

POLITECHNIKA KRAKOWSKA IM. TADEUSZA KOŚCIUSZKI

KARTA PRZEDMIOTU

obowiązuje studentów rozpoczynających studia w roku akademickim 2021/2022

Wydział Inżynierii Lądowej

Kierunek studiów: Budownictwo

Profil: Ogólnoakademicki

Forma studiów: stacjonarne

Kod kierunku: BUD

Stopień studiów: II

Specjalności: Structural Design and Management in Civil Engineering (profile: Structural Design), Building and Engineering Constructions (profile: Building Structures), Structural Design and Management in Civil Engineering (profile: Construction Technology and Management)

1 INFORMACJE O PRZEDMIOCIE

NAZWA PRZEDMIOTU	Zaawansowane materiały konstrukcyjne
NAZWA PRZEDMIOTU W JĘZYKU ANGIELSKIM	Advanced Structural Materials
KOD PRZEDMIOTU	WIL BUD oIIS C3 21/22
KATEGORIA PRZEDMIOTU	Major subjects
LICZBA PUNKTÓW ECTS	2.00
SEMESTRY	1

2 RODZAJ ZAJĘĆ, LICZBA GODZIN W PLANIE STUDIÓW

SEMESTR	WYKŁAD	ĆWICZENIA AUDYTORYJNE	LABORATORIA	LABORATORIA KOMPUTERO- WE	PROJEKTY	SEMINARIUM
1	15	0	15	0	0	0

3 CELE PRZEDMIOTU

Cel 1 Objective 1: To make students understand the fundamental relationships between composition, structure, manufacturing processes and properties of modern structural materials.

- Cel 2** Objective 2: To introduce the issues related to the properties modification of the modern materials. Presentation of the scientific approach to modifying the properties of construction materials.
- Cel 3** Objective 3: To acquaint students with selected modern construction materials both with mineral and organic skeleton.
- Cel 4** Objective 4: To acquaint students with advanced techniques of construction materials testing and properties evaluation using standard methods and advanced scientific ones.
- Cel 5** Objective 5: Data collection, analysis of test results; formulating conclusions and preparing a report. Learning the principles of experimental scientific work. Acquisition of teamwork skills.

4 WYMAGANIA WSTĘPNE W ZAKRESIE WIEDZY, UMIEJĘTNOŚCI I INNYCH KOMPETENCJI

- 1 Building Materials course credit
- 2 Building Chemistry course credit
- 3 Concrete Technology course credit

5 EFEKTY KSZTAŁCENIA

- EK1 Umiejętności** Application of Knowledge: Student explains the basic relationships between manufacture technology, structure and properties of modern construction materials;
- EK2 Wiedza** Knowledge: Student identifies and describes the main directions of construction materials modification;
- EK3 Wiedza** Knowledge: Student enumerates the basic properties of structural materials and describes the methods of mechanical and physical properties determination. The student describes the principles of structural and microstructural materials testing methods both standard and scientific ones;
- EK4 Kompetencje społeczne** Practical skills: Teamwork skills.
- EK5 Umiejętności** Practical skills: Observation, handling equipment, reporting, oral and written communication skills necessary for scientific work.

6 TREŚCI PROGRAMOWE

WYKŁAD		
LP	TEMATYKA ZAJĘĆ OPIS SZCZEGÓŁOWY BLOKÓW TEMATYCZNYCH	LICZBA GODZIN
W1	Types of engineering materials: metals and alloys, ceramics and glasses, polymers, composite materials. Relation and interaction between the manufacturing process, structure and properties.	3
W2	Crystal structure of metals and phase diagrams of alloy systems. Structural steels: Fe-C system, structural steel components, examples of steel products, influence of alloys elements on the properties of steel. Steels for the reinforced and prestressed concrete. The role of heat treatment in steel production.	3
W3	Composite materials with mineral and organic matrices. Reinforcement mechanisms in composite materials. Fibre reinforced concretes as an example of composite material. Types of fibres and their nature.	3

WYKŁAD		
LP	TEMATYKA ZAJĘĆ OPIS SZCZEGÓŁOWY BLOKÓW TEMATYCZNYCH	LICZBA GODZIN
W4	Properties and application of concretes with special aggregates type (LWC, HWC). The properties and characteristic features of high performance cementitious materials (HPC, UHPC and RPC).	3
W5	Geopolymer binders, application, properties and characteristic features.	1
W6	Ceramics, advanced ceramics and glasses: manufacturing process, classification, properties.	2

LABORATORIA		
LP	TEMATYKA ZAJĘĆ OPIS SZCZEGÓŁOWY BLOKÓW TEMATYCZNYCH	LICZBA GODZIN
L1	Determination of modulus of elasticity and dynamic modulus of elasticity of structural materials.	2
L2	The heat treatment of steels as an example of process-structure-properties relationship	2
L3	The role of admixtures in new generation cement concretes (SCC)	2
L4	Properties and application of concrete with special aggregates type (LWAC)	2
L5	Toughness index determination of brittle materials modified with fibrous inclusion (RPC, FRC)	2
L6	Structure and microstructure observation of structural materials - the application scanning electron microscope	2
L7	High performance concrete - from composition towards performance	3

7 NARZĘDZIA DYDAKTYCZNE

N1 Wykłady/Lectures

N2 Ćwiczenia laboratoryjne/ Laboratory classes

N3 Prezentacje multimedialne/ Presentations

N4 Konspekty/ Handouts