UNIVERSITY OF PORTSMOUTH

Operating Systems and Internetworking

OSI – M30233

Week 1- Module Overview

Dr Tamer Elboghdadly

Module Overview

OSI - Staff Team

- **Lectures:**
  - Dr Tamer Elboghdadly (Operating Systems)

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  - Dr Thanos Paraskelidis (Internetworking)

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OSI - Staff Team

- **Labs:**

Operating Systems (OS)			
	Uchenna Ogenyi	Dongxu Gao	Massoud Forooshani
Internetworking (INT)			
	Ioannis Kagalidis	Carrie Toptan	Massoud Forooshani

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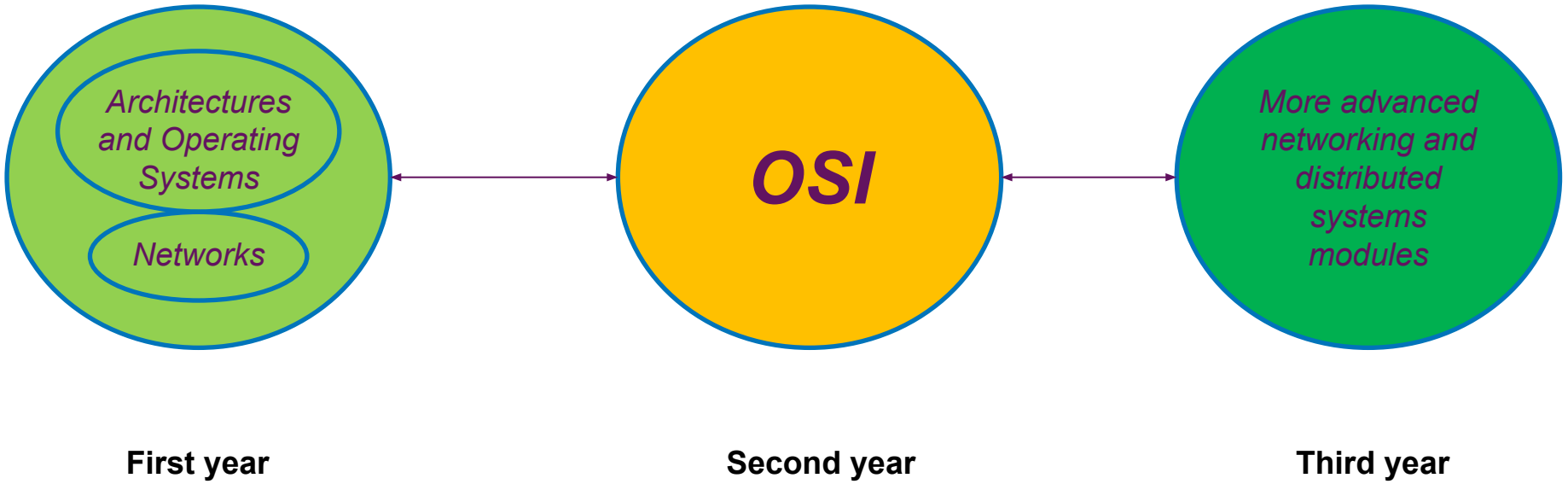
Goals

- This unit sits between first year modules *Architectures and Operating Systems* and *Networks*, and more advanced networking and distributed systems modules in third year.



Goals

- Attempts to provide a deeper view of topics in implementation of Operating Systems including concurrency, memory management and file systems. Also covers topics in organization of modern microprocessors.
- The Internetworking part introduces topics such as IP addressing, routing and routing security.

Organization

- The module is divided into two distinct “themes” – an *Operating Systems* theme, and an *Internetworking* theme.
- The two themes run *concurrently* throughout the teaching block – one lecture and one lab *per theme* every week.
  - To try to avoid confusion, teaching materials on the Moodle site are mostly split into two sections; one section per theme.
- This year, we have 6 groups of students per theme for the laps.
- When teaching finishes in January, both themes will be assessed by a *single CBT exam*.
  - Also quizzes component of assessment – see later.

Summary of the OSI Topics to be covered

Operating System

- Concurrency, including threads, mutual exclusion, semaphores, and deadlock.
- Processes, scheduling, system calls, and Inter-Process Communication
- Memory management, virtual memory, and file systems
- Advanced microprocessor architectures

Internetworking

- Foundations of routing, Network Services, Static vs Dynamic routing
- IP addressing, Subnets and Classless Inter-domain Routing
- Broadly used routing algorithms such as RIP, OSPF and BGP
- Routing and security

Learning Outcomes

- After completing this unit, students should be able to:
  1. Evaluate a multi-tasking and multi-user operating system.
  2. Demonstrate the role of concurrency and communication in modern operating systems and processors.
  3. Analyse the operation of advanced computer architectures and high performance processors.
  4. Identify and evaluate the principles, operations, limitations and security considerations of modern routing protocols.
  5. Evaluate and apply the various approaches of IP addressing along with the related network services.
  6. Develop and interpret simple codes in a system level programming language.

Operating Systems Time Table

- Details may change as we go, but approximately:
  - Weeks 2-4: Concurrency, including threads, mutual exclusion, semaphores, Synchronization and deadlock.
  - Week 5-6: Processes, scheduling, system calls, and Inter-Process Communication
  - Week 7-8: File systems, Memory management and virtual memory
  - Weeks 9-11: Advanced microprocessor architectures
- Check the OS work scheme for more details.

- Per week, we have one hour lecture, plus one hour lab **for each theme**

  (4 hours in total)

Operating Systems Labs

- Labs will often make use of Java to illustrate concepts introduced in the lectures, but should not require extensive Java programming.
  - You *do* need to be able to look at a short program and understand broadly what it is doing.
- Idea is to give live illustrations of concepts of operating systems and concurrency that would, otherwise be completely “theoretical”.
- Some labs will be reserved for quizzes.

Internetworking Time Table

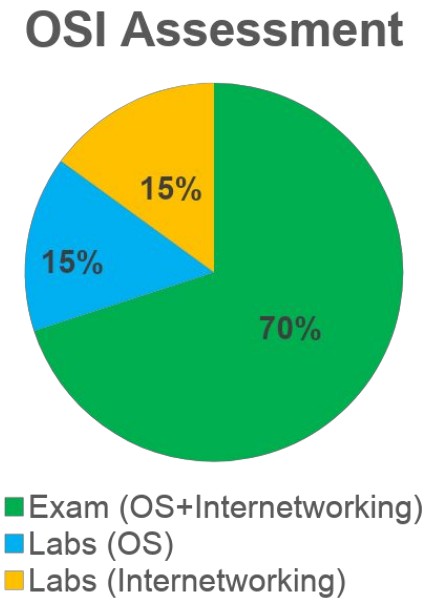
- Sequence might change slightly.
  - Weeks 2-3: Foundations of routing, Network Services, Static vs Dynamic routing
  - Weeks 4-6: IP addressing, Subnets and Classless Inter-domain Routing
  - Weeks 7-9: Broadly used routing algorithms such as RIP, OSPF and BGP
  - Week 10: Routing and security

Internetworking Labs

- Lab activities – a showcase of your understanding:
  - Problem solving exercises on routing and IP addressing
  - Network routing simulations using Cisco Packet Tracer
- Many of the tasks will be assessed and to be part of your logbook coursework
- A full schedule is provided on Moodle showing deadlines

Assessment

- **70% One CBT exam**, covering all learning outcomes.
  - 90 minute CBT – answer all questions.
- **30%** from the lab books, which will be marked in lab sessions
  - Lab books will be assessed by the staff team as we go – This will help you for the quizzes.
  - **3 quizzes for Operating Systems** theme, and **3 quizzes for Internetworking**. **We will consider the best 2 for each theme**. This means that students will have finally 4 quizzes (4*7.5%) **to be recorded**. **Therefore, ECF will not be accepted for any missing quiz.**
  - Formative feedback on lab books throughout term.



Useful Operating Systems Texts

- Tanenbaum, A. S., & Bos, H. (2015). *Modern operating systems*. Pearson.
- Comer, D. (2015). *Operating System Design: The Xinu Approach*. CRC Press.
- Tanenbaum, A. S., & Woodhull, A. S. (2009). *Operating systems : design and implementation* (3rd ed., International ed. / Andrew S. Tanenbaum, Albert S. Woodhull.). Pearson Prentice Hall.
- Patterson, D. A., Hennessy, J. L., Waterman, A. S., Lee, Y., & Alexander, P. (2018). *Computer organization and design : the hardware/software interface*. Morgan Kaufmann Publishers, an imprint of Elsevier.
- Hennessy, J. L., & Patterson, D. A. (2012). *Computer architecture : a quantitative approach* (5th ed. / with contributions by Krste Asanović ... [et al.].). Morgan Kaufmann.

Useful Internetworking Texts

- Comer, D. (2015). *Computer networks and Internets* (Sixth edition.). Pearson.
- Tanenbaum, A. S., & Wetherall, D. (2014). *Computer networks. [electronic resource]* (Fifth edition / Andrew S. Tanenbaum, David J. Wetherall.). Pearson.
- Larry Peterson, *Computer Networks: a system approach*, 5th edition, Morgan Kaufmann, 2012
- Wu, C.-H. (2013). *Introduction to computer networks and cybersecurity*. CRC Press/Taylor & Francis Group.

Learning Materials - Location

- All materials needed can be found on the Moodle
- The Moodle includes:
  - lecture presentation slides and lab sheets.
  - Useful links to other resources (Tutorials, Examples, Videos).
  - Announcement and Discussion forums.
    - Feel free to use the weekly discussion forums to ask a questions or post useful resources.

Attendance

- Attendance is very important to get benefit from this module.
- Attendance will be **recorded** for each session (Lectures & Labs)

Lectures and labs are completing each other.

It is crucial to attend both of them.

If you need more external support

- You can contact the Academic Tutor's .
- This service is for students in the Faculty of Technology only.

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Questions?