Department of Computer Science and Engineering
Faculty of Engineering, University of Moratuwa

CS5202 Advanced Operating Systems
Semester 1, MSc in CS 2015 (Jan-Apr. 2015)

Class Moodle	http://online.mrt.ac.lk/course/view.php?id=2406
Schedule/Hours	Saturday 8:00am - 10:00am at UoM (14 sessions) About 3 hours/week of self-study and Moodle engagements are expected
Instructor(s)	• Ms. Vishaka Nanayakkara, vishaka@cse.mrt.ac.lk • Dr. Dilum Bandara, dilumb@cse.mrt.ac.lk, 011-265-0152
Prerequisite(s)	Students are required to have a background in fundamentals of operating systems, algorithms, and programming. Ability to read and understand research literature.
Text	Operating System Principles (7th/8th Edition) by A Silberschatz, P Galvin, and G Gagne. Other readings: • Operating System Concepts by Silberschatz, Galvin, and Gagne. 6th to 9th edition. • Modern Operating Systems (3rd/4th Edition) by Andrew S. Tanenbaum
Assessment	Distribution of marks is as follows: • Paper Presentation & Discussion 30% • Mid-Semester Exam 15% • Participation (in class & Moodle) 5% • Final Exam (2 hours, closed book) 50%
Course objectives	To provide a broader understanding of advanced Operating System (OS) topics and Recent developments in OS research. At the end of the module, students should be: • aware of the OS functions, issues pertaining to designing of OSs • able to critically evaluate OSs and their components (both widely available as well as research attempts) • able to take decisions regarding the designing and selecting OSs This module is compulsory for all MSc students except for the once targeting the Security Engineering specialization.
Syllabus	The goal for the class is to be deep with an emphasis on key design and algorithmic decisions related to modern operating system architectures. Following is a tentative list of topics that might be covered in the class. We will select material adaptively based on the background, interests, and progress of the students. 1. Operating system structure and extension techniques • Microkernels and. Monolithic Kernels 2. Threads • User-level vs. kernel level 3. Process synchronization and communication • Locks, semaphores, synchronization 4. Memory management • Main memory, Virtual memory 5. File systems design • Local and network file systems

6. Distributed operating systems
7. Real-time systems

Paper Presentation & Discussion

Objective of this assignment is for students to be able to read, understand, and lead a discussion on research literature relevant to the subject.

In groups of 2, students will read, understand, document, and present a set of research literature related to modern operating system design and development. Each presentation will last 30 minutes and 2 students are expected to present a comprehensive and accurate summary of the literature studied. Other students (audience) are also expected to read the research material and prepare 2-4 questions for discussion. Another 30 minutes are allocated to discuss a selected subset of those questions prepared by the audience. The 2 students conducting the presentation are expected to lead this discussion.

Presentation slides need to be submitted to the lecturer for feedback and quality control 1 week earlier and questions need to be submitted 1 day before the class. 50% of the marks are allocated to the presentation, 20% for leading the discussion, 5% for maintaining WiKi, and remaining 25% is allocated to question preparation and contributions to discussions.

Class policies

- Topics to be discussed in each class will be posted on Moodle, along with relevant readings for each topic. You are expected to keep up with the readings as we go, as they will help provide the foundation for the homework, quizzes, and exam. Impromptu quizzes will be based on these assigned readings.
- All students are expected to actively participate in class and Moodle activities. Poor participation and/or poor performance in assigned course work can be grounds for failure in the course.
- Discussing and exchanging ideas through study groups are encouraged, as this usually leads to a better depth of understanding. As part of the discussions, you may share ideas and thoughts, discuss the meaning of homework questions, or possible ways of approaching a solution. However, you must write homework solutions strictly. If one of your solutions is based on a key idea of someone else, you must acknowledge this in your homework, to avoid the perception of cheating. This form of collaboration is not an opportunity to copy answers from others.
- Group assignments are given to encourage team work and discussion/toleration of alternative ideas/views; hence, they need to be done as a group. A penalty will be enforced for doing group assignments individually.
- Plagiarism, copying another person's work, letting another person copy your work, giving or receiving aid during any test or examination is all strictly not allowed. Any student caught in any of these will receive a failing grade regardless of marks earned on other assessed work.
- Proper netiquette should be observed in using the Moodle and other learning tools.
- Each assigned work will have either a deadline for submission or a specific date for performance. For each day delayed beyond a deadline, 10% of marks will be deducted. Not performing (e.g., not doing a presentation) on an assigned date will result in 0 marks unless there is a valid reason and another student/group is arranged as a replacement. Details of submission will be given with each assignment. All assignments must be submitted via the Moodle.
- Mid-semester and final exam are closed book. The final exam will be comprehensive, covering material from the entire course including in classes, presentations, research papers, homework, and online/offline discussions.
- You may not use cell phones, mp3 players, etc., during the class. All laptops, smart phones, and tablets must be closed, unless you use it to take notes or search for additional contents relevant to the ongoing class discussion. The reason is to prevent distractions to other students, and to prevent the temptation to check email, Facebook, etc.