

# POLITECHNIKA KRAKOWSKA IM. TADEUSZA KOŚCIUSZKI

## KARTA PRZEDMIOTU

obowiązuje studentów rozpoczynających studia w roku akademickim 2018/2019

Wydział Architektury

Kierunek studiów: Architektura

Profil: Ogólnoakademicki

Forma studiów: stacjonarne

Kod kierunku: AiU

Stopień studiów: II

Specjalności: Master Degree in Architecture in English

### 1 INFORMACJE O PRZEDMIOCIE

NAZWA PRZEDMIOTU	II-C-4 Building Structures
NAZWA PRZEDMIOTU W JĘZYKU ANGIELSKIM	II-C-4 Building Structures
KOD PRZEDMIOTU	WA AU oIIS C6 18/19
KATEGORIA PRZEDMIOTU	przedmioty kierunkowe
LICZBA PUNKTÓW ECTS	4.00
SEMESTRY	1 2

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

SEMESTR	WYKŁADY	ĆWICZENIA	SEMINARIA	LABORATORIA	PROJEKTY	PRAKTYKI
1	15	0	15	0	0	0
2	15	0	15	0	0	0

### 3 CELE PRZEDMIOTU

**Cel 1** Structural problems in protecting and renovation of historical buildings. Historical masonry structures, vaults and timber floors. Methods of examining, protecting and adaptation for new use.

**Cel 2** Guidelines for evaluation of the technical condition of existing building. Law basis of the technical evaluation. Technical basis of building revitalization.

**Cel 3** Getting students acquainted with the basic principles of shaping the structural systems applied in modern architecture.

**Cel 4** Getting students acquainted with the basic types of the structural systems used in construction of roof covers, hall buildings, multi-storey buildings and objects of various functional purposes.

**Cel 5** Getting students acquainted with the innovative technical solutions proposed or applied in contemporary buildings of unique architectonic forms.

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

**1** Student has to pass all exams in the subjects related to the theory of structures (structural mechanics) and building structures.

**2** Knowledge of basis of Building Mechanics and ability to design and evaluate commonly used structural solutions in civil and industrial building.

#### 5 EFEKTY KSZTAŁCENIA

**EK1 Wiedza** History of development of building technologies. Ancient Roman building as the prototype of European building styles. Historical models of load-bearing structures of walls, vaults and rafter framings.

**EK2 Umiejętności** Ability to evaluate the condition of historical brick and stone buildings. Ability to design and implement structural protection of historical buildings in accordance with conservation rules.

**EK3 Wiedza** Knowledge in the area of the basic ways of shaping various forms of roof cover structures.

**EK4 Umiejętności** Ability to apply basic engineering rules for the conceptual design of various forms and types of roof covers.

**EK5 Wiedza** Getting knowledge in the area of various ways of shaping structural systems of tall buildings and multi-storey objects.

**EK6 Umiejętności** Ability to apply basic engineering rules for the conceptual design of various forms and types of tall buildings and multi-storey objects.

#### 6 TREŚCI PROGRAMOWE

SEMINARIA		
LP	TEMATYKA ZAJĘĆ OPIS SZCZEGÓŁOWY BLOKÓW TEMATYCZNYCH	LICZBA GODZIN
S1	Reinforcing historical layer walls by injection and transverse anchorage. Calculations.	2
S2	Methods of investigating and reinforcing historical masonry structures. Composite reinforcement systems. Examples.	2
S3	Protecting of deep excavation in the proximity of existing buildings. Examples of practical solutions. Slurry walls and palisades of CFA piles.	2
S4	Excursion to the building site in Cracow to see stages of execution the slurry wall.	2

SEMINARIA		
LP	TEMATYKA ZAJĘĆ OPIS SZCZEGÓŁOWY BLOKÓW TEMATYCZNYCH	LICZBA GODZIN
<b>S5</b>	Influence of the depth of foundation on the carrying capacity. An example calculation of changing foundation after deepening the cellars.	2
<b>S6</b>	Historical rafter framings. Discussing causes of typical damage. Designs of repair and conservation. Examples of reinforcing historical beam floors.	2
<b>S7</b>	Historical brick vaults. Discussing forms of damage and their causes. Preservation of historical vaults against deformation caused by thrust forces.	2
<b>S8</b>	Principles and range of periodic evaluation of the technical condition of existing building. Example of final report of survey. Guidelines for a written task.	2
<b>S9</b>	General principles of shaping surface-girders. Force systems in folded plate structures.	2
<b>S10</b>	Shell state. Force distribution in shell structures. Examples of application of shell structural systems in contemporary architecture.	2
<b>S11</b>	Types of truss systems used in structures of dome covers.	2
<b>S12</b>	Examples of truss structural systems applied in dome covers.	2
<b>S13</b>	Lightweight roof structures shaped by means of funicular systems and tension-strut systems.	2
<b>S14</b>	Shaping the structural systems of tall objects.	2
<b>S15</b>	Buildings designed or constructed by means of unique types of structural systems.	2

WYKŁADY		
LP	TEMATYKA ZAJĘĆ OPIS SZCZEGÓŁOWY BLOKÓW TEMATYCZNYCH	LICZBA GODZIN
<b>W1</b>	Structural problems of historical buildings conservation. History of masonry building development. Building materials and structures during Roman, Gothic, Renaissance and Baroque periods.	2
<b>W2</b>	Historical layer walls. Methods of testing. Designing of reinforcement in accordance with German WTA instruction.	2
<b>W3</b>	Systematics of cracks origin in historical masonry buildings. Examples of cracks distribution.	2
<b>W4</b>	Methods of protecting layers walls with cracks. Application of composite materials and injection with cement modified grout.	2
<b>W5</b>	Designing of the foundation in the proximity of existing buildings. Principles of deep excavation in contact with existing buildings. Contemporary methods of reinforcing the foundation.	2

WYKŁADY		
LP	TEMATYKA ZAJĘĆ OPIS SZCZEGÓŁOWY BLOKÓW TEMATYCZNYCH	LICZBA GODZIN
W6	Historical timber structures. Systematics of damage and methods of reinforcing framework structures. Historical timber floors. Historical rafter framings. Methods of testing and evaluating historical rafter framing. Methods of protection.	2
W7	Systematics and origin of vault damage. Methods of reinforcing and protecting in accordance with conservatory rules.	2
W8	Basis of evaluating technical condition of building. Contemporary non-destructive testing reinforced concrete, steel and timber structures.	2
W9	General overview of modern structural systems applied in contemporary architecture. Surface girders. Folded plate structures. General remarks on shell structures.	2
W10	Shell covers. Long and short barrel shells. Shell domes. Covers in the form of hyperbolic paraboloid and conoid.	2
W11	Truss girders. Multi-layer space structures as roof structural systems rules of shaping. Nodes of space structures principles of designing.	2
W12	Lattice dome structures overview of basic types of structural systems. Shaping grids onto the sphere surface.	2
W13	Funicular structural systems, cable-beam systems, funicular girders, shroud systems. Examples of tension-strut systems.	2
W14	Structural systems of multi-storey buildings and towers.	2
W15	Examples of application of modern innovative types of structural systems in contemporary architecture.	2

## 7 NARZĘDZIA DYDAKTYCZNE

N1 Lectures

N2 Multimedia presentations

N3 Design classes

N4 Consultations

## 8 OBCIĄŻENIE PRACĄ STUDENTA

FORMA AKTYWNOŚCI	ŚREDNIA LICZBA GODZIN NA ZREALIZOWANIE AKTYWNOŚCI
<b>Godziny kontaktowe z nauczycielem akademickim, w tym:</b>	
Godziny wynikające z planu studiów	60
Konsultacje przedmiotowe	10
Egzaminy i zaliczenia w sesji	10
<b>Godziny bez udziału nauczyciela akademickiego wynikające z nakładu pracy studenta, w tym:</b>	
Przygotowanie się do zajęć, w tym studiowanie zalecanej literatury	15
Opracowanie wyników	10
Przygotowanie raportu, projektu, prezentacji, dyskusji	15
<b>SUMARYCZNA LICZBA GODZIN DLA PRZEDMIOTU WYNIKAJĄCA Z CAŁEGO NAKŁADU PRACY STUDENTA</b>	<b>120</b>
SUMARYCZNA LICZBA PUNKTÓW ECTS DLA PRZEDMIOTU	4.00

## 9 SPOSOBY OCENY

### OCENA FORMUJĄCA

F1 Test

F2 Practical exercise

### OCENA PODSUMOWUJĄCA

P1 Written examination

P2 Oral examination

### OCENA AKTYWNOŚCI BEZ UDZIAŁU NAUCZYCIELA

B1 Practical exercise

### KRYTERIA OCENY

EFEKT KSZTAŁCENIA 1	
NA OCENĘ 3.0	Student has general knowledge of taught subjects.
NA OCENĘ 4.0	Student has good knowledge of taught subjects and is able to apply acquired principles in designing.

NA OCENĘ 5.0	Student has excellent knowledge of taught subjects and is able to compare different solutions and draw own conclusions.
EFEKT KSZTAŁCENIA 2	
NA OCENĘ 3.0	Student has fulfilled all requirements for credit. Student has general knowledge of taught subjects.
NA OCENĘ 4.0	Student has fulfilled all requirements for credit and obtained good grades. Student has good knowledge of taught subjects and is able to apply acquired principles in designing.
NA OCENĘ 5.0	Student has fulfilled all requirements for credit and obtained excellent grades. Student has excellent knowledge of taught subjects and is able to compare different solutions and draw own conclusions.
EFEKT KSZTAŁCENIA 3	
NA OCENĘ 3.0	Student has general knowledge of taught subjects.
NA OCENĘ 4.0	Student has good knowledge of taught subjects and is able to apply acquired principles in designing.
NA OCENĘ 5.0	Student has excellent knowledge of taught subjects and is able to compare different solutions and draw own conclusions.
EFEKT KSZTAŁCENIA 4	
NA OCENĘ 3.0	Student has fulfilled all requirements for credit. Student has general knowledge of taught subjects.
NA OCENĘ 4.0	Student has fulfilled all requirements for credit and obtained good grades. Student has good knowledge of taught subjects and is able to apply acquired principles in designing.
NA OCENĘ 5.0	Student has fulfilled all requirements for credit and obtained excellent grades. Student has excellent knowledge of taught subjects and is able to compare different solutions and draw own conclusions.
EFEKT KSZTAŁCENIA 5	
NA OCENĘ 3.0	Student has general knowledge of taught subjects.
NA OCENĘ 4.0	Student has good knowledge of taught subjects and is able to apply acquired principles in designing.
NA OCENĘ 5.0	Student has excellent knowledge of taught subjects and is able to compare different solutions and draw own conclusions.
EFEKT KSZTAŁCENIA 6	
NA OCENĘ 3.0	Student has fulfilled all requirements for credit. Student has general knowledge of taught subjects.
NA OCENĘ 4.0	Student has fulfilled all requirements for credit and obtained good grades. Student has good knowledge of taught subjects and is able to apply acquired principles in designing.

NA OCENĘ 5.0	Student has fulfilled all requirements for credit and obtained excellent grades. Student has excellent knowledge of taught subjects and is able to compare different solutions and draw own conclusions.
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## 10 MACIERZ REALIZACJI PRZEDMIOTU

EFEKT KSZTAŁCENIA	ODNIESIENIE DANEGO EFEKTU DO SZCZEGÓLOWYCH EFEKTÓW ZDEFINIOWANYCH DLA PROGRAMU	CELE PRZEDMIOTU	TREŚCI PROGRAMOWE	NARZĘDZIA DYDAKTYCZNE	SPOSOBY OCENY
EK1	GC8, GC9	Cel 1 Cel 2	S1 S2 S3 S4 S5 S6 S7 S8 W1 W2 W3 W4 W5 W6 W7 W8	N1 N2 N3 N4	F1 F2 P1 P2
EK2	GC8, GC9	Cel 1 Cel 2	S1 S2 S3 S4 S5 S6 S7 S8 W1 W2 W3 W4 W5 W6 W7 W8	N1 N2 N3 N4	F1 F2 P1 P2
EK3	GC8, GC9	Cel 3 Cel 4 Cel 5	S9 S10 S11 S12 S13 S14 S15 W9 W10 W11 W12 W13 W14 W15	N1 N2 N3 N4	F1 F2 P1 P2
EK4	GC8, GC9	Cel 3 Cel 4 Cel 5	S9 S10 S11 S12 S13 S14 S15 W9 W10 W11 W12 W13 W14 W15	N1 N2 N3 N4	F1 F2 P1 P2
EK5	GC8, GC9	Cel 3 Cel 4 Cel 5	S9 S10 S11 S12 S13 S14 S15 W9 W10 W11 W12 W13 W14 W15	N1 N2 N3 N4	F1 F2 P1 P2
EK6	GC8, GC9	Cel 3 Cel 4 Cel 5	S9 S10 S11 S12 S13 S14 S15 W9 W10 W11 W12 W13 W14 W15	N1 N2 N3 N4	F1 F2 P1 P2

## 11 WYKAZ LITERATURY

### LITERATURA PODSTAWOWA

[1 ] C.Siegel — *Formy strukturalne w nowoczesnej architekturze*, Warszawa, 1974, Arkady

- [2 ] **W.Borusiewicz** — *Konstrukcje budowlane dla architektów*, Warszawa, 1978, Arkady
- [3 ] **T.Kolendowicz** — *Mechanika budowli dla architektów*, Warszawa, 1993, Arkady
- [4 ] **S.Pyrak, K.Szulborski** — *Mechanika konstrukcji dla architektów*, Warszawa, 1994, Arkady

#### LITERATURA DODATKOWA

- [1 ] 457788, 88804, 3, 1, Books, monographs and papers published in scientific journals., , , 0, ,

## 12 INFORMACJE O NAUCZYCIELACH AKADEMICKICH

### OSOBA ODPOWIEDZIALNA ZA KARTĘ

dr inż. arch. Stanisław Jurczakiewicz (kontakt: [sjurczakiewicz@pk.edu.pl](mailto:sjurczakiewicz@pk.edu.pl))

### OSOBY PROWADZĄCE PRZEDMIOT

- 1 prof. dr hab. inż. arch. Janusz Rebielak (kontakt: [j.rebielak@wp.pl](mailto:j.rebielak@wp.pl))
- 2 dr inż. arch. Stanisław Jurczakiewicz (kontakt: [sjurczakiewicz@pk.edu.pl](mailto:sjurczakiewicz@pk.edu.pl))

## 13 ZATWIERDZENIE KARTY PRZEDMIOTU DO REALIZACJI

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(miejsowość, data)

(odpowiedzialny za przedmiot)

(dziekan)

PRZYJMUJĘ DO REALIZACJI (data i podpisy osób prowadzących przedmiot)

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