Operating Systems

83-301

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Course format: Lectures and Training

First Semester 2016/17 **Weekly hours**: 2 lecture + 1 training

1) **Course objectives**:

An operating system is a set of subsystems/programs that manage a computer system composed of hardware and software resources, providing common services/utilities needed to run system and user applications. All computers and computing devices need some kind of operating system in order to run/service their applications. This course provides students of computer science with the principles and knowledge they need to analyze and design operating systems and program applications.

2) **Course format**:

Frontal lectures – in the classroom.
Frontal training – in the classroom.

3) **Course content**:

- **Motivation for Operating Systems**
- **Introduction**
    - What's an Operating System
    - Computer/Operating System Overview
    - Evolution of Operating Systems
    - Functional/Protection Aspects
    - Operating System Structures

- **Concurrent Processes**
    - Process Models and Management
    - Process Description and Control
    - Task/Thread Description and Control
    - Concurrency: Mutual Exclusion and Synchronization
    - Concurrency: Deadlock and Starvation

- **Memory Management**
    - Real Memory Management

- o Motivation for Virtual Memory (VM)
- o Paging and Segmentation
- o Page Fetch, Placement and Replacement

- **Uniprocessor Scheduling**
  - o Levels of CPU Scheduling
  - o Process Scheduling

- **External Storage Management**
  - o File Systems/Management
  - o Directories
  - o File Allocation
  - o Disk Scheduling

4) **Prerequisites:**

   As defined in the university catalog

5) **Course requirements:**

   4-5 homework projects.

6) **Grading:**

   Final exam: 80% ; Homework exercises: 20% ; Pass grade in the final exam is mandatory.

7) **Textbooks and supplementary reading:**

   A. S. Tanenbaum and H. Bos, Modern Operating Systems, 4th Edition, Pearson, 2015.