

# Operating Systems

2019

Michael O'Boyle: [mob@inf.ed.ac.uk](mailto:mob@inf.ed.ac.uk)

Tom Spink: [tspink@inf.ed.ac.uk](mailto:tspink@inf.ed.ac.uk)

Overview

# How to get the most of the course

- Read ahead and use lectures to ask questions. Take notes
- Do the coursework well. Straightforward - schedule smartly
- **Expect you to know C++**
- Exam questions are a mix of simple conceptual and challenging applied ones
  - *Orthogonal to coursework not replication*
- If you are struggling, ask earlier rather than later
- If you don't understand – ask!

# Course Aims

- Understanding the *concepts* that underlie OS
- Purpose, structure and functions of OS
- Illustration of key OS aspects by example
- 3rd/4th year course
  - Independent working - no labs
  - No dedicated tutorials - use lecture slots occasionally

# Course Outcomes

By the end of the course you should be able to

- Describe, contrast and compare differing structures for OSes
- Understand and analyse theory and implementation of: processes, resource control (concurrency etc.), physical and virtual memory, scheduling, I/O and files

In addition, during the practical exercise and associated self-study, you will:

- Become more familiar with the C/C++ languages, gcc compiler, and Makefiles
- Understand the high-level structure of the kernel both in concept and source code
- Acquire a detailed understanding of three aspects of the kernel

# Course Structure

- Introduction: overview of OS
- Basic OS functions
- Process management: scheduling, concurrency
  - Scheduling: CPU utilization and task scheduling
  - Concurrency: mutual exclusion, synchronization, deadlock, starvation, etc.
- Memory management
  - Physical memory, early paging and segmentation techniques
  - Modern virtual memory concepts and techniques
  - Paging policies
- Storage Management
  - Low level I/O functions, high level I/O functions and filesystems
- Other topics to be determined, e.g virtualisation, security

# Administrative Details

- Tom Spink (IF-1.46, [tspink@inf.ed.ac.uk](mailto:tspink@inf.ed.ac.uk)).
  - Co-lecturer
  - Designed coursework
  - Virtualisation
- TA Siavask Katebzadeh (IF-2.0 [m.r.katebzadeh@ed.ac.uk](mailto:m.r.katebzadeh@ed.ac.uk))
- TA Priyank Falda <[priyank.faldu@ed.ac.uk](mailto:priyank.faldu@ed.ac.uk)>
- TA Martin Kristien Martin <[s133145@sms.ed.ac.uk](mailto:s133145@sms.ed.ac.uk)>
- Out-of-class communication
  - Instructor/TA
  - Course mailing list: [os-students@inf.ed.ac.uk](mailto:os-students@inf.ed.ac.uk)
  - Q&A via Piazza

# Administrative Details

- When and Where: (Semester 2)
  - Mondays and Thursdays, 10:00-10:50
  - Lecture venue: Teviot Lecture Theatre, MEDS, Teviot
- Course descriptor
  - <http://www.drps.ed.ac.uk/18-19/dpt/>
- Course webpage
  - <http://www.inf.ed.ac.uk/teaching/courses/os/>
  - Schedule w/ lecture slides, assignments, TA contact info, past exam papers, examinable material, etc.

# Assessment

- Exam: **70%** and three practical exercises: **30%**
- **3 task practical exercise** (Coursework)
  - Task 1: Process Scheduler
    - Due: 4pm on Thurs, 31st Jan (10 marks)
  - Task 2: Memory Allocator
    - Due 4pm on Thurs 7<sup>th</sup> March (60 marks)
  - Task 3: System interface
    - Due 4pm on Thurs 28<sup>th</sup> March (30 marks)
- **Exam**
  - Past exam papers: <http://www.exampapers.lib.ed.ac.uk.ezproxy.is.ed.ac.uk/Informatics0405.shtml>



# Textbooks

- **Main Textbook:** A. Silberschatz, P. Galvin and G. Gagne, "Operating System Concepts", 9th International student edition, John Wiley, 2013
- Most of the other major OS texts are also suitable.
- You are expected to read/know Silberschatz 9th edition.
- Slides are a supplement not a replacement of book

# Acknowledgment

[Myungjin Lee/ Ed Lazowska](#) (Univ. of Washington) allowed use of teaching slides for this course.