SYLLABUS OF A MODULE

Polish name of a module	**Analiza właściwości polimerów i kompozytów polimerowych**
English name of a module	**TESTING OF POLYMERS AND COMPOSITES**
ISCED classification - Code	0722
ISCED classification - Field of study	*Materials (glass, paper, plastic and wood)*
Languages of instruction	*English*
Level of qualification:	*1 – BSc (EQF 6)*
Number of ECTS credit points	*5*
Examination:	*A - assignment*
Available in semester:	*Y - both*

Number of hours per semester:

Lecture	Exercises	Laboratory	Seminar	E-learning	Project
15	**-**	**30**	-	-	-

MODULE DESCRIPTION

Module objectives

O1. Provide knowledge about selected methods of polymer properties analysis.

O2. Provide knowledge about selected methods of polymer composites properties analysis.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Fundamentals of physics, chemistry, mathematics, mechanics and thermodynamics.
2. Fundamentals of materials science.
3. Safety rules during the use of laboratory equipment and technological machines.
4. Capability of using source literature.
5. Capability of individual work and collaboration in a group.

6. Data analysis and presentation of results.

LEARNING OUTCOMES

LO 1 – Knowledge on polymeric materials and polymeric composites.

LO 2 – Knowledge on selected methods of polymer materials and polymers composites properties analysis.

LO 3 – Ability to independently conduct the experiment and interpret the results.

MODULE CONTENT

Type of classes – lecture	**Number of hours**
Lec 1 – Standardized test methods for polymers	**1**
Lec 2 - Preparation of samples for testing, conditioning	**1**
Lec 3 – 4 Assessment of physical properties of granules, density, humidity, moisture absorption)	**2**
Lec 5 - 7 Mechanical properties (tensile strength, hardness, impact strength, dynamic tests, drop test)	**3**
Lec 8 – 9 Testing the properties of the top layer (surface structure, color, gloss, adhesion, wettability, coefficient of friction)	**2**
Lec 10 -12 Thermal properties tests (expansion, thermal shrinkage, thermal conductivity, Vicat and HDT temperature, DSC, TGA)	**3**
Lec 13 - Flammability tests of plastics using methods UL94, GWFI, GWIT	**1**
Lec 14 - Assessment of the supermolecular structure of polymers and the filler content	**1**
Lec 15 - Fatigue tests, residual stress	**1**
Sum	**15**
Type of classes – laboratory	**Number of hours**
Lab 1 - Introduction to laboratory classes, OHS training in the laboratory	**1**
Lab 2-3 - Methods of preparing research samples	**2**
Lab 4-6 - Assessment of physical properties of granules, density,	**3**

humidity, moisture absorption)	
Lab 7-12 - Mechanical properties tests (tensile strength, hardness, impact strength, drop test)	**6**
Lab 13-14 - Tests of the surface layer properties - color, gloss, wettability	**2**
Lab 15-18 - Thermal properties tests (expansion, thermal shrinkage, thermal conductivity, Vicat and HDT temperature)	**4**
Lab 19-21 - Flammability of plastics by UL94, GWFI, GWIT methods	**3**
Lab 22-23 - Conditioning of polymeric materials and its influence on properties	**2**
Lab 24-25 - Assessment of the supermolecular structure of polymers and the filler content	**2**
Lab 26 – **27** Fatigue tests of polymers	**2**
Lab 28-30 - The elasto-optic method for the evaluation of residual stresses and elements under load	**3**
Sum	**30**

TEACHING TOOLS

1 – lecture with the use of multimedia presentations
2 – stands equipped with machines and other equipment for polymer processing
3 – instructions to laboratory exercises

WAYS OF ASSESSMENT (F – FORMATIVE, S – SUMMATIVE

F1. - assessment of preparation for laboratory exercises
F2. - assessment of the ability to apply the acquired knowledge while doing the exercises
F3. - evaluation of reports on the implementation of exercises covered by the curriculum
F4. - assessment of activity during classes
S1. - assessment of the ability to solve the problems posed and the manner of presentation obtained results - pass mark *
S2. - assessment of mastery of the teaching material being the subject of the lecture - exam

*) in order to receive a credit for the module, the student is obliged to attain a passing grade in all laboratory classes as well as in achievement tests.

STUDENT'S WORKLOAD

L.p.	Forms of activity	Average number of hours required for realization of activity
1. Contact hours with teacher		
1.1	Lectures	15
1.2	Tutorials	
1.3	Laboratory	30
1.4	Seminar	-
1.5	Project	-
1.6	Examination	5
	Total number of contact hours with teacher:	**50**
2. Student's individual work		
2.1	Preparation for tutorials and tests	20
2.2	Preparation for laboratory exercises, writing reports on laboratories	10
2.3	Preparation of project	-
2.4	Preparation for final lecture assessment	-
2.5	Preparation for examination	10
2.6	Individual study of literature	35
	Total number of hours of student's individual work:	**75**
	Overall student's workload:	**125**
Overall number of ECTS credits for the module		**5 ECTS**
Number of ECTS points that student receives in classes requiring teacher's supervision:		**1,8 ECTS**
Number of **ECTS** credits acquired during practical classes including laboratory exercises and projects:		**1,6 ECTS**

BASIC AND SUPPLEMENTARY RESOURCE MATERIALS

1. Pyzdek T., Keller P., The Handbook for Quality Management A Complete Guide to Operational Excellence, The McGraw-Hill Companies, 2013
2. Fied J., POLYMER SCIENCE AND TECHNOLOGY Third Edition, Pearson Education, Inc., 2014
3. Grellmann W., Seidler S., Polymer Solids and Polymer Melts, Part 3 Mechanical and thermomechanical Properties of Polymers, Springer, 2014
4. Ramdani N., Polymer and Ceramic Composite Materials, CRC Press Taylor & Francis Group, 2019
5. Van Krevelen D.W., PROPERTIES OF POLYMERS, Elsevier, 2009
6. Mark J.E., Physical Properties of Polymers Handbook, Second Edition, Springer 2007

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