SUBJECT (MODULE) DESCRIPTION

Subject (module) name	Code
Computer architecture	

Lecturer	Unit
Coordinating: jr. assist. Konstantinas Korovkinas	Kaunas faculty Institute of Social Sciences and Applied Informatics

Study stage	Subject (module) level	Subject (module) type
First	1/1	Mandatory

Form of implementation	Implementation period	Implementation language
Auditorium	1 semester	English

Requirements for the student	
Prerequisites: No	**Adjacent requirements:**

Subject (module) volume in credits	Full student workload	Contact Hours	Independent working hours
5	130	52	78

Subject (module) goal: study program competences to be developed		
Subject goal – develop the ability to understand, describe and explain the modern computer elements, their architecture and principles of operation, providing theoretical and practical knowledge of the basic processes on the computer, also their implementation devices and their characteristics.		
Subject (module) learning outcomes	**Study methods**	**Assessment methods**
Will be able to understand the fundamentals of computer architecture and their functioning principles also will be able to explain their application in practical work.	Lectures, practical tasks, reports	Theoretical settlement (with open-ended and closed-ended questions), reports
Will be able to describe and explain the structure and operating principles of the main computer devices (processor, memory, input and output devices). Will be able to understand the performance of computer systems.	Lectures, practical tasks, reports	Theoretical settlement (with open-ended and closed-ended questions), reports
Will be able to perform various mathematical operations in different computing systems, as well as apply logical elements and operations with them, studying computer arithmetic	Lectures, practical tasks, reports	Theoretical settlement (with open-ended and closed-ended questions), practical tasks
Will be able to understand and apply the principles of textual, graphic, audio and visual information coding.	Lectures, practical tasks, reports	Theoretical settlement (with open-ended and closed-ended questions), practical tasks
Will be able to understand the structure of operating systems and the basic principles of operation, will be able to describe and explain the operating systems used process, memory, input-output, file system management functions and algorithms implementing them. Be able to understand and apply the operating principles of MS Windows, UNIX and Apple OS X operating	Lectures, practical tasks, reports	Theoretical settlement (with open-ended and closed-ended questions), reports

systems.		
Will be able to understand the principles of operation of computer networks. Will be familiar with Cloud computing solution architecture.	Lectures, practical tasks, reports	Theoretical settlement (with open-ended and closed-ended questions), reports
Will be able to explain the architecture and operating principles of distributed systems.	Lectures, practical tasks, reports	Theoretical settlement (with open-ended and closed-ended questions), reports
Will be able to understand the basics of systems virtualization technology and essential principles of operation.	Lectures, practical tasks, reports	Theoretical settlement (with open-ended and closed-ended questions), reports

Topics	**Contact Hours**							**Independent working hours**	
	Lectures	Consultations	Seminars	Exercise	Exam	Practice	**Full Contact Hours**	**Independent work**	**Tasks**
1. Basic Computer Architecture Concepts. Development of the computer. Computer Generation and Classification.	1		2				**3**	**6**	Literature analysis, problem teaching
2. Computing systems. Mathematical operations in various computing systems. Logic Elements and Operations. Logic Schemes.	2		4				**6**	**6**	Literature analysis, problem teaching, practical tasks
3. Information encoding (text, graphic, audio, video information). Representing integer also real numbers and symbols on a computer.	2		2				**4**	**6**	Literature analysis, problem teaching, practical tasks
4. Processor structure and operating principles.	1		4				**5**	**6**	Literature analysis, problem teaching
5. Computer memory system. Memory devices and their characteristics.	1		4				**5**	**6**	Literature analysis, problem teaching, practical tasks, software features
6. Computer input and output systems.	1		2				**3**	**6**	Literature analysis, problem teaching
7. Data processing equipment and trunks. Computer Performance Metrics.	1		2				**3**	**6**	Literature analysis, problem teaching, practical tasks
8. System and application software. Basic operating system structure, operation principles, control functions and algorithms implementing them. MS Windows, UNIX and Apple OS X operating systems.	2		2				**4**	**6**	Literature analysis, problem teaching, practical tasks, software features
9. Computer networks. Data transmission channels. Cloud computing.	2		4				**6**	**6**	Problem teaching, practical tasks, software features
10. High-performance computers, their architecture and application.	1		2				**3**	**6**	Problem teaching, practical tasks, software features
11. Distributed system architecture.	1		2				**3**	**6**	Problem teaching, practical tasks, software features

12. System virtualization.	1		2				**3**	**6**	Problem teaching, practical tasks, software features
Exam		4					**4**	**6**	
Totak	**16**	**4**	**32**				**52**	**78**	

Estimation strategy	**Weig ht %.**	**When**	**Estimation criterioni**
Practical tasks (U)	10%	Appointed time	Practical tasks are performed in the auditorium according to the instructions given by the teacher. Each work is ranked on a ten-point scale. At the end of the semester the average of evaluations is calculated.
Self-report on selected topic (P)	20%	Appointed time	Each student presents a report on a selected topic (offered by a teacher or selected by himself).
Colloquium (K)	25%	During the semester	The colloquium consists of questions of open and closed type of varying complexity from theoretical course material to the colloquium date.
Exam(E)	40%	During exam session	The exam consists of open-ended and closed-ended questions of varying complexity from the entire theoretical course material.

Ten-point proportional knowledge assessment system is used. Exam is passed if mark is ≥ 5, in case of mark is <5 – not passed, the student is allowed to retake.

Final mark formula of the study subject (GV):

$$GV = 0{,}05*L+0{,}10*U + 0{,}20*P + 0{,}25* K + 0{,}4*E, \text{ where}$$

K – Colloquium mark,

E – exam mark,

P – mark of self-report,

L – attendance,

U – mark of practical tasks,

U = (U1+U2+U3+…+Un)/n – average of marks of practical tasks.

Author	**Year of public ation**	**Title**	**Periodical No. or volume of publication**	**Place of publication and publisher or internet address**
Privalomoji literatūra				
1. Stallings, W.	2015	Computer Organization and Architecture (10th Edition)		Pearson.
2. Stallings, W.	2010	Computer Organization and Architecture: Designing for Performance		Boston: Pearson.
Papildoma literatūra				
1. Winkler, J. R.	2011	Securing the Cloud: Cloud Computer Security Techniques and Tactics		Amsterdam: Elsevier.
2. Tarnoff, D. L.	2007	Computer Organization and Design Fundamentals		Interactive: http://faculty.etsu.edu/tarnoff/ntes2150.html
3. Skyrius, R.,	2008	Informacijos ir komunikacijos		Vilnius: Vilniaus universiteto

Mikalauskienė, A., Zalieckaitė, L		technologijos		leidykla.
4. Urbanavičius, V.	2007	Kompiuteriai ir jų architektūra		Vilnius: „Technika“.
5. Janickienė, D.	2005	Informatika		Kaunas: Vytauto Didžiojo universiteto leidykla.
6. Englander, Irv.	2000	The Architecture of Computer Hardware and Systems Software: An Information Technology Approach		New York: Wiley
7. Portnoy, M.	2012	Virtualization Essentials		Indianapolis: J. Wiley & Sons.