Study program : Informatics

Type and level of studies : Undergraduate academic studies

Course unit : Operating Systems 2

Teacher in charge : Miloš Ivanović

Language of instruction: English

ECTS: 7

Prerequisites: basics of programming (any course), basics of computer architecture

Semester : Winter Semester

Course unit objective

- To understand the services provided by and the design of an operating system.
- To understand basics of I/O within the modern operating systems.
- To understand the structure and organization of the file system.
- To understand how processes are synchronized and scheduled in uniprocessor and multiprocessor systems.
- To understand different approaches to real time scheduling.
- To understand basic mechanisms of synchronization in distributed systems.
- Students should be able to employ High Performance Computing resources in order to solve complex problems.
- Students should understand and implement map/reduce paradigm for big data processing.
- Students should learn how to use OS protection mechanisms in order to protect user data.

Learning outcomes of Course unit

Following topics from the field of the Operating Systems will be covered:

- I/O management, disk scheduling
- File systems
- Uniprocessor scheduling
- Multiprocessor scheduling
- Real-time scheduling
- Distributed systems, client-server systems, clusters
- Grid computing, Cloud computing
- Security and Privacy

Course unit contents

Theoretical classes

I/O management; Buffers; Disk scheduling; History of Linux disk schedulers; File systems; Uniprocessor scheduling methods; Multiprocessor scheduling; Fair-share algorithhm; Real-time systems; Rate-monothonic scheduler; Distributed systems; Distributed queues; Lamport's algorithm; Distributed mutual exclusion; Client-server systems, HPC clusters; Grid computing; Cloud computing; Security and Privacy of Computer Systems;

Practical classes

Concurrent programming using *pthread* library; Distributed data processing on HPC clusters; Map/reduce methodology using Apache Hadoop.

Literature

- W. Stallings, *Operating Systems: Internals and Design Principles*, Fifth Edition, Pearson Education Inc, 2005.

Number of active teaching hours				**Other classes**
Lectures:	Practice:	Other forms of classes:	Independent work:	
3	2	1		

Teaching methods Classical, case study, individual research			
Examination methods (maximum 100 points)			
Exam prerequisites	**No. of points:**	**Final exam**	**No. of points:**
Student's activity during lectures	**4**	oral examination	**30**
practical classes/tests	**36**	written examination	/
Seminars/homework	**30**		
Project	**/**		
Other			

Grading system		
Grade	**No. of points**	**Description**
10	**91-100**	Excellent
9	**81-90**	Exceptionally good
8	**71-80**	Very good
7	**61-70**	Good
6	**51-60**	Passing
5	**0-50**	Failing