

CS 470 - Operating Systems

Spring 2017 - Syllabus

Instructor

Dr. Deborah Hwang

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Home page: <http://csserver.evansville.edu/~hwang>

Office Hours: See instructor's home page.

Course Home Page

Announcements regarding handouts will be made in class. However, most handouts will be available only at the course home page (<http://csserver.evansville.edu/~hwang/s17-courses/cs470.html>). It is your responsibility to consult the course home page on a regular basis. Grades will be posted to Blackboard (<http://bblearn.evansville.edu>).

Catalog Data

Components of operating systems. Tasking and processing; process coordination; scheduling; memory organization and management; device management; security; networks; distributed and real-time systems.

Objectives and Outcomes

The main objectives of this course are to develop an awareness of the components of an operating system, to become familiar with design and implementation issues concerning these components, and to experience researching, reading, writing, and presenting technical material. Specific outcomes for this course include:

- Students will be able to identify the components of an operating system and how they interact with each other.
- Students will complete at least two open ended design problems simulating components of an operating system.
- Students will complete at least two programming projects demonstrating use of operating system components such process management and threads.
- Students will become familiar with the details of at least one operating system to the level of being able to write a case study report and make a presentation to the class.
- Students will be introduced to contemporary professional issues.

Prerequisite: CS 215

Recommended Co-requisite: CS 320

Required Textbook

Abraham Silberschatz, Peter B. Galvin, and Greg Gagne, *Operating System Concepts Essentials, 2ed.*, John Wiley & Sons, 2014, ISBN 978-1-118-80492-6.

Daily and Weekly Requirements

Assigned daily reading and weekly homework assignments generally given out on Wednesday and due the following Wednesday. Homework problems may include short programming problems.

Programming Projects

There will be 4 programming projects that will illustrate key concepts in operating system design and implementation. Each project will consist of a written functional description of the program (25%), an implementation of the program (50%), and a written analysis of a test plan or the results of the program (25%).

Case Study

Each student will participate in the preparation of a written report and a presentation describing the features of a specific operating system that illustrates the concepts we discuss in class. See handout [Guidelines for Operating Systems Case Study](#) for more details.

Exams and Evaluation

There will be two in-class exams during the term and an optional comprehensive final exam. Grades will be based on the following weighted distribution:

- 30% 2 Written In-class Exams (15% each)
- 15% Case study report
- 40% Programming projects (equally weighted)
- 15% Homework assignments

The optional comprehensive final exam (scheduled for Wednesday, May 3, 9-10am) may be taken to replace the lower of the in-class exam scores. Final grades are based on the final weighted percentage with some adjustments depending on class distribution. Historically, the A/B line falls around 88% +/- 2% with subsequent grade levels every 10%.

Missed Exams, Late Homework, Late Projects

Written homework is due at the instructor's office by 4:30pm on the date specified unless otherwise noted. Any such assignments arriving after 4:30pm are considered late. Programming homework and projects must be submitted electronically by 11:59pm on the date specified. The following automatic late penalties will be applied:

- 10% if handed in or submitted one day late
- 20% if handed in or submitted two days late
- 30% if handed in or submitted three days late

Unexcused late work will not be accepted for credit after three days after the due date without prior arrangements. For the purpose of counting days, Friday to Monday is considered one day. Please note that the purpose of the automatic late extension is to allow students leeway when needed. It is usually better to hand in something late and completed than on-time and incorrect. However, chronically handing in late submissions will lower your final grade.

Valid excuses for missing exams and handing assignments in late include illness, family emergencies, religious observances, official UE events such as varsity games and concerts, etc. They do not include (most) work conflicts, studying for other classes, leaving a day early or staying home an extra day over a weekend or holiday, etc. In general, an excused absence is one caused by circumstances beyond your control.

The instructor will rely on your integrity for getting work excused. If you have a valid excuse, **send an email to the instructor with the details**. For religious observances and official UE events, you must inform the instructor that you will be absent **before** the absence occurs, otherwise it will be considered an unexcused absence. In cases of excessive absences, the instructor reserves the right to require official documentation

Excused work must be made up within one calendar week from the original due date for full credit. Late excused work will not be accepted. Exceptions will be made for serious or prolonged illness, or other serious problems. Please note: It is your responsibility to take care of missed or late work.

Attendance Policy

Attendance is important and expected. Attendance records will be maintained in accordance with Federal Law, but will not be used in the determination of grades, except in borderline cases. However, the instructor reserves the right to reduce a final grade in this course for excessive unexcused absences. Students will be warned prior to such action. Students are responsible for all material covered in class. If you miss a class, find out what was covered from another student. You are responsible for checking the course home page for new assignments even if you miss class.

Credit Hour Policy

This course meets the federal requirements of 15 in-class hours plus an expected 30 hours of out-of-class work per credit hour.

Disability Policy

It is the policy and practice of the University of Evansville to make reasonable accommodations for students with properly documented disabilities. Students should contact the Office of Counseling and Health Education at 812-488-2663 to seek services or accommodations for disabilities. Written notification to the instructor from the Office of Counseling and Health Education is required for academic accommodations.

Honor Code

All students are expected to adhere to the University's Honor Code regarding receiving and giving unauthorized assistance. Three specific guidelines are in force for this course.

- **Homework exercises** are for you to gain experience and practice. **You may collaborate with your classmates**, but each student must submit a solution in his/her own words that reflect his/her understanding of the solution. In particular, **submissions that are substantial copies of solutions found in the publisher's instructor's manual or on-line will not receive credit**. Ultimately you will be required to demonstrate your proficiency of the material on exams. Therefore, it is highly recommended that you attempt all homework problems on your own before finding a solution from another source.
- **Programming projects are to be your own work**. Asking another person for assistance on specific items in your own code is permitted, but you may not observe another person's code or solution for the purposes of studying or copying it, with or without that person's permission. This includes, but is not limited to, other students in the class, previous students in the class, and the Internet.
- Of course, **exams are to be entirely your own work**.

If there is any doubt as to whether assistance is acceptable, consult the instructor.

Reading Schedule

This is a tentative schedule. Adjustments will be made as needed.

<i>Week of</i>	<i>Monday</i>	<i>Wednesday</i>	<i>Friday</i>
01/09	Ch 1: Introduction, History	Ch 2: System structures	Ch 3.1-3.3: Processes, Process operations
01/16	MLK, Jr. Day No class	Parallel processing concepts	Ch 3.4-3.5: IPC
01/23	Ch 3.5-3.7: IPC	Ch 4.1-4.4: Threads, Thread libraries	Ch 4.5-4.8: Implicit threading, OpenMP
01/30	Ch 5.1-5.3: Synchronization, Critical-section	Ch 5.3-5.5: Peterson's algorithm, Mutex locks	Ch 5.6-5.7: Semaphores, Classic problems,
02/06	Ch 5.7-5.8: Classic problems, Monitors	Ch 5.8: Monitors	Ch 5.11: Deadlock
02/13	Ch 6.1-6.3: CPU scheduling	Ch 6.3-6.6: CPU scheduling	Ch 6.7-6.8: CPU scheduling
02/20	Ch 7.1-7.3: Memory management	Ch 7.4-7.5: Segmentation, Paging	Ch 7.6-7.8: Page table, Examples
02/27	Exam 1 Review	Exam 1, Ch 1-6	Instructor out of town No class
03/06	SPRING BREAK – No class		
03/13	Ch 8.1-8.3: Demand paging	Ch 8.4: Page replacement	Ch 8.4-8.5: Page replacement
03/20	Ch 8.6-8.11: Thrashing, Other considerations	Ch 9: Storage structures	Ch 10: File system interface
03/27	Ch 11.1-11.4: File system implementation	Ch 11.5-11.11: File system implementation	Ch 13: Protection
04/03	Ch 13: Protection	Ch 14: Security	Ch 14: Security
04/10	Exam 2 Review	Exam2, Ch 7-14	Easter break No class
04/17	Case studies	Case studies	Senior project presentations No class
04/24	Case studies makeups Course wrap-up	Reading/Study Day	

Optional Final Exam is on Wednesday, May 3, 9:00am-10:00am