

Operating Systems Concepts

Course Syllabus

Ver. 18.11.2019

Instructor: Assoc. Prof. Yuriy Shamshin

ISMA University
Riga, Latvia

2019

Contact Information

Instructor: Assoc. Prof. Yuriy Shamshin

Email: ys@academy.lv

Course hours: 4h x 6 = 24h

Website: <http://sys.academy.lv>

Download the lecture slides (LS),
lab works assignments (LW),
practice works assignments (PW),
quizzes (QZ), tests, exam questions,
books, applications, links, etc.

Refer to the website frequently

Objectives

The objectives of this course are to introduce the fundamental concepts, structure and components of modern operating systems (UNIX, Linux, MacOS, Windows, Android), to give your competency as a beginning user of Unix/Linux. You will leave from this course with the ability to use Unix/Linux to perform routine file management, file editing, command piping and filtering, file permissions, and customizations, scripting. You will also know how to access Unix/Linux reference information and help material online so that you can gain more Unix/Linux knowledge when you require it.

Prerequisites and Required Skills

The course does not assume prior knowledge of operating systems.

However, the course will move relatively fast.

Expected Skills:

The course is not suited for students without basic calculus skills.

The grading policy

Coursework:	Approximate, %
Class Participation	(10%)
Practice Assignments with Reports PW2=10%	(10%)
Lab Works Assignments with Reports LW1=10%, LW2=5%, LW3=5%, LW4=10%, LW5=10%, LW6=10%, LW7=10%	(60%)
Final Exam Test=10%, Task=10%	(20%)

Reading Books

BK-01EN. Operating System Concepts, 9th.ed. 2012, A. Silberschatz, P. Galvin, G. Gagne.
(http://sys.academy.lv/library/BK-01EN_Silberschatz-OSC_9ed.pdf)

Optional Books

BK-02EN. Modern Operating Systems, 4th.ed. 2015, A. Tanenbaum, H. Bos.
(http://sys.academy.lv/library/BK-02EN_Tanenbaum-MOS_4ed.pdf)

BK-03ENa. Windows Internals. Part I, 7th.ed. 2017, M. Russinovich, D. Solomon, A. Ionescu.
(http://sys.academy.lv/library/BK-03ENa_Russinovich-WIN-I_7ed.pdf)

BK-03ENb. Windows Internals. Part II, 6th.ed. 2015, M. Russinovich, D. Solomon, A. Ionescu.
(http://sys.academy.lv/library/BK-03ENb_Russinovich-WIN-II_6ed.pdf)

Lecture, Lab Schedule and Readings

Chapter	Slides	Topics	Reading	Labs, Practices, Quizzes (* mandatory)
1. OS Overview	LS-00 LS-01 LS-02	Introduction. Operating Systems Evolution. Types. OS Concepts. Architectures.	BK-01, Ch.01 BK-01, Ch.02	*LW-01. Computing Basis's.
2. Storage Management	LS-03 LS-04	OS Booting. Mass-Storage Structure. File System Interface.	BK-01, Ch.10 BK-01, Ch.11	*LW-02. Download & Install Virtual Machines for Oracle VirtualBox. *LW-03. Using ssh for remote Linux/UNIX/Mac server management.
	LS-05 LS-06	File System Implementation. File Systems Examples.	BK-01, Ch.11 BK-01, Ch.12	*LW-04. Linux/UNIX Command Line Basic. *LW-05. Linux/UNIX Shell Environment Variables.
3. Protection & Security Management	LS-07a LS-07b LS-08	OS Protection Models. Managing User Accounts on Linux. OS Permissions. SUID/SGID/Sticky. Extended Attributes.	BK-01, Ch.14 BK-01, Ch.15	*LW-06. Linux Shell. Files Globbing & Streams Redirection. *PW-02. Linux Permissions. SUID/SGID/Sticky Bits.
4. Memory Management	LS-09	Main Memory. Virtual Memory.	BK-01, Ch.08 BK-01, Ch.09	*LW-07. Regex. Filters.
5. Process Management	LS-10	Processes & Threads. OS Examples. CPU Scheduling.	BK-01, Ch.03 BK-01, Ch.06	
6. I/Os Management	LS-11	I/Os Devices.	BK-01, Ch.13	
7. Distributed Systems	LS-12	Distributed File Systems.	BK-01, Ch.17	
	All bell.	Exam		All below assignments Reports.

Lab Information

What you need to do for a Lab?

Before a lab session:

- Read book chapter and do related reading.
- Make related Practice work (if have).
- Answer the questions to the prelab (if have).

During a lab session:

- Select your variant.
- Complete exercises of the assigned lab (1 hour to several hours, Average: 3 hours).
- Perform experiments. Save data to drive.

After a lab session:

- Write lab report, using saved data on drive.
- You may only use data that you collected in the lab session for your lab report.
- Submit lab report by the posted due date.

What to submit with your lab report?

- Lab reports must be e-mailed. File Formats: Submit lab reports as a PDF, DOC or XLS file.
- Each submitted lab report must have a cover page, indicating the lab name and student name.
- Truncate long output, insert relevant supporting output into the place where you answer the lab questions. Only include data that supports your answers.
- Please organize your lab report according to the lab exercise part number. Avoid using your own numbering system.

Grading of Lab reports

- Every Completeness and Correctness Report: 5% of Total grade
- Late Penalty -10% of the Lab grade per day.

Your Practice Skill after Course

1. Introduction to Linux Philosophy
2. Positional Number Systems & Binary Operations Understanding
3. Getting Access to a Remote Linux System
4. Installing VirtualBox on Windows and Mac
5. Installing Linux/Windows Using an Image for VirtualBox
6. Learn Linux Directory Structure
7. Basic Shell and Linux Commands
8. Linux Package Management
9. Working with Directories, Listing Files and Understanding 'ls -l' Output
10. OS File and Directory Permissions Understanding
11. Finding Files and Directories, Wildcards
12. View/Edit Files Using vi, nano Editors
13. Understanding Basic & Extended Regular Expressions
14. Working with Filters
15. User and Group Management
16. File and Directory Extended Attributes Understanding
17. Managing Processes and Jobs
18. At and Cron Scheduling
19. Shell Scripting to Automate Tasks
20. Basic exam preparation for:
 - RedHat Certified System Administrator / Engineer (RHCSA/RHCE),
 - Linux Foundation Certified System Administrator / Engineer (LFCS/LFCE),
 - Linux Professional Institut Certified Linux Administrator / Engineer / Enterprise (LPIC-1/LPIC-2/LPIC-3)