Institution: Šiauliai State College
Study programme: Multimedia Technologies

DESCRIPTION OF THE STUDY SUBJECT

Title

MATERIALS SCIENCE

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**			
II	Full-time	23	10	6	42	81	3	Compulsory subjects of the study field
II	Part-time	12	6	21	42	81	3	

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

Aim of the subject

To master the basics of materials science, classification of materials, their basic physical and chemical properties, to understand and evaluate optical, magnetic properties of materials, basic methods of analysis and engineering applications of materials in advertising and graphic arts.

Necessary background knowledge for studying the subject

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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 materials and usage trends.	2	-	-	-	**2**
2. Structure of materials. Inter-molecular bonds in materials.	1	2	-	-	**3**
3. Chemical, physical and mechanical properties of materials. Methods of analysis of materials (metallography, optical, X-ray, ultrasound, etc.).	2	2	-	-	**4**
4. Metals and their alloys. Magnetic materials. Their use in computers, audio and video development equipment.	2	-	-	-	**2**
5. Properties and characteristics of semiconductors. Their use in the production of computer processors, random access memory (RAM), etc.	2	-	-	-	**2**
6. Ceramic and composite materials. Test No.1	2	-	1	5	**8**
7. Optical materials. Lasers. Optical fibre construction and transmission of information over it.	2	-	-	-	**2**
8. Structure of polymers. Electrical and optical properties of polymers. Plastics and their types. Polymers used in graphic arts. Polymeric materials of print finishing: varnishes, films.	2	2	-	-	**4**
9. Materials of graphic arts. Optical properties of paper. Interaction of paper with fluids. Kinds of printing paper. Photo paper. Printing ink properties and characteristics. Pigments. Adhesives, their structure and properties. Test No.2.	4	2	1	5	**12**
10. Visual advertising materials: textile, paper, cardboard, monomeric and polymeric films, tents, nets, etc.	2	-	--	-	**2**
11. New engineering materials. Usage of nanomaterials in microelectronics. Smart nanomaterials. Magnetic nanomaterials.	2	2	-	-	**4**
Independent work. To collect information and prepare a presentation of one engineering material.	-	-	4	14	**18**
Preparation for the examination and taking the examination	-	-	-	18	**18**
Total number of hours	**23**	**10**	**6**	**42**	**81**

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 presentation of intermediate accountings (P), test (T) and examination (E) multiplied by weighted coefficients. ICI = 0,2 T + 0,3 P + 0,5 E.

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	VGTU elektroninė knyga		
2.	2006	Rinkevičius G.J,, Mukulys R.J., Elektrotechninės medžiagos	Technologija	11	1	19
3.	2005	Balandis A. Inžinerinės neorganinės medžiagos	Technologija	4	1	5
Additional literature						
No.	**Year of publishing**	**Author(s) and title of the publication**		**Publishing house and/or internet link**		
1.	2011	Jeremy J. Ramsden Nanotechnology: an introduction		Elsevier		
2.	2010	Raymond A. Higgins Materials for engineers and technicians		Elsevier		
3.	2001	Handbook of print media: technologies and production methods / edited by Helmut Kipphan		Berlin [etc.] Springer		

* 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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