IUCA-OS, Operating Systems

International University of Central Asia
Department of Information Technologies

1 Course Information

Course ID
IUCA-OS

Course Repository
`https://github.com/iucau/iuca-os`

Class Discussions
`https://piazza.com/iuca.kg/spring2019/iuca-os`

Place
IUCA, Room 108

Time
Tuesday, 12:55–14:15
Thursday, 12:55–14:15

2 Prerequisites

Object-oriented Programming

3 Contact Information

Instructor
Toksaitov Dmitrii Alexandrovich
toksaitov_d@iuca.kg

Office Hours
Remotely through Skype at toksaitov@hotmail.com

4 Course Overview

This course introduces students to the fundamentals of operating systems design and implementation. Topics include an overview of the components of an operating system, synchronization, implementation of processes, scheduling algorithms, memory

management and file systems. This course is designed for Information Technology majors.

5 Topics Covered

Processes

Week 1: Introduction, History, OS Concepts Overview
Week 2: System Calls
Week 3: Scheduling
Week 4: Interprocess Communication

Memory Management

Week 5: Segmentation
Week 5–7: Virtual Memory Management
Week 8: Page Replacement Algorithms
Week 9: Swapping

File Systems

Week 10–11: File System Implementation
Week 11: Protection Mechanisms

Input & Output

Week 12: Principles of I/O Hardware & Software
Week 13: Deadlocks
Week 14–16: RAM Disks, Disks, Terminals

6 Practice Tasks, Labs & Quizzes

Students are required to finish 4 practice tasks during the course. These tasks are based on topics discussed during lectures. Students will have to finish 10 lab tasks. Students will also get four quizzes throughout the course on topics discussed during classes.

7 Course Project

The course project is to develop a limited simulation of an OS kernel on top of a virtual computer system. For educational and experimental purposes different approaches should be used and each solution should be analyzed and compared with others.

8 Reading

1. Operating Systems Design and Implementation, Third Edition by Andrew S. Tanenbaum (ISBN: 978-0131429383)

2. Modern Operating Systems, 4th Edition by Andrew S. Tanenbaum (ISBN: 978-0133591620)

8.1 Supplemental Reading

1. Understanding the Linux kernel, Third Edition by Daniel P. Bovet and Marco Cesati (ISBN: 978-0596005658)
2. Linux Kernel Development, 3rd Edition by Robert Love (ISBN: 978-0672329463)
3. Windows Internals, Part 1 (6th Edition) by Mark E. Russinovich and David A. Solomon (ISBN: 978-0735648739)
4. Windows Internals, Part 2 (6th Edition) by Mark E. Russinovich and David A. Solomon (ISBN: 978-0735665873)
5. Mac OS X and iOS internals : to the apple's core by Jonathan Levin (ISBN: 978-1118057650)
6. Mac OS X Internals: A Systems Approach by Amit Singh (ISBN: 978-0321278548)

9 Grading

- Practice tasks (40%)
- Quizzes (15%)
- Course project (40%)
- Piazza Participation (5%)

– 94%–100%: A
– 90%–93%: A-
– 87%–89%: B+
– 84%–86%: B
– 80%–83%: B-
– 77%–79%: C+
– 74%–76%: C
– 70%–73%: C-
– 67%–69%: D+
– 64%–66%: D
– 60%–63%: D-
– Less than 60%: F

10 Rules

Students are required to follow the rules of conduct of the Department of Information Technology and International University of Central Asia.

Team work is NOT encouraged. Equal blocks of code or similar structural pieces in separate works will be considered as academic dishonesty and all parties will get zero for the task.