Institution: Šiauliai State College
Study programme: Information Systems Technology

DESCRIPTION OF THE STUDY SUBJECT

Title

ENGINEERING MATERIALS

Scope of the subject

Semester	Mode of studies	Structure*				Total number of hours	Number of credits	Group and type of subjects
		L	PS	C	S			
III	Full-time	13	20	6	40	79	3	Compulsory subjects of the study field
III	Part-time	10	8	21	40	79	3	

*L – lectures, PS – practical activities, seminars, LW – laboratory work, PR – practice, CP – course paper, C – consultations, S – self-study

Aim of the subject

Will know the parameters and characteristics of the most important engineering materials used in computing and processes taking place in them, possibilities and fields of application of materials.

Necessary background knowledge for studying the subject

Students shall have heard the subject physics.

Content of the subject

Title of the topic and description of the content	Number of contact hours			S	Total number of hours
	L	PS	C		
1. Classification of engineering materials and use trends. Mechanical, physical and chemical properties of materials.	1	-	-	-	**1**
2. Electrical conductivity of solids. Conductive materials. Superconductors and cryo-conductors.	1	4	1	2	**8**
3. Dielectric materials. General knowledge of dielectric materials.	1	4	1	2	**8**
4. Ceramic and composite materials. The structure of polymers. Electrical and optical properties of polymers. Plastics and their types.	1	-	-	-	**1**
5. Cables. Structure of cables used in computer networks.	1	2	1	2	**6**
6. Semiconductor materials. The most important properties and characteristics of semiconductor materials. Use of semiconductors in lasers, production of computer processors, random access memory (RAM), etc.	1	4	1	2	**8**
7. Luminescent materials. Liquid crystal display (LCD) monitors. Colour obtaining systems.	1	-	-	-	**1**
Test.	1	-	-	7	**8**
8. Copying and printing materials.	1	-	-	-	**1**
9. Battery types (nickel cadmium (NiCd), nickel metal hydride (NiMH), lithium, lithium ion (Li, Li-ion), etc.), the structure and the operation principle.	1	-	-	-	**1**
10. Magnetic materials. The most important properties of magnetic materials and classification. Magnetically soft materials. Magnetically hard materials. Structure of hard disks and principles of recording information on them.	1	2	-	2	**5**
11. Methods of analysis of materials (optical, X-ray, etc.).	1	-	-	-	**1**
12. New engineering materials. Nanomaterials. Usage of nanomaterials in microelectronics. Magnetic nanomaterials. Smart nanomaterials. Optical materials: structure of optical fibres and information transfer via them, structure of compact discs and ways of writing information on them.	1	4	-	4	**9**
Individual work.	-	-	-	6	**6**
Preparation and taking the exam			2	13	**15**
Total number of hours	**13**	**20**	**6**	**40**	**79**

Assessment of learning outcomes

Ten-point criteria-based assessment system as well as cumulative assessment using individual cumulative index (ICI) are applied. The overall grade is the sum of grades for intermediate accountings and examination (E) multiplied by weighted coefficients. ICI = 0,3 T + 0,2 IND + 0,5 E, where T – test, IND – individual work.

Recommended literature

Key literature						
No.	**Year of publishing**	**Author(s) and title of the publication**	**Publishing house**	**Number of copies and/or internet link**		
				ŠSC library	**Other premises**	**Other libraries ***
1.	2010	Valiulis A. V. Šiuolaikiškos inžinerinės medžiagos: kūrimas ir taikymas	Technika	Elektroninė knyga: http://www.ebooks.vgtu.lt/pdfreader/iuolaikikos-ininerins-mediagos-krimas-ir-taikymas		
2.	2006	Rinkevičius, G. J., Mukulys, R. J. Elektrotechninės medžiagos.	Technologija	11	1	19

Additional literature			
No.	**Year of publishing**	**Author(s) and title of the publication**	**Publishing house and/or internet link**
1.	2011	Ramsden J. Nanotechnology: an introduction	Waltham (Mass.)
2.	2010	Higgins R. A. Materials for engineers and technicians	Newnes

* ŠAVB – Šiauliai Region Povilas Višinskis Public Library, ŠU – library of Šiauliai University

Required material resources and their short description

- **Equipment (devices):** a computer with Internet access, multimedia projector

The description prepared by:

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