POZNAN UNIVERSITY OF TECHNOLOGY

EUROPEAN CREDIT TRANSFER AND ACCUMULATION SYSTEM (ECTS)

pl. M. Skłodowskiej-Curie 5, 60-965 Poznań

COURSE DESCRIPTION CARD - SYLLABUS

Course name
Computer systems management

Course

Field of study	Year/Semester
Computing	1/1
Area of study (specialization)	Profile of study
Distributed and cloud systems	general academic
Level of study	Course offered in
Second-cycle studies	Polish
Form of study	Requirements
full-time	elective

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
15	30	
Tutorials	Projects/seminars	

Number of credit points
3

Lecturers

Responsible for the course/lecturer:

dr inż. Cezary Sobaniec

Responsible for the course/lecturer:

Prerequisites
Student starting this module should have a basic knowledge in the field of: operating systems, computer networks, distributed computing, security of information systems, and database systems. The student should be able to obtain information from indicated sources, and be able to cooperate in groups.

Course objective
1. Provide students with basic knowledge of the functioning of services in distributed systems (directory services, distributed file systems, cluster systems) and system management mechanisms (software management, backup and recovery).
2. Developing students' skills in solving problems related to the implementation, configuration and diagnostics of service software in distributed systems.
3. Shaping students' team work skills.

Course-related learning outcomes
Knowledge
1. Has knowledge of the issues of local computer systems management in the field of: software management, local file systems operations (including volume managers, snapshots, extended

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attributes).

2. Has detailed knowledge of the issues of backup and recovery of information systems.

3. Has detailed knowledge of the functioning of directory services on the example of the LDAP directory service and a Windows domain controller.

4. Has detailed knowledge of distributed file systems, including NFS, SMB/CIFS file systems.

Skills

1. Can set up system services (installation, configuration, tuning).

2. Can perform monitoring and diagnostics of system services.

3. Can carry out simple experiments to verify the performance of services.

Social competences

1. Understands that in the field of IT the knowledge and skills quickly become obsolete.

2. Is able to cooperate in a group.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The course is assessed through a written test consisting of 5 problem-related questions. For each question one can get 12 points, a positive assessment requires at least 30 points.

Programme content

The lecture program includes the following topics:

1. Software management: system directory structure, software packages, package granularity, dependencies, shared libraries, RPM and DEB packages, the process of creating, installing and updating packages, package repositories, OpenPKG system.

2. LDAP directory service: applications, data schemas, structure, partitioning, tree searching, protocol operations, OpenLDAP server, replication mechanisms, access control, API, Microsoft Active Directory.

3. Backup and recovery: inventory, backup levels, incremental backup, backup schemes, data carriers, RAID systems, file systems, versioning, deduplication, Rsync protocol, BackupPC, Amanda, continuous data protection systems.

4. Distributed file systems: file and directory services, access models, transparency levels, interface, sharing semantics, statelessness, cache, replication, systems: NFS, AFS, Coda, Google FS, OCFS, GFS.

The program of laboratory classes includes the following topics:

1. Software management: RPM, external repositories, creating RPM packages, BSD ports, OpenPKG.

2. NFS: automounter, access authorization, caching, fault tolerance, NFSv4.

3. Samba: Unix and Windows systems integration, distributed file system, domain controller, Winbind server, home directories, password synchronization.

4. LDAP: data input and retrieval, access rights, integration with the operating system, security, replication.

5. Backup and recovery: tools: rsync, unison, tar, star, dd, xar, xdelta, rsnapshot, rdiff-backup, data compression tools, BackupPC.

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6. File systems: loop interface, NTFS, SquashFS, extended attributes (xattr), dynamic resizing, in-memory file systems, UnionFS, Logical Volume Manager, Btrfs, snapshots, quota, snapper.

Teaching methods

1. Lecture: multimedia presentation, illustrated with examples given on the board, discussion.
2. Laboratory: exercises carried out individually or in teams of 2-4 people depending on the nature of the exercise. The aim of the exercises is to set up, configure and test the presented mechanisms and services.

Bibliography

Basic

1. System documentation for file systems and services.

Additional

1. RFC documents describing standards of particular services and protocols.

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	45	2,0
Student's own work (literature studies, preparation for laboratory classes, preparation for the final test) [1]	30	1,0

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[1] delete or add other activities as appropriate