Syllabus for Advanced Operating Systems

Spring 2019

LECTURER:

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TEACHING ASSISTANT:

Name: TBD
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COURSE DESCRIPTION:

This course forms a foundation for graduate-level operating systems. The course focuses on advanced concepts/features in operating system design and coverage of recent research directions. In this course, the students should learn how the advanced features work and how to make use of the features to complete your research work or advance your career. This course will not focus on how to design or implement a so-called "advanced" operating systems.

In this course, we will also study the research methods for computer science to help fresh graduate students to build the foundation for computer scientists.

Covered topics includes: research methods for computer science, distributed process management, virtual memory, parallel and distributed file system designs, persistent objects, process and data migration, load balancing, security, multimedia operating systems, middleware for IoT/M2M, heterogeneous multicore systems, and embedded operating systems.

COURSE WEBSITE: HTTPS://CEIBA.NTU.EDU.TW/1052CSIE7010_

The course website will provide class announcements, course slides, hand-outs, reading materials, and discussion forum for the class. You should also submit your homeworks to the site.

PREREQUISITES:

作業系統,計算機網路, and 計算機結構, or consent of instructor.

TEXT BOOK:

There are three recommended text books:

Distributed Systems: Principles and paradigms by Tanenbaum
Distributed Operating Systems by Pradeep K. Sinha, IEEE Press, 1997.
Practical Linux Programming: device drivers, embedded systems, and the internet by Ashfaq A. Khan.
A PhD Is Not Enough!: A Guide to Survival in Science by P.J. Felbelman.

We will cover the most materials in the book “Distributed Systems: Principles and paradigms.” Hence, it is recommended to own this book for your reference in the class and/or for the future. Additional materials will be provided on course website.

GRADING CRITERIA:

In this course, the grade consists of leading discussion/participation, paper critics, mid-term exams, and Final Exam. The leading discussion, mid-term, and final exam count 40%, 30%, and 30% of your final grade, respectively.

Leading Discussion:

The leading discussion starts on the week of March 21, 2019. In each week, we will have one leading discussion. The reading lists will be provided on March 7, 2019. Each student can volunteer at most one discussion during the semester and each discussion lasts for at most 30 minutes.

In each discussion, we will discuss one selected paper. All the students are required to read the paper before the class and participate the discussions in the class. The discussion leaders should prepare the topics to be discussed, lead the students to discuss, and summarize the opinions. The purposes of leading discussion are two-folds:

- To know the pros and cons of the discussed algorithm or paper.
- To figure out the possible research directions, based on the discussed algorithm.

The discussion leader may (but are not required to) prepare a five minutes presentation at the beginning of the discussion for the background of the paper, leader's viewpoints, and discussion agenda. Note that it is not discussion leader's responsibility to educate the students to understand the paper.

The leader will be graded based on the following criteria:
- The organization of the discussion, and
- The designed discussion topics.

Paper Critics:

The students will be given papers to write critics during the semester. Each student has to write at least two critics. The critics should be written in English and are recommended to be edited by native speakers before submission. The detail for writing the critics will be given in the class. The critics have to be submitted before the paper is discussed in the class. Once the paper is discussed in the class, no critics for the discussed papers will be accepted.

The reading lists will be provided no later than March 8, 2017.

POLICY:

Late Assignment:

The assignments should be handed in via the provided web-based assignment submission system. All assignments must be handed in before 11:59PM at their corresponding due days. It is your responsibility to make sure that your assignments are handed in before the deadline. The TAs will not accept the assignments via emails or any other means. Check out the submission web site to see how to make sure your assignments are submitted successfully. So, do it as early as possible.

Only the assignments submitted before the deadline will receive full credit. 5% of your grade will be deducted for single day delay.

The presentation files and paper critics have to be submitted one day before the date scheduled for discussion. (For example, if the discussion is scheduled for March 6th, the presentation slides and paper critics have to be submitted before 11:59PM on March 5th to receive full credit.)

Plagiarism:

There is absolutely NO tolerance for plagiarism. We will follow the IEEE policies on authorship (Section 6.4.1.A) and plagiarism (Section 6.4.1.B.f) to ensure your homework/article meets all criteria for authorship and originality. (As an engineer, you should check out IEEE's code of ethics.) You should also check out **臺灣大學學生個人獎懲辦法** for your own rights.

SCHEDULE:

The schedule is tentative and subjected to change. However, any change will be announced in the class and the announcement section of the course web site.

The lecture slides and handouts will be available on the course web site. Please check out the slides and handouts before the class. The handouts will NOT be distributed in the class.

Week	Date	Topic	Discussion
1	2019-02-21	Syllabus	
2	2019-02-28	Introduction for distributed operating systems Communication for distributed systems and multicore systems	
3	2019-03-07	Distributed Shared Memory	
4	2019-03-14	Distributed Shared Memory	Sample Discussion on distributed systems
5	2019-03-21	Synchronization	Communication
6	2019-03-28	Synchronization	Distributed Shared Memory
7	2019-04-04	(Holiday)	(Holiday)
8	2019-04-11	Distributed Process Management	Synchronization
9	2019-04-18	Distributed File Systems	Synchronization for WSN
10	2019-04-25	Distributed File Systems	Distributed Resource Management
11	2019-05-02	Middleware for IoT/M2M	Distributed Process Management
12	2019-05-09	Embedded operating systems	Google File Systems
13	2019-05-16	Embedded operating systems	Memory-based File Systems
14	2019-05-23	Operating systems for multi-core/processor systems	Middleware for M2M
15	2019-05-30	Operating systems for heterogeneous systems	Embedded OS/ Android
16	2019-06-06	Virtualization for Real-time Systems	OS for Multi-core
17	2019-06-13	Robotic Operating Systems	Real-Time Operating Systems
18	2019-06-20	Final Exam	