

**Location** West Village H 210  
**Time** Mondays, Wednesdays, Thursdays 10:30AM–11:35AM  
**Web site** <http://www.ccs.neu.edu/course/cs3600f14>  
**Forum** <http://piazza.com/northeastern/fall2014/cs3600/home>

**Instructor** Prof. Alan Mislove  
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**Office hours** Mondays, 3:00PM–4:00PM, 250 West Village H

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**Office hours** Tuesdays, 10:00AM–11:30AM, 102 West Village H (Vishakha)  
Thursdays, 5:00PM–6:30PM, 102 West Village H (Vishakha)  
Fridays, 4:00PM–5:30PM, 102 West Village H (Harish)  
Saturdays, 10:00AM–11:30AM, 102 West Village H (Harish)

#### DESCRIPTION (from the Registrar)

Introduces the basic concepts underlying computer operating systems and computer networks and provides hands-on experience with their implementation. Covers the basic structure of an operating system: application interfaces, processes, threads, synchronization, interprocess communication, processor allocation, deadlocks, memory management, file systems, and input/output control. Also introduces network architectures, network topologies, network protocols, layering concepts (for example, ISO/OSI, TCP/IP reference models), communication paradigms (point-to-point vs. multicast/broadcast, connectionless vs. connection oriented), and networking API's (sockets). Uses examples from many real operating systems and networks (UNIX, MS-DOS, Windows, TCP/IP, Ethernet, ATM, and token rings) to reinforce concepts.

#### DESCRIPTION (from me)

We'll be studying how computers and the Internet really work. The course will be hands-on and participation is *required*. This course is hard.

#### LOGISTICS

The class will thrice per week for 65-minute sessions sessions, plus a two-hour final exam. The midterm exam will be administered during a regular class session. I am not going to require you to attend class; I am not your mother. However, special requests will be treated with particular suspicion if I do not recognize you from lecture.

#### PREREQUISITES

The official prerequisite for this course is cs2600. This course will be project-centric, and all students will complete in projects in groups of two (or possibly three, if necessary). Thus, to

succeed in this course, you must be able to work in a group. I will allow you to form your own groups, and the Piazza forum has a dedicated thread that can serve matching service if necessary. As you are free to choose your partner(s), I will not be sympathetic to complaints at the end of the semester about how your group-mates did not do any work.

It is also highly recommended that you become familiar with using a debugger, as this will greatly aid you in completing the projects. At a high level, you should be motivated, eager to learn, willing to work hard, and make up, on your own, any prerequisite deficiencies you may have.

## GOALS

By the end of this course, I expect you to understand the following concepts:

- Operating system basics — context switching and program loading
- Virtual memory at the hardware and operating system level
- Basic operating system security mechanisms
- File system implementation options and challenges
- Basic networking protocols, including protocol layering
- Networking principles including routing, addressing, congestion control
- The benefits and limitations of the current Internet and its service model
- The causes of network congestion, and the basic methods for alleviating congestion

## TEXTBOOK

The recommended (but not required) textbooks for the course are

Silberschatz, Galvin, and Gagne. *Operating Systems Concepts, 8th Ed.* ISBN 978-0470128725.

Peterson and Davie. *Computer Networks: A Systems Approach, 4th Ed.* ISBN 978-0123705488.

Yes, there are two books. I'm sorry. The course is Systems **and** Networks. If its any consolation, you'll use the operating systems book in cs5600 and the networking book in cs4700/cs5700. For the C bootcamp (see below), you are also encouraged (but not required) to buy the book

Prinz and Crawford. *C in a Nutshell, 1st Ed.* ISBN 978-0596006976.

Note that none of the textbooks are required; they are only there for your reference. Any recent edition of these book should suffice.

## C BOOTCAMP

Part of the goal of this class is to teach you some systems programming skills. To do so, most of the projects will be required to be completed in C. As many of you are not familiar with C, we will spend the first four lectures doing a C “bootcamp.” Each lecture will cover an aspect of C,

and will be followed by short homework problems that make sure you understand what we did in lecture.

*The C bootcamp projects are due at 11:59:59pm on the specified date. No slip days may be used on the C bootcamp projects.*

## HOMework ASSIGNMENTS

This course will have ten homework assignments reviewing concepts in class. Homework assignments are to be done by each student individually. The homework assignments will be graded and handed back to you within a week. You are **strongly recommended** to complete the homework by the date assigned, as the homework will prepare you for the exams.

*Homework assignments are due at the beginning of lecture on the specified date. No slip days may be used on the homeworks. Homeworks will be marked 20 points off per day that they are late, up to 2 days.*

## PROGRAMMING PROJECTS

The goal of this course is to teach the both the fundamentals of systems and networks, as well as how to write programs which use both. As such, there will be four programming projects throughout the semester.

For the projects in this course, we will use C to complete the programming projects. The submitted code must compile and run without any special requirements on the CCIS Linux machines. If you have any questions about the use of C for the programming assignments, please email the instructor. If you have any questions about the support code, C error messages, and so forth, please post to the class Piazza forum.

The TA has been instructed to grade in part on design and implementation style and to be increasingly strict about this as the semester proceeds. In other words, it is not enough to get a working solution; you must implement the solution in a clean way that would simplify making further enhancements. It will benefit you in the long run to work on your software engineering skills.

*Programming projects are due at 11:59:59pm on the specified date. You do not need to inform the instructor about the use of slip days; they will be automatically deducted.*

## TEAMWORK

You will form groups of two people to do the programming projects (if necessary, one group of three will be allowed). To collaborate effectively, you should both be involved in all of the major design decisions. You may switch groups between programming projects.

**Important:** *You alone are responsible for finding a partner. The class forum (newsgroup) located on Piazza is a particularly good resource for this—there will be a thread there that serves exactly this purpose. Right before or right after lecture, as well as during TA lab hours, are also a good time to look for partners.*

We often receive complaints that somebody cannot find their partner, or that their partner continues to promise things that are never delivered. To address this concern, the policy is **you flake, you fail**. Simply put, if you disappear, or are generally not pulling your own weight at any time during the semester, you get an F in the course right then. End of story. If you don't completely flake, but are under-responsive, we reserve the right to design an appropriate (but

still fair) way of redistributing points. If your partner is flaking on you, do not wait until the end of the semester to let the course staff know; let us know *immediately*.

Of course, disasters happen that may pull you away from campus. You are responsible for notifying your partner and the course staff if a major time conflict arises in your life. In the real world, you don't just disappear from your job for a week. You tell people you have to go. The same thing applies here. Likewise, if you feel you're going to need to drop this class, then do it between projects, not in the middle of one. Dropping the course in the middle of a project may be allowed by the university, but it's extremely rude to your partner(s). Be polite.

One useful bit of advice: work together with your partner. We don't mandate pair programming, but it really works. You'll be more than twice as effective as you might if you split the work up and did it separately. Also, you'll avoid the sort of rude surprises that often arise when partners have different expectations.

## SUBMITTING C BOOTCAMP HOMEWORKS AND PROJECTS

We will use CCIS Linux-based scripts for submitting C bootcamp homeworks and programming projects; instructions for using these will be included with each project. Note that submitting projects via email is *not acceptable*, and no credit will be given for these submissions, and no extensions will be granted. You can submit your projects multiple times, and we will grade the latest submission. We suggest submitting your project a few times well before the deadline to ensure there are no configuration errors.

Before you can submit any assignments, you must register for the system with your student ID. To do so, ssh into any CCIS Linux machine and execute

```
bash$ /course/cs3600f14/bin/register-student ID
About to register user 'USER' with student ID 'ID'. Is this correct? [yn]
```

where ID is your student ID, with any leading 0s removed. For example, if your NEU student ID is 003044, you would enter

```
bash$ /course/cs3600f14/bin/register-student 3044
```

Double-check that the userid and student ID are correct; if so, type y and Enter. If not, type n and Enter. If it was successful, you will see the message

```
bash$ /course/cs3600f14/bin/register-student ID
About to register user 'USER' with student ID 'ID'. Is this correct? [yn] y
User 'USER' is now successfully registered for CS3600 with student ID 'ID'.
bash$
```

If you see any other message (in particular, a message with "Error" in it), it has not succeeded. Email the instructor with the error message if you are not able to diagnose the problem.

## FORUM

We will provide a Piazza-Based Web forum (the URL is provided at the beginning of this document) that can be used by students to ask questions and exchange wisdom while completing the homeworks and projects in this course. You will be expected to check it at least every few days, participate actively, and use it as a first place to post questions related to the projects or homeworks in this course. Please use the forum to post questions and answers that may be useful to

others. Specifically, questions of the form “How do I link foo?”, “Does such-and-such option in the compiler work for you?”, or “What is the precise interpretation of homework question III, part b?” should be posted on the forum first. If you mail me (or other course staff) these questions, we might not be able to answer them in time.

Please register for Piazza by going to <http://piazza.com/northeastern/fall2014/cs3600> and registering as a student.

## EXAMS

There will be one midterm and one final. All exams will be closed book and closed notes, and computers are not allowed nor is any access to the Internet via any device. The exams will cover material from lectures, readings, and the projects. They will cover the material discussed during the first and second halves of the class, respectively (i.e., they are not cumulative).

## GRADING

The breakdown of the grades in this course is

50%	Projects (2 at 10% and 2 at 15%)
25%	Exams (12.5% midterm and 12.5% final)
15%	Homeworks (10 at 1.5% each)
7.5%	Participation
2.5%	C Bootcamp Projects

Each project and homework will include a breakdown and description of how it will be graded.

Any requests for grade changes or regrading must be made within 7 days of when the work was returned. To ask for a regrade, attach to your work a page that specifies (a) the problem or problems you want to be regraded, and (b) for each of these problems, why do you think the problem was misgraded.

## LATE POLICY

Late C bootcamp homeworks will not be accepted. Extensions will not be granted.

For the four programming projects, we will use flexible slip dates. Each student is given an automatic extension of 4 calendar days for the semester. You can use the extension on any project during the semester in increments of a day.<sup>1</sup> For instance, you can hand in one project 4 days late, or one project 2 days late and two projects 1 day late. The slip time will be deducted from each group member’s remaining slip time.<sup>2</sup> This should let you schedule due dates around the due dates for other courses. After you have used up your slip time, any project handed in late will be marked off 20% per day. Projects more than 2 days late (beyond the use of slip days) will not be accepted. Extensions will not be granted.

## ON CHEATING

It’s ok to ask someone about the concepts, algorithms, or approaches needed to do the assignments. We encourage you to do so; both giving and taking advice will help you to learn. However,

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<sup>1</sup>A “day” refers to 24 hours. Thus, a project turned in 28 hours late will count as two days late.

<sup>2</sup>Note on slip days: Slip days can only be used if all group members have at least one remaining slip day. If not, the 20% off per day policy stated above will be used for all group members.

what you turn in must be your own, or for projects, your group's own work; looking at or copying other people's code, solution sets, or from any other sources is strictly prohibited. In particular, looking at other solutions (e.g., someone else's solution to a similar project) is a direct violation. The project assignments must be *entirely* the work of the students turning them in. If you have any questions about using a particular resource, ask the course staff first.

All students are subject to the Northeastern University Academic Integrity Policy, available at <http://www.northeastern.edu/osccr/academichonesty.html>. All cases of suspected plagiarism or other academic dishonesty will be referred to the Office of Student Conduct and Conflict Resolution (osccr).

### ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES

If you have a disability-related need for reasonable academic accommodations in this course and have not yet met with a Disability Specialist, please visit <http://www.northeastern.edu/drc> and follow the outlined procedure to request services.

If the Disability Resource Center has formally approved you for an academic accommodation in this class, please present the instructor with your "Professor Notification Letter" during the first week of the semester, so that we can address your specific needs as early as possible.

### ADVICE

As the course is difficult, it is **absolutely essential** to start early on homeworks and projects. The projects require substantial design, implementation, and testing effort, especially for students who are unfamiliar with network and systems programming. Students are encouraged to drop by the instructor's or teaching assistant's office hours (or set up a separate appointment via email) if they run into problems while completing the assignments.

Finally, computer use during class is allowed but expected to be for class purposes (e.g. note-taking, reference) only. Please avoid non-class-related computer use so that I do not have to revisit this policy.