

Spring 2020

IT 420-006: Computer Systems and Networks (Revised for Remote Learning)

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IT 420

Computer Systems and Networks

General Information

REV 1 – Revised to reflect change to on-line instruction

Course Description

IT420 provides students with an understanding of methods, tools and technologies required to work with computer systems and networks. It includes a detailed discussion of Internet/intranet issues, including standards, connectivity, performance, protocols, network configurations, network design, and wireless technology, covering both hardware and software systems. This course focuses on the theories of networking. Specific applications come and go, but a firm understanding of the theories will benefit you for your whole career.

Prerequisite: IT 120 Introduction to Network Technology

Upon completion of this course, students are able to:

- Explain how standards, such as IP and routing protocols, control the world-wide internet
- Evaluate how various elements of data communications, such as bandwidth or error detection, affect network performance
- Explain how TCP provides reliable communication, flow control, and congestion control

Instructor

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Office Hours: Monday and Thursday 2:00pm – 4:00pm and by appointment

Office hours by email for on-line portion of the class

Resources

There is no textbook for this course. Instead, we will use the following Internet resources:

1. Principles of Communication Tutorial
https://www.tutorialspoint.com/principles_of_communication/index.htm
2. Dordal, Peter; An Introduction to Computer Networks
<http://intronetworks.cs.luc.edu/current/html/>
3. Bonaventure, Olivier; Computer Networks: Principles, Protocols, and Practice
<https://resources.saylor.org/wwwresources/archived/site/wp-content/uploads/2012/02/Computer-Networking-Principles-Bonaventure-1-30-31-OTC1.pdf>

This course previously used the textbook below. It is out of print, but may be useful as an additional resource.

Comer, Computer Networks and Internets, Sixth Edition, Pearson Prentice Hall, 2015,
ISBN-13: 978-0-13- 358793-7 ISBN-10: 0-13-358793-2

The class web page is on Canvas. (<http://canvas.njit.edu/>) Notes, assignments and solutions will be posted on the web page.

Some of the homework will require you to use programs that are not on public NJIT computers. Therefore, you must have access to a computer where you can install programs.

Grading

Your term grade will be based on exams, quizzes, homework and labs.

| | | |
|----------|-------|---|
| Midterm | 24% | One 240 point exam |
| Final | 21% | One 210 point exam |
| Quizzes | 20% | Two quizzes, each worth 100 points |
| Labs | 3.5% | 7 labs at 5 points each |
| Homework | 31.5% | Nine homework assignments at 35 points each |

Note: Quiz 2 is late in the semester (week 13). Final + Quiz 2 are more than the required 30% of the points for the final.

Grades are assigned based on the sum of the points you earn (1000 total points)

| | |
|----|-------------------------------------|
| A: | Greater than or equal to 900 points |
| B+ | 850 – 899 points |
| B: | 800 – 849 points |
| C+ | 750 – 799 points |
| C | 700 – 749 points |
| D | 600 – 699 points |
| F: | 0 - 599 points |

I may curve up when assigning grades, but I will under no circumstances curve down. For example, you may earn an A if you have 898 points, but you will not earn lower than a B+ if you have 850 points. I will not assign incompletes unless there are extraordinary circumstances.

Exams and Quizzes

The midterm will be a during regular class period. The final will be during finals week. The final is not cumulative and covers the material from the midterm until the end of the class. Quizzes will be given during class and will last about 45 minutes. The purposes of the quizzes are to force you to keep up with the material and to assess your readiness for the midterm and final. Make-up exams and quizzes will not be given unless there is a reason beyond your control that causes you to miss the exam or quiz.

Quiz 2 and the final are on-line.

Exams and quizzes will be closed book and closed notes, but you will be provided with a formula sheet. Calculators are recommended, but you may not use your phone or any networked computing device as a calculator.

Quiz2 and the final allow the use of any resource except another person.

Class Preparation and Meetings

As with all college courses, you are expected to spend two hours outside of class for every hour in class, so plan to spend about 6 hours per week outside class.

PowerPoint notes and other resources will be available on the class Canvas page well before each class. I expect you to do the assigned reading and review the notes *before* you come to class. You will get more out of the class if you have spent some time thinking about the material in advance. This course covers a lot of material quickly. Don't let yourself get behind!

Attendance is highly correlated with good performance in the class, so I will record attendance for every class. Up to 20 points of extra credit are available for attendance as shown below:

| | |
|---------------------|-----------|
| Miss 0 - 5 classes | 20 points |
| Miss 6 - 10 classes | 10 points |
| Miss > 10 classes | 0 points |

Absences may be excused for athletics, religious holidays, illness, court, military obligation or family emergencies if you contact me before the missed class.

I expect you to be on time.

The extra credit points are based on attendance only while the class met in person.

Homework and In-Class Exercises

Homework is due just about every week. Most homework problems will be paper-and-pencil, but some problems will require computer use. Solutions will be provided on the class Canvas page.

Unless otherwise specified, homework should be submitted as hardcopy and is due at the beginning of class on the due date. If you cannot attend class, you may submit your homework via e-mail no later than the beginning of class on the due date. I strongly prefer hard-copy homework, so please do not e-mail your homework if you plan to come to class. If you e-mail your homework, I will acknowledge receipt within 24 hours. Please follow up if you do not receive an acknowledgement.

Late homework will not be accepted in any circumstances after the solutions are posted, which is usually two days after the due date. Late homework may be accepted before that if it is late for a reason beyond your control.

Homework is a very large component of your semester grade. I weight homework so heavily because:

- It forces you to work on this class every week
- It is your opportunity to learn how to do the questions that will be on the quizzes and exams
- It can help your grade. You have a whole week and full access to the text, class notes, and me. You should be able to earn most of the points on every homework.

The downside of heavily weighing homework, of course, is that not turning in homework will significantly hurt your semester grade.

You may, if you wish, work on homework in a study group. Each person in the group must turn in a homework paper and each paper must have a note indicating who is in the study group. You will have to do problems similar to the homework on the tests and quizzes individually, so just copying someone else's solution without understanding will hurt your test and quiz grades.

Homework is to be submitted through Canvas while the class is on-line.

There will regularly be graded in-class exercises (called Do_Now). These are worth 3 points each and will be included in the week's homework grade. The topics will be announced in advance. These exercises are open-book and open-notes, but you will have limited time. These cannot be made up.

Do-nows are cancelled while the class is online.

Labs

This class meets in a laboratory. Do not bring food or drink into the lab.

We will do several hands-on labs during the semester. Some labs will use only the computers and some will use the switches and routers. Read each lab ahead of time, perform each lab and turn in the worksheet before you leave class on the day of the lab.

There are 8 labs in the semester, but I assume only 7 are submitted for grading purposes. This means that you can miss one lab without affecting your semester grade. If you prefer, the eighth lab can be used for extra credit.

The lab will be open for a few hours a week so you can catch up on a missed lab or do your own projects. Hours will be announced. You may also make an appointment to use the lab.

Labs that require use of the equipment in the classroom are cancelled while the class is online and students will get points for these labs.

Honor Code

Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on.

As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at:

<http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf>.

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university. If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu

Modifications to this Syllabus

Students will be consulted about any changes to the course policies in this syllabus.

The schedule is a guide. Topics will be covered in the order specified, but may move to either the class before or the class after if the class moves faster or slower than I expect. I do not expect the exam, quiz, and homework due dates to change unless we miss a class. The latest information will be on the class Canvas page.