



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Tool Materials [S1IMat1>MN]

### Course

Field of study

Materials Engineering

Year/Semester

3/6

Area of study (specialization)

–

Profile of study

general academic

Level of study

first-cycle

Course offered in

polish

Form of study

full-time

Requirements

elective

### Number of hours

Lecture

15

Laboratory classes

15

Other (e.g. online)

0

Tutorials

0

Projects/seminars

0

### Number of credit points

2,00

### Coordinators

dr inż. Wojciech Gęstwa

wojciech.gestwa@put.poznan.pl

### Lecturers

### Prerequisites

Knowledge: Knowledge of engineering materials and manufacturing technology. Skills: Logical thinking associating image with description Social competences: Understanding the need to learn and acquiring knowledge, systematic learning.

### Course objective

Getting to know the classification, properties, selection, heat treatment, structure and production of tool materials.

### Course-related learning outcomes

Knowledge:

1. the student should know the types of tools. - [k\_w08]
2. the student should know the requirements for the properties of tool materials. - [k\_w09]

Skills:

1. the student knows how to evaluate the tool wear mechanism. - [k\_u19]
2. the student is able to select material for a specific tool. - [k\_u18]

3. the student is able to propose the heat treatment of the tool. - [k\_u21]

Social competences:

1. the student is able to work in a group. - [k\_k03]

2. the student is aware of the impact of the quality of tools on the production results. - [k\_k02]

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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Lectures:

A written form of credit consisting of three (3) to five (5) questions;

Credit based on the following evaluation criteria: dst (3.0) ÷ dst + (3.5) ⊃ 50.1 ÷ 70%; db (4.0) ÷ db + (4.5) ⊃ 70.1 ÷ 90%; very good (5.0) ⊃ 90.1 ÷ 100%

Laboratory:

Assessment based on oral or written answers regarding the content of each laboratory exercise according to the instructions of the laboratory teacher.

In order to pass the laboratories, all exercises must be passed on the basis of a positive mark from the answer and a passed report.

### Programme content

Lecture:

Tools - what is it? Material processing versus tools - general issues. Properties of tool materials. Classification of tool materials. Tool steels classification. The influence of alloying elements on the properties of steel. Designations, application, structures of steel and the accompanying heat treatment. Sintered tool steels, manufacturing technology. Carbide sinters. Surface treatment of tools. Tool ceramics. Super-hard tool materials.

Laboratory:

1. Heat treatment of tool steels. 2. Construction of modern cutting tools. 3. Assessment of the correctness of the structure of conventional tool steels. 4. Sintered tool materials. 5. Comparison of conventional and sintered tool steels.

### Teaching methods

1. Lecture: multimedia presentation, presentation illustrated with examples given on the blackboard.  
2. Laboratory exercises: practical exercises, discussion and preparation of the results in the form of a report, formulation of conclusions concerning the issues discussed during classes.

### Bibliography

Basic

1. M. Kupczyk: Wytwarzanie i eksploatacja narzędzi skrawających z powłokami przeciwzużyciowymi, Wyd. PP, 2009

2. M. Wysięcki: Nowoczesne materiały narzędziowe?, WNT Warszawa 1997

Additional

1. L. Dobrzański i inni : Metaloznawstwo i obróbka cieplna materiałów narzędziowych, Wyd. Naukowo-Techniczne;1990

2. H.Leda : Współczesne materiały konstrukcyjne i narzędziowe; Wyd. Politechniki Poznańskiej; 1996

### Breakdown of average student's workload

	Hours	ECTS
Total workload	60	2,00
Classes requiring direct contact with the teacher	34	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	15	1,00