Course Catalog description: Operating system as resource manager. Processor management and scheduling, deadlocks, concurrency, memory management and protection and security as applied in modern operating systems. Concepts are illustrated via laboratory assignments which heavily emphasize concurrency.

Academic Affairs Syllabus Policy http://www.d.umn.edu/vcaa/SyllabusPolicy.html

1. Course title, number and semester:

2. Class meeting times and locations:
   LEC MWF 10:00-10:50 HH306
   LAB M 4:00-5:50 MWAH 177

3. Instructor:
   Andrew Brooks, Heller Hall 334, work phone 218-726-7391, e-mail abrooks@d.umn.edu
   website http://www.d.umn.edu/~abrooks/
   Office Hours: Monday 1-3pm, Tuesday 1-3pm, Wednesday 1-3pm or walk-in.
   TA: Sarmad Siddiqui, siddi035@d.umn.edu
   Office Hours: TBD

4. Pre-requisites:
   CS 2511 Software Analysis and Design & CS 2521 Computer Organization and Architecture (or ECE 2325). Students taking CS 5631 must have obtained passing grades in these courses.

5. Recommended Textbook:
   The required textbook (hardback or e-version) is:
   Operating System Concepts with Java, 8th Edition
   Abraham Silberschatz, Peter B. Galvin, Greg Gagne (©2010)
   Online materials: will be made available in the Moodle at:
   https://ay13.moodle.umn.edu/my/ or moodle.umn.edu
   Students are expected to make full use of online materials. Check on the site once a day.
   Software:
   The technology platform (Java, Eclipse IDE, VMware Player, Petri Nets, Unix, C, nano, etc) is described in Moodle. Students are encouraged to install the “tool chain” on their own machines.

6. Graded Course Components and Grading
   There is a mix of individual and group-based assessment. Please note while every effort will be made to adhere to the percentage breakdown indicated, small adjustments might be necessary to better reflect work done.
   Laboratories 10%   (gradebook L, individual, ~weekly)
   Homework 10%      (gradebook H, individual, ~weekly)
   Assignments (4x10%) (gradebook A, some individual/some group, ~3-4 week intervals)
   Mid-term exam 20%  (gradebook M, individual, ~Week 7)
   Final exam 20%     (gradebook F, individual, Week 16)

   Please note presentations and demonstrations will be used in assessing students’ work. Please...
note there will be extra-credit opportunities (E), between 5% and 10% in total value. Students are advised to tackle extra-credit opportunities: percentage marks are simply added on to the overall grade calculation. Please note a grade of incomplete (I) will not be issued unless there are extenuating circumstances (see Excused Absences below).

The grading scheme is as follows. No scaling will be applied.

- A  >=90%
- A-  87-89%
- B+  83-86%
- B   80-82%
- B-  77-79%
- C+  73-76%
- C   70-72%
- C-  67-69%
- D+  63-66%
- D   60-62%
- F   <60%

7. **Final Exam Date and Time**
   FRIDAY May 16 8:00-9:55am

8. **Special outside-of-class requirements**
   No field trips to local IT companies are currently planned.

9. **Attendance requirements and penalties for non-attendance**
   Students are expected to attend all lectures. There is no penalty for non-attendance of lectures, but please note that there may be occasional extra-credit exercises held during lecture time. Non-attendance means a student misses the extra-credit opportunity. Students are expected to attend all laboratories. Please note that there may be occasional extra-credit exercises held during laboratory time. Non-attendance means a student misses the extra-credit opportunity. Non-attendance on any field trip carries no penalty. Please note there may be extra-credit opportunities associated with any field trip.

10. **Policy on late and make-up work**
    Deadlines associated with assignments and homework are firm. Late submissions associated with assignment work and homework score zero. The value of a laboratory drops by half after one week and to zero after two weeks. (Exceptions are possible e.g. documented absence through illness.)

11. **Statement on participation by students with disabilities**
    [http://www.d.umn.edu/access/faculty/basics/#syllabus](http://www.d.umn.edu/access/faculty/basics/#syllabus)
    It is the policy and practice of the University of Minnesota Duluth to create inclusive learning environments for all students, including students with disabilities. If there are aspects of this course that result in barriers to your inclusion or your ability to meet course requirements –
such as time limited exams, inaccessible web content, or the use of non-captioned videos – please notify the instructor as soon as possible. You are also encouraged to contact the Office of Disability Resources to discuss and arrange reasonable accommodations. Please call 218-726-6130 or visit the DR website at www.d.umn.edu/access for more information.

N.B. For students with on-going difficulties, Letters of Accommodation should be agreed no later than the 3rd week of semester.

12. Supplemental course materials
   As mentioned earlier, students are expected to make full use of online materials available in the Moodle course site and check on the site at least once a day.

13. Is the course a liberal education course?
   CS 5631 is not a liberal education course.

14. Policies related to teaching and learning
    http://www.d.umn.edu/vcaa/SyllabusStatements.html
    
    Student Conduct Code:
    Appropriate classroom conduct promotes an environment of academic achievement and integrity. Disruptive classroom behavior that substantially or repeatedly interrupts either the instructor’s ability to teach, or student learning, is prohibited. Student are expected adhere to Board of Regents Policy: Student Conduct Code:

    Teaching & Learning: Instructor and Student Responsibilities:
    UMD is committed to providing a positive, safe, and inclusive place for all who study and work here. Instructors and students have mutual responsibility to insure that the environment in all of these settings supports teaching and learning, is respectful of the rights and freedoms of all members, and promotes a civil and open exchange of ideas. To reference the full policy please see: http://www.d.umn.edu/vcaa/TeachingLearning.html

    Academic Integrity:
    Academic dishonesty tarnishes UMD’s reputation and discredits the accomplishments of students. Academic dishonesty is regarded as a serious offense by all members of the academic community. UMD’s Student Academic Integrity Policy can be found at:
    http://www.d.umn.edu/vcaa/StudentAcademicIntegrity.html

    Final Exams:
    All 1xxx-5xxx courses offered for undergraduate credit should include a final graded component or end of term evaluation that assesses the level of student achievement of one or more course objectives. All final graded components are to be administered or due at the time and place according to the final exam schedule and not during the last week of class. To reference the full policy please see: http://www.d.umn.edu/vcaa/FinalExams.html
Excused Absences:
Students are expected to attend all scheduled class meetings. It is the responsibility of students to plan their schedules to avoid excessive conflict with course requirements. However, there are legitimate and verifiable circumstances that lead to excused student absence from the classroom. These are subpoenas, jury duty, military duty, religious observances, illness, bereavement for immediate family, and NCAA varsity intercollegiate athletics. For complete information, please see: [http://www.d.umn.edu/vcaa/ExcusedAbsence.html](http://www.d.umn.edu/vcaa/ExcusedAbsence.html)

Appropriate Student Use of Class Notes and Course Materials:
Taking notes is a means of recording information but more importantly of personally absorbing and integrating the educational experience. However, broadly disseminating class notes beyond the classroom community or accepting compensation for taking and distributing classroom notes undermines instructor interests in their intellectual work product while not substantially furthering instructor and student interests in effective learning. For additional information, please see: [http://www.d.umn.edu/vcaa/ClassNotesAppropriateUseof.html](http://www.d.umn.edu/vcaa/ClassNotesAppropriateUseof.html)

15. Student learning outcomes as they relate to the course objectives

Upon successfully completing this course, a student should be able to:

- demonstrate a knowledge and understanding of processes, threads, CPU scheduling, process synchronization, deadlocks, memory management and storage management (file systems) (Ch 3-12)
  - also protection and security (Ch 14-15) if time permits
- design, execute, and report on the results of experiments to monitor the performance of an operating system as a whole or one of its parts
- design, code, and test programs that use thread libraries to support concurrency (using for example java.util.concurrent or POSIX Threads also known as Pthreads) and design, code and test models of concurrency (using, for example, Petri Nets)
- demonstrate a knowledge and understanding of user-space programs (such as shell scripts and the shells themselves)
  - also kernel-space programs (such as loadable kernel modules) if time permits
- compare and contrast the historical development and structure of several operating systems (Ch 2, 21-23)
- demonstrate a knowledge and understanding of virtualization and emulation

Other
a. Students may be required to host some of their work on servers external to the University. (A group-based assignment, for example, may use Google Drive or Project Hosting on Google Code to support collaborative working. Note that UMD is in partnership with Google: [http://www.d.umn.edu/itss/google/](http://www.d.umn.edu/itss/google/) - go to this site before using any Google functionality.)
Spring 2014, CS 5631 Operating Systems, Syllabus

b. Students without their own laptop will require use of a high capacity flash drive.
c. 30-60-90 UMD Student Success Roadmap
   http://www.d.umn.edu/roadmap/
d. Equal Opportunity & Affirmative Action, Policies and Directives
   https://diversity.umn.edu/eoaa/policiesanddirectives

Instructor

Andrew Brooks, Tuesday, January 07, 2014
http://www.d.umn.edu/~abrooks/