



COURSE INFORMATION

Course Title:

CSSE213 Computer Systems Principles and Programming

Semester:

July Session, 2020

CLASS HOURS: Monday through Friday, 180 minutes each day, for three weeks. At the end of each week there will be a one-hour discussion session; the instructor will also be available by appointment.

Discussion Section: 1 hour each week.

Field Trip: Not required.

CREDITS(s): 3

OVERVIEW

This course provides students with the opportunity to learn and understand operating system (OS) concepts, the principles of computer systems and systems programming. It covers OS structures to make the students understand different services it offers at each level. It deepens students' understanding of threads and processes, and the strategies to synchronise multiple processes. The course covers the topics of virtual memory, the mapping between main and virtual memories, file and I/O systems, networking and system programming in Unix environment. Students will demonstrate their understanding of different concept by submitting practical assignments, which will provide them hands-on experience to solve real-world problems. The course expects that the students to have a basic understanding of C programming.

LEARNING OUTCOME

Upon successful completion of this course, the students should have basic expertise in the following areas:

- Understanding the properties and major abstraction levels of operating systems.
- Understanding Unix shell concepts and expertise in writing scripts with simple Unix shell and utility commands.
- An ability to explain the behaviour of processes and threads, and inter-process communication and coordination.
- Expertise in writing programs with processes and threads.
- Demonstrate the understandings of main memory and virtual memory concepts, and calculate mappings between physical and virtual address spaces.
- Describe and contrast the properties of file systems and file/IO.
- Confidently express the understanding of functionalities and properties of different layers of IP stack.
- Solving simple problems using network programming and system programming in Unix environment.

LEARNING RESOURCES

Disclaimer: Course schedule is subject to change and you will be responsible for abiding by any such changes.



Suggested textbooks:

[AS] A. Silberschatz, P. Galvin and G. Gagne, *Operating Systems Concepts, 9th Edition*, Wiley, 2012.

[NM] N Matthew and R Stones, *Beginning Linux Programming*, John Wiley & Sons, 2008.

[GG] G. Glass and K. Ables, *UNIX for Programmers and Users, 3rd Edition*, Prentice Hall, 2003.

WEEKLY SCHEDULE

Week	Day	Topic	Reading
1	1	Introduction and Overview	AS - Chapter 1
	2	Operating System Structures	AS – Chapter 2
	3	Shell Programming	NM - Chapter 2
	4	Processes and Threads Quiz 1	AS - Chapters 3,4
	5	Process Synchronisation Practical Assignment 1 is due	AS – Chapter 5
2	1	Mid-semester Examination	
	2	Main Memory	AS - Chapter 8
	3	Virtual Memory	AS - Chapter 9
	4	File System Interface	AS - Chapter 11
	5	I/O Systems Quiz 2	AS - Chapter 12
3	1	Networking Concepts Practical Assignment 2 is due	GG - Chapter 9
	2	Network Programming	GG - Chapter 9
	3	Systems Programming	GG - Chapter 13
	4	Revision	
	5	Final Examination	

ASSESSMENT

Assessment Task	Score Percentage
Attendance and Participation	10%
Quiz 1	5%
Quiz 2	5%
Practical Assignment 1	10%
Practical Assignment 2	10%
Mid-semester Examination	20%
Final Examination	40%
Total	100%

DETAILS ON GRADE COMPONENTS

1. Attendance and Participation

Students are required to attend all classes and participate actively. Students should treat their classroom obligations as they would treat any serious professional engagement. Your

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participation grade will be based on the instructor's assessment of how well you contribute to classroom dynamics relative to your class peers.

NB: In case of an absence, the student is responsible for the materials and assignments for that class; it is the student's responsibility to inform the instructor regarding absences and assignments that are missed. **Unexcused absence from three or more scheduled class sessions will be grounds for failure in this course.** If you do have to miss class due to a personal emergency, please let the instructor know as soon as possible. Such emergencies will be dealt with on a case-by-case basis.

Participation grades will be based on **quality** (in-class performance that reflects intellectual depth, insightfulness, and contribution to class learning) and **quantity** (consistency and regularity of performance).

Accordingly, **you are expected to read the related chapters before participating the class.** Be prepared to be called upon to "open" a class discussion by presenting your full analysis and thoughts on the assigned topic at the start of class, or to be asked through a "cold call" for comment during the discussion.

The grading of class participation is necessarily a subjective exercise. However, high-quality comments have one or more of the following characteristics: **(1) insightfulness, (2) appropriate application of course concepts, and (3) advancement of the in-class discussion at hand.**

2. Quizzes

Quizzes will happen on the first and second weeks to review and reinforce what has been learned in the previous classes.

3. Practical Assignments

To enhance the learning process, students have to submit two practical assignments. Each assignment weighs 10% of the total marks.

Assignment 1 covers shell programming, threads and processes, and inter-process communications. It is due on Friday of the first week.

Assignment 2 covers main memory, virtual memory, file systems and I/O systems. It is due on Monday of the third week.

4. Mid-semester Examination

The mid-semester examination will be held on Monday of the second week. It will cover the contents of the first week including but not limited to Operating system concepts, Shell programming, Processes and threads, and Inter-process synchronisation.

5. Final Examination

An in-class final examination will be administered at the end of the course on Friday of the third week. Details of contents, exam format, etc. will be announced in class well before the examination dates.

6. Course Grading

Upon completion of this course, you receive a final grade. A final grade is a letter grade that carries with it a numerical value, as outlined below.

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Grade	Mark
A	80-100
B	70-79
C	60-69
D	50-59
E	0-49

To pass this subject, students are required to obtain Grade C or above in order to satisfy all the intended learning outcomes.

CLASSROOM ETHICS & COURSE POLICIES

Being respectful of others' opinions, values and culture

Cell phones are only permitted when the usage is related to the course. Absolutely **NO TEXTING** during class will be tolerated. If you have an emergency situation and you must be able to be reached, set the phone to vibrate and leave the room immediately when it goes off.

Any student with a documented disability needing academic adjustments or accommodations should notify the instructor or the program administrator before the start of the program, so such an arrangement will be made accordingly.

Any student who anticipates a schedule conflict because of religious reasons should make arrangements within two weeks of the start of class.

Academic misconduct

Please follow the guideline of the university policy. Academic dishonesty or misconduct will not be tolerated and may result in disciplinary action including a grade F for the course. Work submitted must be the original work of the student. Original work may include the words and ideas of others, but the source of these words and ideas must be indicated in a manner consistent with an academically recognized form, style, and citation manual. Resubmission of work previously presented in another course is prohibited.

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