

COM 341, Operating Systems

American University of Central Asia
Software Engineering Department

1 Course Information

Course ID

COM 341, 3325

Course Repository

<https://github.com/auca/com.341>

Place

AUCA, room 433, laboratory G30

Time

Monday 9:25, 12:45

Wednesday 10:50

2 Prerequisites

COM 119, Object-oriented Programming (Programming II)

3 Contact Information

Instructor

Toksaitov Dmitrii Alexandrovich
toksaitov_d@auca.kg

Office

AUCA, room 315

Office Hours

Monday 12:10–12:45

Wednesday 12:10–12:45

Friday 12:10–12:45

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 Software Engineering majors and minors.

5 Topics Covered

Processes

- Scheduling
- Interprocess Communication

Memory Management

- Segmentation
- Virtual Memory Management
- Page Replacement Algorithms
- Swapping

File Systems

- File System Implementation
- Protection Mechanisms

Input & Output

- Principles of I/O Hardware & Software
- Deadlocks
- RAM Disks
- Disks
- Terminals

6 Practice Tasks, Labs & Quizzes

Students are required to finish 3 practice tasks during the course. These tasks are based on topics discussed during lectures.

- Students will have to finish 10 lab tasks

- Students will 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 (AUCA Library Call Number: QA76.76.O63 T35 2006, 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 (AUCA Library Call Number: QA76.76.O63 B683 2006, 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 (AUCA Library Call Number: QA76.76.W56 R885 2012, ISBN: 978-0735648739)
4. Windows Internals, Part 2 (6th Edition) by Mark E. Russinovich and David A. Solomon (AUCA Library Call Number: QA76.76.W56 R885 2012, ISBN: 978-0735665873)
5. Mac OS X and iOS internals : to the apple's core by Jonathan Levin (AUCA Library Call Number: QA76.774.M33 L48 2013, ISBN: 978-1118057650)
6. Mac OS X Internals: A Systems Approach by Amit Singh (AUCA Library Call Number: QA76.76.O63 S564 2007, ISBN: 978-0321278548)

9 Grading

- Practice tasks (40%)
- Quizzes (15%)
- Course project (40%)
- Piazza Participation (5%)
 - 90%–100%: A
 - 80%–89%: A-
 - 70%–79%: B+
 - 65%–69%: B
 - 60%–64%: B-
 - 56%–59%: C+

- 53%–55%: C
- 50%–52%: C-
- 46%–49%: D+
- 43%–45%: D
- 40%–42%: D-
- Less than 39%: F

10 Rules

Students are required to follow the rules of conduct of the Software Engineering Department and American 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.