# IOWA STATE UNIVERSITY

Computer Science 252

Fall 2023

## Overview

**What the course covers**

This is a hands-on course designed to demonstrate the installation, administration, and utilization of the Linux operating system for a personal computer. A secondary focus of the course is on interoperability of Linux with other operating systems, including Windows and Mac. While the emphasis is Linux, much of what is covered applies also to UNIX systems and Mac OS X. It is a three-credit, online course, meaning you should set aside about 3 hours per week (on average) to view the online lectures. Delivery is asynchronous, meaning you may watch the lectures whenever you like during the week; however, keep in mind that homework assignments and exams have fixed due dates.

**Course objectives**

The objective of this course is to provide students with an introduction to the administration of Linux systems. Upon successful completion of this course, students will be able to create a dual-boot (Windows and Linux) PC and successfully perform system and network administration tasks, such as installing packages, managing services, and creating a network of communicating Windows and Linux machines.

**Course Topics**

The following is a rough list of topics, in order of coverage, with approximate lecture time.

- OS History (1 hour)
- Primer on computer architecture (1 hour)
- Linux filesystem and file utilities (2 hours)
- Disks: architecture, filesystems, utilities (2 hours)
- Shell tricks (1 hour)
- Processes, redirection, pipes (1.5 hours)
- Filtering utilities (1.5 hours)
- Building packages (1 hour)

- The Kernel (1 hour)

- Bash programming (3 hours)

- Regular expressions (1 hour)

- AWK scripts (1.5 hours)

- SED scripts (1.5 hours)

- Networking (3.5 hours)

- File sharing with Samba (1 hour)

- Unix user accounts (1.3 hours)

- File sharing with NFS/NIS (1.2 hours)

- Network administration (1.7 hours)

- Security (2 hours)

# Prerequisites

Students are expected to have some programming experience (such as ComS 127 or 207 or 227, or CprE/SE 185), to be comfortable with some modern, GUI-based operating system, and to have experience with modern computing applications (Internet browsing, word processing, spreadsheets, etc.).

# Course Work

### Homework (40%)

Homework exercises will be collected electronically. Be sure to follow submission instructions carefully. Instructor notes about homework assignments:

- Assignments are posted under "Assignments", and are due each week, on Tuesdays.

- Most assignments require you to download ISO images and build one or more virtual machines. Each virtual machine will likely require between 2 and 20 GB of disk space, so plan accordingly.

- The first few assignments for this course are fairly easy. This is especially true for students who already have experience in Linux and with command-line Unix. The coursework will get more difficult as the course progresses.

- Assignments are designed to be done in order. Later assignments usually build on earlier ones. For example, homework 2 might have you copying, moving, and removing files. In later

homeworks, I will assume that you remember how to do this. You might want to take notes while you are working on assignments.

- While the assignments are not deliberately tricky, there will be times when you get stuck. This is what the discussion forum is for. However, a frantic question posted a few minutes before an assignment is due is unlikely to receive a response in time. Thus, students are encouraged to start assignments early.

- When possible, homework assignments use automated submission scripts that also grade your work. You might be frustrated that these scripts do not give super detailed feedback. This is to discourage you from relying on the scripts to help you complete the assignment. A strategy of repeatedly making random changes and running the submission script, until you have a correct submission, might allow you to complete the assignment but you will learn nothing.

All due dates are specified in Central time. Homework solutions are due by 11:59 pm on their due date, and will be subject to a penalty based on the number of days late, as follows.

| 0 days: | 0% off |
|---------|--------|
| 1 day: | 5% off |
| 2 days: | 10% off |
| 3 days: | 20% off |
| 4 days: | 30% off |
| 5 days: | 45% off |
| 6 days: | 60% off |
| 7 days: | 80% off |
| 8 days: | 100% off |

Penalties are adjusted linearly based on the number of hours late. For example, homework submitted 42 hours late will be subject to an 8% penalty. Students are encouraged to contact the instructor if lateness is due to extenuating circumstances (generally, situations beyond the student's control, such as illness).

## Exams (60%)

Exams will be offered through Canvas, and must be taken at a test center or with an ISU-approved proctor. Note that for each exam:

- A single exam attempt is allowed.

- No personal calculators are allowed (this probably will not matter for this course).

- Students may need to make an appointment to take an exam at an ISU Test Center.

The following exams are scheduled (all times are Central). Students must take the exams during the specified times.

- Midterm 1: (9/27 - 9/29).  One hour.
- Midterm 2: (11/01 - 11/03). One hour. Comprehensive, but emphasizing material not covered on the first exam.
- Final: (12/11 - 12/14). One hour. Comprehensive, but emphasizing material not covered on the first two exams.

**Overall grade**

The overall letter grade for the course is assigned based on the weighted total score. The classic 10 point scale provides a guaranteed lower bound for your overall letter grade:

| An overall score of at least | 93% | guarantees a grade of | A |
|---|---|---|---|
| An overall score of at least | 90% | guarantees a grade of | A- or higher |
| An overall score of at least | 87% | guarantees a grade of | B+ or higher |
| An overall score of at least | 83% | guarantees a grade of | B or higher |
| An overall score of at least | 80% | guarantees a grade of | B- or higher |
| An overall score of at least | 77% | guarantees a grade of | C+ |
| An overall score of at least | 73% | guarantees a grade of | C or higher |
| An overall score of at least | 70% | guarantees a grade of | C- or higher |
| An overall score of at least | 67% | guarantees a grade of | D+ or higher |
| An overall score of at least | 63% | guarantees a grade of | D or higher |
| An overall score of at least | 60% | guarantees a grade of | D- or higher |

# Working in groups

Students are permitted to work collaboratively, in small groups, on some homework assignments. The group will then submit a single solution in the virtual machine, with all students in the group receiving the same grade. Each assignment will be specified either as a group assignment, or as an individual assignment. Working in small groups is subject to the following restrictions.

1. Members of the group are declared when initializing the virtual machine for an assignment.
2. Group submissions will be penalized; usually by 5% times (the number of members in the group minus one).

Keep in mind that all exams are individual efforts, so students who are carried by their small group on assignments are likely to do poorly on exams.

# Course Policy on Academic Dishonesty

Students are encouraged to discuss homework assignments; there is an online discussion forum precisely for this purpose. Additionally, students are encouraged to search online for help in completing assignments, and to share URLs of sources of information. Ultimately, though, students are expected to understand and turn in their own work (or the collective work of their small group). Since the purpose of the assignments is to increase students' understanding, any activity that allows groups of students to complete a solution without understanding their own solution is prohibited. The following are some concrete examples of prohibited activities.

- Posting solutions or portions of solutions in any public forum (electronic or otherwise).
- Copying solutions or portions of solutions from another group.
- Sharing solutions or portions of solutions with other groups (electronically or via hard copies).
- Discussion to the point that submitted source code is identical.
- Submitting solutions for more than one group, from a single virtual machine.
- Collaboration of any kind on exams.
- Use of unauthorized materials on exams.

Of course, any amount of communication (including copying of files) is permitted within a small group.

Be aware that the instructor has various mechanisms in place on each virtual machine to help detect academic dishonesty, including customized shells that log all of your activity and submit this (and other) information along with your solution when you run the submission script. Suspected cases of academic misconduct will be reported to the Dean of Students Office (see below), and may result in an overall grade of F, in addition to any sanctions imposed by the Dean of Students Office.

If you have any questions about the policy, either in general or for a specific assignment, contact the instructor.

# Academic Dishonesty

The class will follow Iowa State University's policy on academic misconduct ([5.1 in the Student Code of Conduct](#)). Students are responsible for adhering to university policy and the expectations in the course syllabus and on coursework and exams, and for following directions given by faculty, instructors, and Testing Center regulations related to coursework, assessments, and exams. Anyone suspected of academic misconduct will be reported to the [Office of Student Conduct in the Dean of](#)

Students Office. Information about academic integrity and the value of completing academic work honestly can be found in the [Iowa State University Academic Integrity Tutorial.](#)

## Free Expression

Iowa State University supports and upholds the [First Amendment protection of freedom of speech](#) and the [principle of academic freedom](#) in order to foster a learning environment where open inquiry and the vigorous debate of a diversity of ideas are encouraged. Students will not be penalized for the content or viewpoints of their speech as long as student expression in a class context is germane to the subject matter of the class and conveyed in an appropriate manner.

## Accessibility

Iowa State University is committed to advancing equity, access, and inclusion for students with disabilities. Promoting these values entails providing reasonable accommodations where barriers exist to students' full participation in higher education. Students in need of accommodations or who experience accessibility-related barriers to learning should work with Student Accessibility Services (SAS) to identify resources and support available to them. Staff at SAS collaborate with students and campus partners to coordinate accommodations and to further the academic excellence of students with disabilities. Information about SAS is available online at [www.sas.dso.iastate.edu](http://www.sas.dso.iastate.edu), by email at accessibility@iastate.edu, or by phone at 515-294-7220.

## Prep Week

This class follows the Iowa State University Prep Week policy as noted the ISU Policy Library; as well as section 10.6.4 of the Faculty Handbook. Visit the [ISU Policy Library website](#) (http://www.policy.iastate.edu/) for policy wording.

## Discrimination and Harassment

Iowa State University does not discriminate on the basis of race, color, age, ethnicity, religion, national origin, pregnancy, sexual orientation, gender identity, genetic information, sex, marital status, disability, or status as a U.S. Veteran. Inquiries regarding non-discrimination policies may be directed to Office of Equal Opportunity, 3410 Beardshear Hall, 515 Morrill Road, Ames, Iowa 50011, Tel. 515-294-7612, Hotline 515-294-1222, email eooffice@iastate.edu.

## Mental Health and Well-Being Resources

Iowa State University is committed to proactively facilitating all students' well-being. Resources are available on the [ISU Student Health and Wellness website](https://www.cyclonehealth.iastate.edu/) ([https://www.cyclonehealth.iastate.edu/](https://www.cyclonehealth.iastate.edu/)).

## Religious Accommodation

Iowa State University welcomes diversity of religious beliefs and practices, recognizing the contributions differing experiences and viewpoints can bring to the community. There may be times when an academic requirement conflicts with religious observances and practices. If that happens, students may request reasonable accommodation for religious practices. In all cases, you must put your request in writing. The instructor will review the situation in an effort to provide a reasonable accommodation when possible to do so without fundamentally altering a course. For students, you should first discuss the conflict and your requested accommodation with your professor at the earliest possible time. You or your instructor may also seek assistance from the [Dean of Students Office website](http://dso.iastate.edu/) (http://dso.iastate.edu/) or via phone 515-294-1020 or the [Office of Equal Opportunity website](https://www.eoc.iastate.edu/) (https://www.eoc.iastate.edu/) or via phone 515-294-7612.

## Contact Information for Academic Issues

If you are experiencing, or have experienced, a problem with any of the above statements, email academicissues@iastate.edu.