



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Products testing

Course

Field of study

Management and production engineering

Area of study (specialization)

Level of study

First-cycle studies

Form of study

part-time

Year/Semester

4/8

Profile of study

general academic

Course offered in

Polish

Requirements

elective

Number of hours

Lecture

10

Laboratory classes

8

Other (e.g. online)

Tutorials

Projects/seminars

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

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Prerequisites



Basics in the field of production and processing technology of polymer materials and their composites, physicochemistry of polymers, and material science. Logical thinking, analyzing occurring phenomena, using the knowledge obtained from scientific, technical, and popular science literature. Understanding the need to learn and acquire new knowledge.

Course objective

Understanding advanced methods of analyzing the properties of polymeric materials used to assess structural changes caused by operational and process conditions as well as modification of the composition, and familiarization with the methodology of selecting appropriate measurement methods for solving technological problems and quality changes in products. Moreover, getting acquainted with the methods of testing the quality of cast products. Acquiring the ability to assess the quality of products with the use of non-destructive and destructive methods.

Course-related learning outcomes

Knowledge

1. The student knows the measurement methods and measuring systems used in machine building. - [K_W03]
2. The student should characterize the basic properties of plastics - [K_W04]
3. The student should characterize the basic research methods for plastics - [K_W11, K_W10]

Skills

1. The student is able to test selected properties of plastics - [K_U10]
2. The student is able to analyze the course of the technological process. - [K_U10]
3. The student is able to choose the appropriate research method to determine the properties - [K_U10]

Social competences

1. Understands the need for lifelong learning - [K_K01]
2. The student is aware of the role of manufacturing processes in the economy and human life. - [K_K02]
3. The student is determined to achieve the set goals. He can cooperate with various environments. - [K_K12]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Written test carried out on the end of the term (in case of a credit min. 50.1% correct). Up to 50.0% - unsatisfactory (2.0) = F, from 50.1% to 60.0% - Satisfactory (3.0) = E, from 60.1% to 70.0% - Satisfactory plus (3,5) = D, from 70.1 to 80 - Good (4.0) = C, from 80.1% to 90.0% - Good plus (4,5) = B, from 90.1% - Very good (5,0) = A.

Laboratory: Passing the credit is conditioned by a positive assessment of each of the exercises (presence, written or oral answer to the topics indicated by the laboratory teacher.)



Programme content

Lecture:

Methods of forming thermoplastic and thermosetting polymers. Technological defects of products shaped in high-performance technologies and degradation phenomena occurring during their operation. Methods for assessing the properties of polymers and their structure. The use of coupled measurement techniques to analyze the impact of process and operating conditions on structural changes and arising product defects as well as deterioration of product quality. Methods of non-destructive testing of cast products. Destructive testing methods for cast products. Damage tolerance of cast products.

Laboratory:

Getting to know the operation of measuring equipment, including FT-IR and UV-Vis spectrophotometers, differential scanning calorimeter (DSC), thermogravimeter (TGA), multi-angle spectrophotometer, rotational rheometer, universal testing machine, and optical microscope. Configuration of research procedures in terms of quality assessment of selected products resulting from structural changes and technological defects. Acquainting with the possibilities of indirect and simplified evaluation of polymeric materials and their composites. Methods of non-destructive testing of cast products. Destructive testing methods for cast products. Damage tolerance of cast products.

Teaching methods

1. Lecture: multimedia presentation.
2. Laboratory exercises: performing exercises, discussion, team work.

Bibliography

Basic

1. Poradnik Odlewnika, Sobczak J., Wyd. Stowarzyszenia Technicznego Odlewników Polskich, Tom 1, Kraków 2013.
2. Perzyk M., Waszkiewicz S., Kaczorowski M., Jopkiewicz A.: Odlewnictwo. WNT, Warszawa 2000.
3. Tabor A. : Odlewnictwo. Wyd. Politechniki Krakowskiej, Kraków 2009.
4. D.M. Stefanescu, Science and Engineering of Casting Solidification. Springer Verlag.2009.
5. Przetwórstwo tworzyw wielkocząsteczkowych, Sikora R., Wyd. Żak, Warszawa, 1993.
6. Lewińska-Romicka A.: Badania nieniszczące. Podstawy defektoskopii. Wydawnictwo Naukowo-Techniczne, Warszawa, 2001.
7. Wojas M.: Wady wyrobów wykrywane metodami nieniszczącymi. Wydawnictwo Biuro Gamma, Warszawa, 2006.



Additional

1. Górny Z. :Odlewnicze stopy metali nieżelaznych. WNT Warszawa 1992
2. Braszczyński J. : Teoria procesów odlewniczych. PWN Warszawa 1989
3. Z. Ignaszak, Virtual Prototyping w odlewnictwie. Wyd. Politechniki Poznańskiej. Poznań 2002.
4. Tochowicz St., Klisiewicz Z., Metalurgia próżniowa stali, Wyd. Śląsk, Katowice 1979.
5. Aspekty rozwoju recyklingu w Polsce, Merkisz - Guranowska A., WITE, 2005.

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	35	1,5
Student's own work (literature studies, preparation for laboratory classes, preparation for tests) ¹	40	1,5

¹ delete or add other activities as appropriate