



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

**CS5214 Principles of Operating Systems**

Semester 1, MSc in CS 2016 (Jan – Apr.)

Class Moodle	<a href="http://online.mrt.ac.lk/course/view.php?id=4818">http://online.mrt.ac.lk/course/view.php?id=4818</a>
Schedule/Hours	8:00am - 10:00am or 2:00pm – 4:00pm on Saturdays at UoM (7 sessions) About 3 hours/week of self-study and Moodle engagements are expected
Instructor(s)	Dr. Dilum Bandara, <a href="mailto:dilumb@cse.mrt.ac.lk">dilumb@cse.mrt.ac.lk</a> , 011-265-0152
Prerequisite(s)	Students are required to have a basic background in operating systems, computer architecture, algorithms, and programming.
Text	Operating System Principles (7 <sup>th</sup> /8 <sup>th</sup> Edition) by A Silberschatz, P Galvin, and G Gagne. Other readings: <ul style="list-style-type: none"><li>• Operating System Concepts by Silberschatz, Galvin, and Gagne. 6<sup>th</sup> to 9<sup>th</sup> edition.</li><li>• Modern Operating Systems (3<sup>rd</sup>/4<sup>th</sup> Edition) by Andrew S. Tanenbaum</li></ul>
Assessment	Distribution of marks is as follows: <ul style="list-style-type: none"><li>• Quizzes (5) (best 4) 20%</li><li>• Homework (3) 30%</li><li>• Final Exam (2 hours, closed book) 50%</li></ul>
Course objectives	To provide a broader understanding of fundamentals of Operating Systems (OSs) and recent developments in OS development. At the end of the module, students should be: <ul style="list-style-type: none"><li>• aware of the key OS functions</li><li>• issues pertaining to designing of OSs</li><li>• able to take decisions regarding the designing and selecting OSs</li></ul> <p>This module is compulsory for all MSc students who have not taken a full Operating Systems module earlier or have a relatively lower grade. This is a review class that lead to the Advanced Operating Systems module.</p>
Syllabus	The goal for the class is to be broad 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. <ol style="list-style-type: none"><li>1. Operating systems concepts [2 classes]<ul style="list-style-type: none"><li>• Classes of OSs</li><li>• Interrupt handling</li><li>• Operating system structure – Microkernels vs. Monolithic Kernels</li><li>• System calls</li></ul></li><li>2. Processes and Threads [2 classes]<ul style="list-style-type: none"><li>• Process states</li><li>• Context switching</li><li>• Interprocess communication</li><li>• Threading</li><li>• User-level vs. kernel level threads</li><li>• Process and thread scheduling</li></ul></li></ol>

- Process synchronization and communication
- 3. Memory management [2 classes]
  - Main memory
  - Paging, segmentation, and swapping
  - Virtual memory
  - Page replacement algorithms
- 4. File systems and I/O [1 class]
  - File organization and storage – FAT, NTFS, EXT3
  - Access control
  - Disk scheduling
  - Local and network file systems
  - I/O Subsystem

#### 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/tolerance 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.