

The Hebrew University of Jerusalem

Syllabus

OPERATING SYSTEMS - 67808

Last update 12-04-2020

HU Credits: 4

Degree/Cycle: 1st degree (Bachelor)

Responsible Department: Computer Sciences

<u>Academic year:</u> 0

Semester: 2nd Semester

<u>Teaching Languages:</u> Hebrew

<u>Campus:</u> E. Safra

<u>Course/Module Coordinator:</u> Prof. David Hay

Coordinator Email: David.Hay@mail.huji.ac.il

Coordinator Office Hours: Coordinate in advance

Teaching Staff:

Prof David Hay, Mr. Idan Refaeli, Mr. ron.abutbul@mai ron.abutbul@mail.huj, Mr. Ihab, Dr. Rosenshif Neta, Mr.

Course/Module description:

The course provides a detailed overview of what operating systems do and how they work: their role, hardware support, performance as a function of the workload, processes and process scheduling, process interactions, address space, memory management and paging, file abstraction, inter-process communication, and distributed systems.

Course/Module aims:

Expose students to the fundamentals principles in Operating Systems, the challenges and the techniques used to achieve the desired performance.

Learning outcomes - On successful completion of this module, students should be able to:

Better understand how operating systems work and why they operate the way they do. Gain practical experience in tackling some key challenges in operating systems' design and functionality.

<u>Attendance requirements(%):</u>

0

Teaching arrangement and method of instruction: Frontal lectures followed by indepth study in smaller groups and by practical exercises in solving some key issues in OS.

<u>Course/Module Content:</u> Syllabus:

1. Introduction -- The role of an operating system -- Hardware support for the operating system

2. Performance evaluation -- The effect of workloads on operating systems performance -- basic notions in queuing analysis

3. Processes -- The process abstraction -- Threads -- Multiprogramming -- Process and thread scheduling

4. Concurrency -- Mutual exclusion -- Semaphores and locks -- Deadlock prevention and avoidance

5. Memory management -- Virtual memory and address mapping -- Segmentation and contiguous allocation -- Demand paging -- Page replacement algorithms --Caching

6. File systems -- The file abstraction -- File naming and directories -- Access permissions and protection -- Data access -- File layout on disk

7. Communication -- Interfaces for inter-process communication -- Distributed system structures and client-server systems -- Communication protocols -- Basic notions of TCP/IP -- Distributed systems services

8. Advanced topics in OS (such as virtualization, multicore, cloud) if time permits

<u>Required Reading:</u> NA

Additional Reading Material:

- 1. Stallings / Operating systems
- 2. Silberschatz, Galvin, and Gagne / Operating Systems Concepts
- 3. Tanenbaum / Modern Operating Systems
- 4. Bach / The Design of the UNIX Operating System
- 5. Feitelson / Operating Systems Notes (class notes)

<u>Course/Module evaluation:</u> End of year written/oral examination 65 % Presentation 0 % Participation in Tutorials 0 % Project work 0 % Assignments 35 % Reports 0 % Research project 0 % Quizzes 0 % Other 0 %

<u>Additional information:</u>

There will be a bonus on attending Zoom meetings.

In addition, there might be changes of the course grade policy due to COVID-19. Please refer to the course guidelines in the website for exact details.