Principles of Operating Systems

Spring 2017

CS 480-1/580-1   TTh 11:00 AM – 12:15 PM   PM 103

Instructor:  Dr. Reva Freedman
Email:  rfreedman@niu.edu
Phone:  My office has no phone. In emergency (i.e., if email not available),
call the CSCI office at (815) 753-0378, and they will forward a message.
Office hours:  PM 558, TTh 3:00-4:45 PM
TA:  David Williams, MTWTh 12:15-1:45 PM,
z086126@students.niu.edu, FR 227, no phone.

Course web site:  Reference materials at http://www.cs.niu.edu/~freedman/480/
Most course materials will be on Blackboard under CSCI 480
Sample code will be on turing at ~t90rkf1/d480

Course description:
In this course we will study the principles and practices of modern operating system
design, focusing on models of operating systems architecture, scheduling, interprocess
communication, and I/O. Students will demonstrate their learning of these concepts through the
writing of professional-quality object-oriented C++ programs using the STL, the POSIX API,
and other system software.

Course objectives:
1) To understand the most important concepts in operating systems and other modern
   system software.
2) To be able to use these concepts in professional-quality object-oriented C++ using the
   STL, the POSIX API, and other required software, with a special focus on I/O.

Contacting the instructor:  The best way to contact me is in person, followed by email. I will be
happy to talk to you about questions or concerns at any time. I encourage you to address small
problems before they become big problems, not the day before the exam.

I try to respond to email by the next business day, but there are occasional exceptions. Questions
that can be answered from reference material may not be answered. Questions requiring major
debugging are best handled in person.

Late-breaking news, e.g., errors in assignments and weather emergencies, will be posted on
Blackboard. I suggest you check it every morning.

Your TA is generally your best first reference for homework issues.

Class attendance:  You are responsible for all material covered in class. If you miss a class, you
must get notes from another student before the next class, not from the instructor. Research has
shown that students who attend class regularly do better regardless of other behaviors. Class participation is encouraged and will make the class more interesting for you and for the other students. If you have a question, there are probably three other people with the same question who are even more shy than you.

Although many or most class materials will be posted on Blackboard, that is for your convenience. This is not an online class, and there is no assumption that you can learn everything without coming to class.

Class decorum: In classes for freshmen, I state the following rule on the syllabus: “No activity that interferes with learning, i.e., one that may distract other students or the instructor, is permitted in class. For example, eating, talking (whether in person or on the phone), newspaper reading, and regularly being late or leaving early are not permitted.” In a class for seniors and graduate students, I assume it is not necessary to state such a rule explicitly; however, the rule remains in force.

Research has shown that activities such as texting and checking your email interfere with your retention of the material, however, they in general do not interfere with other people’s ability to concentrate. Therefore these are permitted in case of emergency. Please do not sit in the front row if you intend to engage in these activities, as it is distracting.

Exams: There will be two 75-minute exams (midterm and final) and two shorter code tests. The exams and the code tests will all be closed-book, closed-notes. The date of the midterm and the first code test will be announced approximately one week in advance. The final will be Tue., May 9, 10-11:50 AM. The second code test may be combined with the final or may be given on a separate date.

With regard to concepts, each exam will cover approximately half of the course material (the final will not be cumulative). With regard to programming, programming is inherently a cumulative activity, so the exams may include programming constructs from earlier in the course. The exams and the code tests will be conducted in accordance with the department’s academic integrity policy.

Exams will include material from the lecture notes, written assignments and programs. For each exam, a review sheet will be posted listing all the possible conceptual questions (in a somewhat different format). Exam formats will include multiple choice, fill-in-the-blank and similar formats. There will be no essay questions. Slides used in class will be posted at some point after the lectures in which they are used.

Examples for the programming questions on the exams will be available from sample code and the homework. Programming questions will assume that you have not only done the homework but learned from it, i.e., copying code from the sample programs used in class without learning from it may give you a working program but is less likely to give you the level of understanding you will need for the exams.

The code tests will involve writing two or more short functions (10-15 lines or so). You will not be required to memorize names of libraries or similar issues.
You are expected to take the exams and the code tests on the assigned time and date. Missing an exam is an extremely serious matter: makeup exams will only be given if either (a) or all of (b), (c) and (d) are satisfied: (a) an unavoidable reason (e.g. car accident) with notice as soon as possible, (b) advance notification, (c) written documentation, (d) permission of instructor. For the final exam, permission of the department is also required.

Please notify me ASAP if you meet the university’s criterion for rescheduling a final exam, i.e., you have three finals on the same day and this course is the highest-numbered of the three, or if you have another final exam at the same time. The university deadline for scheduling a makeup final is Monday of the last week of classes. Documentation will be required.

Assignments: There will be approximately 7 programs and a possible written assignment and/or short oral presentation. Most or all of the assignments will be object-oriented C++ programs that will run on turing/hopper. Graduate students will be required to do an additional assignment or a more advanced version of one or more assignments. Graduate students may be required to do an oral presentation on their work.

Unless otherwise specified, the following rules apply to all assignments. Assignments must be submitted as defined in the assignment writeup. You will receive 10% extra points for assignments submitted 24 hours before the deadline. Non-programming assignments (and any in-class assignments) will not be accepted late. There will be a penalty of 10% of the points for the assignment for each day or portion of a day for late programs, and no programs will be accepted more than 2 days late. In general, there are no waivers of the late penalty or extensions beyond this period. No programming assignments may be submitted after the last day of classes. There will be a penalty if you do not follow directions for the assignment, e.g., do not submit the correct format, do not submit all the files, submit extra files, etc.

Programs must run as specified in the assignment. There will be a penalty if your program does not follow the coding, layout and documentation standards referred to in the assignment. To receive full credit, programs must (a) work, (b) follow the specifications, (c) be comprehensible to humans, (d) be accompanied by any requested writeup. If multiple versions (e.g., source, object, and/or output) are required, they must be consistent.

If you believe your assignment has been graded incorrectly, you must see the professor or the T.A., as appropriate, within one week after the assignments have been returned.

Working together: You are encouraged to study together, however, that does not mean doing assignments together. Practice on problems from class, from the slides, or your own problems. Do the programs and any written assignments yourself.

Academic integrity: You are expected to do your own work on the homework, programs and exams. Cheating includes, but is not limited to, copying work from other students, copying work from other textbooks, copying work from the Internet, or allowing others to do the same, whether deliberately or not.

All cheating will result in the filing of an academic misconduct form and will affect your course grade, with the possibility of failing the course and/or losing your student job. The penalty for a first offense is usually two letter grades. Note that a second academic misconduct offense may
result in your expulsion from the university.

We may use mechanized source comparison on the programs.

**Grading:** The course grade will be based on the exams and assignments. The exams and code tests will count 60% of your grade (each exam will count 24% and each code test will count 6%, i.e., each exam will have 100 points and each code test will have 25 points). The assignments will count 40% of your grade. The assignments will be weighted according to length and difficulty. Unannounced in-class assignments may allow you to collect extra assignment points. The grading scheme will be as follows (grades will not be curved or rounded):

<table>
<thead>
<tr>
<th>Grade</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>&gt;= 90</td>
</tr>
<tr>
<td>A-</td>
<td>&gt;= 88</td>
</tr>
<tr>
<td>B+</td>
<td>&gt;= 85</td>
</tr>
<tr>
<td>B</td>
<td>&gt;= 80</td>
</tr>
<tr>
<td>C+</td>
<td>&gt;= 75</td>
</tr>
<tr>
<td>C</td>
<td>&gt;= 70</td>
</tr>
<tr>
<td>D</td>
<td>&gt;= 60</td>
</tr>
<tr>
<td>F</td>
<td>&lt; 60</td>
</tr>
</tbody>
</table>

**Special circumstances:** Students with special needs (disability accommodation, religious observances, required military service, major illness or other unexpected events) are encouraged to contact the instructor as soon as possible. Having a lot of work for your other classes, being busy at your job, and network problems are not special circumstances; they are normal circumstances that everyone has.

**Disability accommodations:** The instructor will provide all of the accommodations to which you are entitled by law. If you need an accommodation for this class, you must provide a notification letter from the Disability Resource Center. Once you provide a copy of the notification letter, we will have a private conference to determine how your approved accommodations will be handled in this class. This conference must be held and agreement reached before any accommodations can take effect. No accommodations will be allowed retroactively.

If you wish to take your exams at the DRC office, you must also follow DRC regulations with regard to exam scheduling.

For these reasons you should contact the DRC as soon as possible. They are located on the 4th floor of the Health Services Building, and can be reached at 815-753-1303 or drc@niu.edu. Also, please contact me privately as soon as possible to discuss possible accommodations – there is no need to wait until you have received the notification letter.