STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Data storage systems		**1010331571010334632**
Field of study: **Information Engineering**	Profile of study (general academic, practical): **(brak)**	Year /Semester: **4 / 7**
Elective path/specialty: **Security of Information Technology (IT)**	Subject offered in: **Polish**	Course (compulsory, elective): **obligatory**
Cycle of study: **First-cycle studies**	Form of study (full-time,part-time): **full-time**	
No. of hours: Lecture: **30** Classes: **-** Laboratory: **-** Project/seminars: **-**		No. of credits: **3**
Status of the course in the study program (Basic, major, other): **(brak)**	(university-wide, from another field): **(brak)**	
Education areas and fields of science and art: **technical sciences**		ECTS distribution (number and %): **3 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	K_W02: Student has basic knowledge of physics, especially in such fields as mechanics, thermodynamics, optics, electricity, magnetism, nuclear physics, solid-state physics, including knowledge essential to understand physical phenomena in electronic circuits. K_W06: Student has organized knowledge with theoretical foundations of computer system architecture and operating systems.
2	**Skills**	K_U11: Student is able to do critical analysis of computer hardware operations, operating system and computer networks. K_U16: Student is able to prepare requirements, to create object model and to evaluate uncomplicated IT system, including system functions and relations between system elements.
3	**Social competencies**	K_K02: Student understands and is aware of the importance of nontechnical issues related to computer engineer activity. Student understands the responsibility associated to his engineering decisions.

Assumptions and objectives of the course:

The main course objective is to provide knowledge on models, structure and function of data storage devices and systems. Students should obtain practice in data storage system design.

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. Student has organized knowledge with theoretical foundations of computer system architecture and operating systems. - [K_W06]
2. Student has organized knowledge with theoretical foundations of computer networks. - [K_W07]
3. Student is familiarized with state of the art and current trends in computer science. - [K_W19]

Skills:

1. Student is able to do critical analysis of computer hardware operations, operating system and computer networks. - [K_U11]
2. Student is able to evaluate tools and methods usefulness for simple engineering tasks related to computer science. Student is able to choose and to implement proper technologies. - [K_U22]

Social competencies:

1. Student understands the importance of stringent accomplishment of a given project with proper notation standards, proper language. Student understands the importance of keeping deadlines. - [K_K07]

Assessment methods of study outcomes

Lecture: test.

Project assesment.

Course description

Lecture

Peripheral devices modes of access. Storage systems models (DAS, NAS, SAN, HSM). Interfaces and communication buses (ATA, SCSI, FC, Infiniband). Network systems for data storage (iSCSI, FCIP, IFCP). Storage system security.

Course update 2017: IP storage, cloud storage.

Teaching methods;

- lecture with multimedia presentation,
- additional topics available in Moodle course.

Project

Network storage system design with communication protocols, network devices, media and storage systems.

Basic bibliography:

1. Schmidt F., SCSI i IDE.
2. Jon William Toigo, The Holy Grail of Network Storage Management,
3. Nelson S., Pro Data Backup and Recovery, 2011

Additional bibliography:

1. T. Bilski, Network Storage Systems with IPSec Implementations, Information Systems Architecture and Technology ? Networks Design and Analysis, Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław, 2012, 127?136
2. T. Bilski, Quantitative Risk Analysis for Data Storage Systems, 20th International Conference, CN 2013 Proceedings, [A. Kwiecień, P. Gaj, P. Stera, Editors] Communications in Computer Science and Information Science 370, Springer Verlag, Heidelberg, 2013, s. 124-135.

Result of average student's workload

Activity	Time (working hours)
1. Lectures	15
2. Project	15
3. Preparation for test	15
4. Theoretical preparation for project classes	5
5. Practical preparation for project classes	5
6. Project assessment	15
7. Consultations	5

Student’s workload

Source of workload	hours	ECTS
Total workload	75	3
Contact hours	35	1
Practical activities	35	1