

# 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: I

Specjalności: Bez specjalności - studia w języku angielskim

### 1 INFORMACJE O PRZEDMIOCIE

NAZWA PRZEDMIOTU	Technologia betonu
NAZWA PRZEDMIOTU W JĘZYKU ANGIELSKIM	Technology of Concrete
KOD PRZEDMIOTU	WIL BUD oIS C23 21/22
KATEGORIA PRZEDMIOTU	Przedmioty kierunkowe
LICZBA PUNKTÓW ECTS	3.00
SEMESTRY	3

### 2 RODZAJ ZAJĘĆ, LICZBA GODZIN W PLANIE STUDIÓW

SEMESTR	WYKŁAD	ĆWICZENIA AUDYTORYJNE	LABORATORIA	LABORATORIA KOMPUTERO- WE	PROJEKTY	SEMINARIUM
3	15	15	15	0	0	0

### 3 CELE PRZEDMIOTU

**Cel 1** TO FAMILIARIZE STUDENTS WITH CONSTITUENT MATERIALS FOR ORDINARY CONCRETE, THEIR PROPERTIES, TEST METHODS AND REQUIREMENTS.

**Cel 2** TO FAMILIARIZE STUDENTS WITH BASIC PHENOMENONS OCCURRING IN CEMENT PASTE.

- Cel 3** TO FAMILIARIZE STUDENTS WITH RULES OF DESIGNING OF CONCRETE MIXTURE COMPOSITION AND MEASUREMENTS OF ITS BASIC PROPERTIES.
- Cel 4** TO FAMILIARIZE STUDENTS WITH BASIC PROPERTIES OF HARDENED CONCRETE, METHODS OF THEIR TESTING AND GENERAL QUALITY CONTROL PRINCIPLES.
- Cel 5** TO FAMILIARIZE STUDENTS WITH BASIC TECHNOLOGICAL PROCESSES AND THEIR INFLUENCE ON FINAL PROPERTIES OF CONCRETE IN A MEMBER OR A STRUCTURE
- Cel 6** TO PREPARE STUDENTS FOR TEAM WORKING
- Cel 7** TO PREPARE STUDENTS FOR RESEARCH

#### **4 WYMAGANIA WSTĘPNE W ZAKRESIE WIEDZY, UMIEJĘTNOŚCI I INNYCH KOMPETENCJI**

- 1** BASIC KNOWLEDGE ON CHEMISTRY AND PROPERTIES OF MINERAL BINDERS
- 2** BASIC KNOWLEDGE ON STRENGTH OF MATERIALS

#### **5 EFEKTY KSZTAŁCENIA**

- EK1 Wiedza** A STUDENT KNOWS BASIC GROUPS OF CONSTITUENTS MATERIALS OF ORDINARY CONCRETE AND THEIR GENERAL ROLE IN THE CONCRETE.
- EK2 Wiedza** A STUDENT KNOWS BASIC PROCESSES OCCURRING IN CEMENT PASTE.
- EK3 Wiedza** A STUDENT KNOWS BASIC RELATIONSHIPS BETWEEN CONCRETE COMPOSITION AND PROPERTIES OF FRESH AND HARDENED CONCRETE.
- EK4 Wiedza** A STUDENT KNOWS BASIC PROPERTIES OF HARDENED CONCRETE
- EK5 Wiedza** A STUDENT KNOWS BASIC TECHNOLOGICAL PROCESSES AND CAN EXPLAIN THEIR INFLUENCE ON QUALITY OF HARDENED CONCRETE.
- EK6 Umiejętności** A STUDENT CAN DESIGN COMPOSITION OF ORDINARY CONCRETE OF ASSUMED PROPERTIES.
- EK7 Umiejętności** A STUDENT CAN CARRY OUT LABORATORY TESTS OF BASIC PROPERTIES OF CONCRETE CONSTITUENT MATERIALS, FRESH AND HARDENED CONCRETE.
- EK8 Kompetencje społeczne** A STUDENT CAN WORK INDIVIDUALLY AND COOPERATE IN A TEAM ON AN ASSIGNED TASK.
- EK9 Kompetencje społeczne** A STUDENT IS RESPONSIBLE FOR THE RELIABILITY OF THE ACHIEVED RESULTS OF HIS/HER WORK AND THEIR INTERPRETATION.

#### **6 TREŚCI PROGRAMOWE**

LABORATORIA		
LP	TEMATYKA ZAJĘĆ OPIS SZCZEGÓŁOWY BLOKÓW TEMATYCZNYCH	LICZBA GODZIN
L1	Testing basic properties of cement. Making paste of standard consistence for determination of setting time. Making standard mortar and preparation of specimens for cement strength test. Testing cement flexural and compressive strength and determination of cement class.	2

LABORATORIA		
LP	TEMATYKA ZAJĘĆ OPIS SZCZEGÓŁOWY BLOKÓW TEMATYCZNYCH	LICZBA GODZIN
<b>L2</b>	Testing basic properties of aggregate: sieve analysis, determination of loose and compacted bulk densities, determination of tightness and voids content. Selection of optimal aggregate grading for concrete by a method of successive approximations.	2
<b>L3</b>	Making concrete mixture designed by a trial method. Testing its basic properties: density, consistence (by slump test, Vebe test, Degree of compatibility test and flow table test), air content by pressure method. Moulding specimens for strength tests.	2
<b>L4</b>	Approval of assumptions and correction of calculations of concrete composition for individually assigned subjects of a design project.	3
<b>L5</b>	Testing basic properties of hardened concrete: density, compressive strength, flexural strength, tensile splitting strength. Determination of compressive strength class of the concrete. Demonstration of stands for testing freeze/thaw resistance and waterpermeability of concrete.	2
<b>L6</b>	Non-destructive testing: presentation of basic methods of testing hardened concrete in a structure. Determination of rebound number with a sclerometer of N-type.	2
<b>L7</b>	Solving problems applying in design of concrete composition, prediction of hardened concrete properties and concrete strength classification.	2

ĆWICZENIA AUDYTORYJNE		
LP	TEMATYKA ZAJĘĆ OPIS SZCZEGÓŁOWY BLOKÓW TEMATYCZNYCH	LICZBA GODZIN
<b>C1</b>	Common cements. Types of cements, their application fields, classification, basic properties and their testing.	2
<b>C2</b>	Aggregates for concrete. Classification, types of tests, test methods for basic properties, methods of optimal aggregate selection for concrete.	2
<b>C3</b>	Concrete mixture. Basic properties and their test methods. Practical method of designing concrete composition.	2
<b>C4</b>	Chemical admixtures and mineral additives for concrete. Basic types, effects and fields of application.	2
<b>C5</b>	Designing concrete composition by analytical methods: of sand point, of covering of coarse aggregate particles with mortar, of overfilling voids of coarse aggregate particles with mortar.	3
<b>C6</b>	Testing properties of hardened concrete. Testing mechanical properties: compressive strength, tensile splitting strength, flexural strength. Rules for determination of concrete compressive strength class. Testing physical properties: density, water absorption, depth of penetration of water under pressure, freeze/thaw resistance.	2

ĆWICZENIA AUDYTORYJNE		
LP	TEMATYKA ZAJĘĆ OPIS SZCZEGÓŁOWY BLOKÓW TEMATYCZNYCH	LICZBA GODZIN
<b>C7</b>	Destructive, semi-destructive and non-destructive methods of testing concrete in an element or construction.	2

WYKŁAD		
LP	TEMATYKA ZAJĘĆ OPIS SZCZEGÓŁOWY BLOKÓW TEMATYCZNYCH	LICZBA GODZIN
<b>W1</b>	Introduction to ordinary concrete. Basic terms, components, definitions and classifications. Concrete application. Special types of concrete.	2
<b>W2</b>	Portland cement: production outline, oxide and mineralogical composition of cement clinker. General survey of common cements. Basic information on cement setting and hardening process. Cement paste and water/cement ratio. The role of cement paste in modeling of basic concrete properties.	2
<b>W3</b>	Aggregate and its role in concrete. Classification, basic properties and requirements. Relationship between voids content, specific surface and cement paste demand.	2
<b>W4</b>	Water for concrete, its classification and role in concrete mixture. Consistence condition. Chemical admixtures for concrete and their general classification. Fresh concrete and its basic properties. Tightness condition.	2
<b>W5</b>	Hardened concrete: definition, general characteristic, role in structural members, structure, types of properties.	1
<b>W6</b>	Mechanical properties of hardened concrete: Compressive strength: classification, conformity criteria, formulas. The other mechanical properties: tensile strength; modulus of elasticity, creep. Factors affecting mechanical properties of concrete. Concrete deformability under load.	2
<b>W7</b>	Physical properties of hardened concrete: density, volume changes of unhardened concrete (thermal expansion and contraction, drying and autogenous shrinkage, swelling). Durability: definition, working life, types of detrimental actions, factors determining durability, exposure classes, requirements concerning concrete composition and properties.	2
<b>W8</b>	Basic technological processes (mixing, delivery, placing, compaction and curing) and their influence on quality of concrete in a member or a structure.	2

## 7 NARZĘDZIA DYDAKTYCZNE

**N1** Lectures

**N2** Multimedia presentations

**N3** Laboratory classes