said this, I expect every hardworking student to do well in this course.


**Have fun this semester and good luck!**