# POZNAN UNIVERSITY OF TECHNOLOGY



EUROPEAN CREDIT TRANSFER AND ACCUMULATION SYSTEM (ECTS)

# **COURSE DESCRIPTION CARD - SYLLABUS**

Course name

Modern materials in aviation [S2LiK1>NMwL]

Course			
Field of study Aerospace Engineering		Year/Semester 1/2	
Area of study (specialization) Civil Aviation		Profile of study general academic	>
Level of study second-cycle		Course offered in Polish	
Form of study full-time		Requirements compulsory	
Number of hours			
Lecture 15	Laboratory classe 0	es	Other 0
Tutorials 0	Projects/seminars 0	6	
Number of credit points 1,00			
<b>Coordinators</b> dr inż. Karolina Ostrowska karolina.ostrowska@put.poznan.pl		Lecturers	

### **Prerequisites**

Knowledge: Basic knowledge of physics, mathematics and chemistry. Skills: The ability to effectively selfstudy. Social competences: Is aware of the social role of the engineer. He is willing to expand his competences. He can work in a team.

# **Course objective**

Understanding microbudding and selected properties of solids used in engineering practice. Understanding the theoretical foundations of construction and durability properties of selected materials used in aviation.

# Course-related learning outcomes

Knowledge:

1. has extended knowledge necessary to understand the profile subjects and specialist knowledge about the construction, methods of construction, production, operation, air traffic management, safety systems, impact on the economy, society and the environment in the field of aviation and cosmonautics for selected specialties: Civil Aviation, UAV

2. has an extensive knowledge of the strength of materials, including the theory of elasticity and plasticity, stress hypotheses, calculation methods for beams, membranes, shafts, joints and other

structural elements, as well as methods of testing the strength of materials and the state of deformation and stress in structures

3. has an extended knowledge of metal, non-metal and composite materials used in machine construction, in particular about their structure, properties, methods of production, heat and thermochemical treatment and the influence of plastic processing on their strength

Skills:

1. is able to communicate using various techniques in the professional environment and other environments using the formal notation of construction, technical drawing, concepts and definitions of the scope of the study field

2. has the ability to self-educate with the use of modern teaching tools, such as remote lectures, websites and databases, teaching programs, e-books

3. can obtain information from literature, the Internet, databases and other sources. Can integrate the obtained information, interpret and draw conclusions from it, and create and justify opinions

Social competences:

1. Understands the need for lifelong learning; can inspire and organize the learning process of other people.

2.Is ready to critically evaluate the knowledge and content received, recognize the importance of knowledge in solving cognitive and practical problems, and consult experts in case of difficulties in solving the problem on its own

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows: Lecture: written credit covering the issues discussed in the lecture

# Programme content

Discussion of modern materials used in aircraft structures. Presentation of their physical characteristics, as well as methods of their study. Discussion of issues related to shaping the strength properties of selected structural elements.

### Course topics

none

# **Teaching methods**

Informative (conventional) lecture (providing information in a structured way) - may be of a course (introductory) or monographic (specialist) character

# Bibliography

Basic

1. C. Kittel, Wstęp do fizyki ciała stałego, PWN, Warszawa 1974

- 2. B. N. Buszmanow, J. A. Chromow, Fizyka ciała stałego, WNT, Warszawa 1973
- 3. D. R. Askeland, The science and engineering of materials, PWS Publishers, Boston 1985
- 4. S. Rudnik: Metaloznawstwo. PWN, Warszawa, 1996
- 5. F. Staub; Metaloznawstwo, 1979

6. W. Luty [i in.]: Poradnik inżyniera. Obróbka cieplna stopów żelaza, 1977

7. L. Dobrzański: Metaloznawstwo z podstawami nauki o materiałach. WNT, Warszawa, 1996 Additional

1. M. F. Ashby, D. R. H. Jones, Materiały inżynierskie, t.1 i 2, WNT, Warszawa 1996

### Breakdown of average student's workload

	Hours	ECTS
Total workload	30	1,00
Classes requiring direct contact with the teacher	20	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	10	0,00