CSCI 442: Operating Systems

Berthoud Hall 241, Tues/Thurs 11:00 – 12:15 PM

Instructor: Prof. Hao Zhang
Office: Brown Hall 250
Email: hzhang@mines.edu
Web: http://inside.mines.edu/~hzhang
Office Hours: Tuesdays 2:00 – 4:00 PM at BBW325
Lunches on Thursdays through the CS FUNCH program
Other hours available by appointment

Teaching Assistant: Huan Wang
Email: huhwang@mymail.mines.edu
Office Hours: Wednesdays 10:00-11:30 AM at the Alamode Lab (BB 136)
Fridays 4:00-5:30 PM at the Alamode Lab (BB 136)


Prerequisites: CSCI-262 (Data Structures) and CSCI-341 (Computer Organization). The prerequisites for this course will be enforced.

Communication:
- Course website: http://inside.mines.edu/~hzhang/Courses/CSCI442
  Used for information purposes for the public
- CANVAS: https://ccit.mines.edu/eLearning-Resources
  To submit the final project, and check your grades

Course Description: This course introduces the essential concepts in the design and implementation of operating systems: what they can do, what they contain, and how they are implemented. Despite rapid OS growth and development, the fundamental concepts learned in this course will endure. We will cover the following high-level OS topics:
- Computer System Overview (Chapter 1)
- Operating System Overview (Chapter 2)
- Process Description and Control (Chapter 3)
- Processor Scheduling (Chapter 9)
- Threads (Chapter 4)
- Memory Management (Chapter 7)
- Virtual Memory (Chapter 8)
- Concurrency (Chapters 5 and 6)

This will be a relatively intense yet rewarding course. There will be SEVEN HOMEWORK assignments, along with ONE OPTIONAL programming project for extra credit based on the implementation side of the course.
All work is to be completed individually. In addition to the homework assignments and programming project, we will have a MIDTERM EXAM and a FINAL EXAM. Both exams will be closed book and closed notes. The final exam will cover the entire semester’s work, but significantly emphasizes on the 2nd half. Participation in the course throughout the semester is not required, but it is strongly suggested.

Evaluation:
Grades will be assigned on the following basis

<table>
<thead>
<tr>
<th></th>
<th>Homework</th>
<th>Midterm</th>
<th>Final</th>
<th>Project (optional)</th>
<th>Course Eval</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>30 pt</td>
<td>30 pt</td>
<td>40 pt</td>
<td>9 pt (extra credit)</td>
<td>1 pt (extra credit)</td>
</tr>
</tbody>
</table>

Final grades will be determined by overall average as follows:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>90 – 100</td>
</tr>
<tr>
<td>B+</td>
<td>85 – 89.9</td>
</tr>
<tr>
<td>B</td>
<td>80 – 84.9</td>
</tr>
<tr>
<td>C+</td>
<td>75 – 79.9</td>
</tr>
<tr>
<td>C</td>
<td>70 – 74.9</td>
</tr>
<tr>
<td>D</td>
<td>60 – 69.9</td>
</tr>
<tr>
<td>F</td>
<td>0 – 59.9</td>
</tr>
</tbody>
</table>

Class Policies:

- **Assignments:** The assignment write-ups will be posted on the course website, along with the due dates. Submit paper copies of homework assignments before the class (i.e., 11:00 AM) on the due date. Submit the programming project by 11:59 PM on the due date.

- **Due Dates and Late Assignments:** All assignments are due at the date and time stated, except for extenuating circumstances. No homework submission will be accepted FIVE (5) minutes after the due time (i.e., 11:05 AM, when solutions are handed over). Late projects will lose 20% of the total score per day.

- **Class Attendance:** Class attendance will be taken. Decisions on borderline grades will be based upon exceptional class attendance and participation, as deemed merited by the course instructor. Of course, if you have a good reason to miss class (e.g., you are sick, or you need to present a paper at a research conference, or you have a job interview, etc.), then it is not a problem. Please don’t come to class if you think you have a contagious illness. We will work with you to help keep you posted on class activities and material covered. In any case, it is your responsibility to catch up (or keep up) with all course material and announcements covered in class.

- **Academic Integrity:** All students are advised to be familiar with university policy on Academic Integrity. In addition, The following Collaboration Policy exists for all CS@Mines courses.
  1. If the project is an individual effort project, you are not allowed to give code you have developed to another student or use code provided by another student. If the project is a group project, you are only allowed to share code with your group members.
  2. You are encouraged to discuss homework and final project assignments with other students in the class, as long as the following rules are followed:
     a. You view another student’s code only for the purpose of offering/receiving debugging assistance. Students can only give advice on what problems to look for; they cannot debug your code for you. All changes to your code must be made by you.
     b. Your discussion is subject to the empty hands policy, which means you leave the discussion without any record [electronic, mechanical or otherwise] of the discussion.
3. Any material from any outside source such as books, projects, and in particular, from the Web, should be properly referenced and should only be used if specifically allowed for the assignment.

4. To prevent unintended sharing, any code stored in a hosted repository (e.g., on github) must be private. For group projects, your team members may, of course, be collaborators.

5. If you are aware of students violating this policy, you are encouraged to inform the professor of the course. Violating this policy will be treated as an academic misconduct for all students involved. See the Student Handbook for details on academic dishonesty.

Violations of this policy result in one of a range of punitive measures, from a zero score for an assignment, up to and including a course letter grade drop for all students involved. All issues of misconduct are reported to the Dean of Students. Academic misconduct associated with an exam grade will likely result in course failure.

- **Discrimination & Harassment:** This course and all learning opportunities at Mines require a safe environment for everyone to be productive, develop professional practices, and to be able to share and learn without fear of discrimination or harassment. Discrimination or harassment of any type will not be tolerated. Sometimes harassment is unintentional, but regardless of intent the instructor will address any language or behaviors that might discriminate, stereotype, or promote harassment. If you witness discrimination or harassment of others, please bring it to the attention of Mines faculty so it can be addressed immediately.

Title IX is a federal law that protects individuals from discrimination based on sex and gender in educational programs or activities. Mines takes its Title IX obligations seriously and is committed to providing a campus community free from gender-based discrimination. Gender-based discrimination, including sexual harassment, sexual violence, stalking, and domestic violence, is prohibited within the Mines campus community. If these issues have impacted you or someone you know, you can appropriate resources here: http://inside.mines.edu/POGO-Title-IX. You can also contact the Mines Title IX Coordinator, Karin Ranta-Curran, at 303.384.2558 or krcurran@mines.edu for more information.

- **Learning Environment:** Fundamentally, I expect and require respect in this course for yourself, your classmates, and your instructor and TAs.
  - Respect for yourself includes taking care of yourself physically and mentally and advocating for an environment that facilitates learning for you.
  - Respect for your classmates includes recognizing and appreciating the diversity of backgrounds and experiences of your classmates and making it your interest to foster a learning environment for everyone; all are welcome.
  - Respect for your instructors (as well as your classmates) includes not participating in disruptive or distracting behavior: talking, playing games, or web surfing during lecture, for instance, make it difficult for others to focus on the reason we are all here.
  - Respect must be mutual to be effective; we (your instructors) and your TAs will be held to the same standards of respect.

Please let your instructor know if you become aware of an issue with the classroom (or out-of-classroom) environment with regards to these policies.

- **Disability Accommodations:** website http://disabilities.mines.edu outlines the university’s disability services. Any student requiring accommodations must request Student Disability Services deliver each professor a Confidential Letter of Required Accommodations to ensure accommodations are met. Any student requiring accommodations, please contact the instructor via email or schedule an individual meeting to coordinate accommodations.