Course code: ……. **Plan position:** ……

A. INFORMATION ABOUT THE COURSE

B. Basic information

Name of course	Materials Science and Enginnering
Field of studies	Mechanical Engineering
Level of studies	First degree
Profile of studies	Academic
Form of studies	Full-time
Specialty	Research and Development Production Maintenance
Unit responsible for the field of studies	Faculty of Mechanical Engineering
Name and academic degree of teacher(s)	Piotr Szewczykowski, PhD
Introductory courses	Chemistry, Physics, Mathematics
Introductory requirements	Basic knowledge in chemistry, physics, and mathematics, knowledge of MS Office package, ability to use databases of scientific publications

C. Semester/week schedule of classes

Semester	Lectures (W)	Auditorium classes (Ć)	Laboratory classes (L)	Project classes (P)	Seminar (S)	Field classes (T)	Number of ECTS points
Winter/Summer	45		30	15			7

2. LEARNING OUTCOME

No.	Learning outcomes description	The reference to the learning outcomes of specific field of study	The reference to the learning outcomes for the area
KNOWLEDGE			
W1	A student has in-depth knowledge of general materials and modern engineering materials.	K_W07	P7S_WG
W2	A student knows development trends in the field of materials science.	K_W09	P7S_WG
SKILLS			
U1	A student can obtain information from literature, databases, experts, and other sources, integrate the received data, interpret it, draw conclusions, and formulate and justify opinions.	K_U01	P7S_UW
U2	A student can use catalogs, standards, and patents in order to select the appropriate materials for the designed machine, device or system.	K_U02	P7S_UW
SOCIAL COMPETENCES			

K1	A student is ready to critically evaluate his knowledge and obtain expert opinions in case of difficulties with solving projects.	K_K01	P7S_KK

3. TEACHING METHODS

A. Traditional methods used ***

multimedia lecture, laboratory, and other methods, e.g., CES Edupack software, videos, books, catalogs, diagrams, blackboard, online techniques, exercise workbook classes

B. Distance learning methods used ***

Synchronous method (classes conducted in a way that ensures direct interaction between the student and the teacher in real time, enabling immediate flow of information, the method can be used only if it is provided for in the study plan for a given cycle of education):
e.g. remote lecture in the form of videoconference, remote discussion, etc.

Asynchronous method used as an auxiliary (a method that does not ensure direct interaction between the student and the teacher in real time, used only as an auxiliary / complementary method):

e.g. online educational videos, online multimedia presentations, etc.

4. METHODS OF EXAMINATION

Written test/colloquium, reports from laboratory work, and project preparation

5. SCOPE

Lectures	Atomic structures and interatomic bonding, fundamentals of crystallography, the structure of crystalline solids, structures of polymers, imperfections in solids, diffusion,, mechanical properties of metals, dislocations and strengthening mechanisms, phase diagrams, the iron-iron carbide phase diagram, phase transformations, properties and applications of metals, properties and applications of ceramics, characteristics and applications of polymers, composite materials, fabrications and processing of engineering materials etc.
Laboratories	Microscopic examination of steels and cast irons, optical and scanning electron microscopy, hardness measurements, tensile tests, impact strength testing, identification of materials, hardening and recrystallization of metals, physical states of polymers, the density of materials, heat resistance, glass transition, and melting temperatures etc.
Project	Applying databases and CES EDUpack software to design to select proper materials in machine design.

6. METHODS OF VERIFICATION OF LEARNING OUTCOMES

LEARNING OUTCOME	Form of assessment					
	Oral examination	Written exam	Colloquium	Project	Presentation	……
W1			x			
W2			x			
U1				x	x	
U2				x		
K1				x	x	

7. LITERATURE

Basic literature	- Callister WD, Rethwisch DG, 2015, Materials Science and Engineering, John Wiley & Sons (Asia) Pte Ltd - Ashby M, Shercliff H, Cebon D, 2014, Materials: Engineering, Science, Processing and Design, Elsevier Ltd, The Boulevard, Langford, Lane, Kidlington, Oxford
Supplementary literature	- Ashby MF, 2011, Materials Selection in Mechanical Design, Elsevier Ltd, The Boulevard, Langford, Lane, Kidlington, Oxford

8. TOTAL STUDENT WORKLOAD REQUIRED TO ACHIEVE EXPECTED LEARNING OUTCOMES EXPRESSED IN TIME AND ECTS CREDITS

Student's activity		Student workload– number of hours
Classes conducted under a direct supervision of an academic teacher or other persons responsible for classes	Participation in classes indicated in point 1B	90
	Supervision hours	10
Student's own work	Preparation for classes	20
	Reading assignments	45
	Other (preparation for exams, tests, carrying out a project etc)	45
Total student workload		210
	Number of ECTS points	7