CS 471-003: Operating Systems
Fall 2018
Department of Computer Science, George Mason University

Time and location:

- Section: 003
- Monday and Wednesday, 9:00am - 10:15am
- Nguyen Engineering Building 1108

Instructor:

- Dr. Parth Pathak
- Email: phpathak@gmu.edu
- Office hours: Monday, 10:30am - 12:30pm, or by appointment
- Office: Engineering building, Room 5318

Description:

- This course covers the concepts and design principles of modern operating systems, both from theory and practical aspects. Fundamental concepts such as processes, synchronization, scheduling and memory management will be presented.

Prerequisites:

- Grade of C or better in CS 310 and CS 367.
- The students must be fluent in C programming language in order to complete the coursework, which includes substantial programming projects.

Course outcomes:

Upon completion of this course, the students should be able to:

- Demonstrate knowledge about the role and purpose of the operating systems, and its fundamental components
- Demonstrate knowledge about different approaches to operating system design and the involved trade-offs, and be able to explain the main performance evaluation criteria for computer systems and how the operating system design can have an impact on these
- Show an understanding of the need for the concurrent operation of multiple tasks (processes/threads) and an ability to solve basic process synchronization and concurrency problems that arise from concurrent operation settings
- Demonstrate the knowledge about process scheduling, basic memory management
- Show an understanding of I/O devices, storage and file system management techniques and their impact on the overall performance
- Demonstrate the basic knowledge about distributed systems
- Be able to implement a suite of basic algorithms proposed for the main OS services such as memory management and process scheduling

Books:

- Required textbook:
  - Operating Systems: Three Easy Pieces, By Remzi H. Arpaci-Dusseau and Andrea C. Arpaci-Dusseau (This textbook is freely available online at http://pages.cs.wisc.edu/~remzi/OSTEP/)
- Other recommended textbooks for reference
  - Operating System Concepts by Silberschatz, Galvin and Gagne (10th Edition, John Wiley & Sons 2018, ISBN 978-1-118-06333-0)
  - Operating Systems - Principles and Practice (2nd Edition, Recursive Books 2014, ISBN 978-0-9856735-2-9) by Anderson and Dahlin

Graduate teaching assistant (TA):

- TBD
- Email: TBD
- Office hours: TBD
- Office: TBD

Topics:

- Introduction to operating systems and design goals
- Processes and threads
- Concurrency issues and synchronization techniques
- CPU scheduling
- Memory Management and virtual memory
- I/O devices, persistent storage and file systems
- Protection and security
- Virtual machines
- Distributed systems

Course material and computer account:

- All course material (announcements, slides, assignments, homeworks, etc.) will be available on the GMU Blackboard
- All students should have accounts on the VSE Unix cluster (aka zeus.vse.gmu.edu). Instructions and related links can be found here. Your programs will be tested and graded on the zeus server.

Grading:

- Your grade will be calculated using the following percentages:
  - Two midterm exams (15% + 15%)
  - Final exam (30%)
  - Programming assignments (30%)
  - Homeworks and quizzes (15%)
- A total grade of less than 50 or a final exam score less than 40 will result in an F

Policies:

- Late submission:
  - Late submissions of homeworks and programming assignments will be penalized at 15% each day, and will not be accepted after 3 days of the due date
- Exams:
  - The midterm and final exams will be closed book
  - The final exam will be cumulative which means that it will include all topics discussed during the term.
  - No early exams will be given. If you must miss an exam, you should provide an official/verifiable proof of why you are missing the exam before the exam. Once it is validated, instructor can arrange a make exam.
- Honor code:
  - All students must adhere to the GMU Honor Code and the Computer Science Department's Honor Code Policies.
  - The students are supposed to work individually on the homeworks, assignments projects, unless told otherwise.
  - We reserve the right to use MOSS to detect plagiarism. Violation of the Honor Code will result in an F.
- Accommodations for disabilities:
  - If you have a documented learning disability or other condition that may affect academic performance, you should: 1) make sure this documentation is on file with Office for Disability Services (SUB I, Rm. 4205; 993-2474; http://ods.gmu.edu) to determine the accommodations you need; and 2) talk with me within the first week of the semester to discuss any accommodation needs.