

POLITECHNIKA KRAKOWSKA IM. TADEUSZA KOŚCIUSZKI

KARTA PRZEDMIOTU

obowiązuje studentów rozpoczynających studia w roku akademickim 2023/2024

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)

1 INFORMACJE O PRZEDMIOCIE

NAZWA PRZEDMIOTU	Konstrukcje z betonu i konstrukcje murowe w sytuacjach pożarowych
NAZWA PRZEDMIOTU W JĘZYKU ANGIELSKIM	Concrete and Masonry Structures in Fire Situations
KOD PRZEDMIOTU	WIL BUD oIIS E12 23/24
KATEGORIA PRZEDMIOTU	Subjects Related to Diploma Projects
LICZBA PUNKTÓW ECTS	2.00
SEMESTRY	2

2 RODZAJ ZAJĘĆ, LICZBA GODZIN W PLANIE STUDIÓW

SEMESTR	WYKŁAD	ĆWICZENIA AUDYTORYJNE	LABORATORIA	LABORATORIA KOMPUTERO- WE	PROJEKTY	SEMINARIUM
2	15	0	0	0	30	0

3 CELE PRZEDMIOTU

Cel 1 Introducing the basic terms and definitions as well as determining the requirements connected with design of concrete and masonry structures in fire conditions

Cel 2 Getting familiar with the questions of the influence of fire temperature onto thermal and mechanical properties of concrete and reinforcing steel as well as of masonry elements

- Cel 3** Presenting the methods of verification of fire resistance for structural elements (slabs, beams, columns, walls)
- Cel 4** Shaping the ability to choose the solutions with respect to structural elements fire resistance and verification of fire resistance for elements
- Cel 5** Shaping the structural engineer consciousness with respect to responsibility for executed project within the frame of building fire resistance

4 WYMAGANIA WSTĘPNE W ZAKRESIE WIEDZY, UMIEJĘTNOŚCI I INNYCH KOMPETENCJI

- 1 Passing all subjects for semester 1

5 EFEKTY KSZTAŁCENIA

- EK1 Wiedza** Student can explain the basic terms connected with design of concrete and masonry structure in fire situation
- EK2 Umiejętności** Student can define the fire resistance requirements for RC and masonry structural elements
- EK3 Wiedza** Student can describe and explain the character of changes in thermal and mechanical properties for concrete and reinforcing steel as well as of masonry elements as a function of temperature
- EK4 Umiejętności** Student can determine the values of material parameters for given level of fire temperature
- EK5 Wiedza** Student can describe and explain the methods for fire resistance verification for different structural elements
- EK6 Umiejętności** Student can carry out the verification of fire resistance for selected structural element

6 TREŚCI PROGRAMOWE

PROJEKTY		
LP	TEMATYKA ZAJĘĆ OPIS SZCZEGÓŁOWY BLOKÓW TEMATYCZNYCH	LICZBA GODZIN
P1	Determination of fire resistance for selected structural elements made of reinforced concrete and masonry within the range of diploma work.	30

WYKŁAD		
LP	TEMATYKA ZAJĘĆ OPIS SZCZEGÓŁOWY BLOKÓW TEMATYCZNYCH	LICZBA GODZIN
W1	Basic definitions and terms connected with design of concrete and masonry structures in fire situation. General requirements for structures in fire conditions. Determination of detailed requirements with regard to fire resistance for reinforced concrete and masonry structural elements.	2

WYKŁAD		
LP	TEMATYKA ZAJĘĆ OPIS SZCZEGÓŁOWY BLOKÓW TEMATYCZNYCH	LICZBA GODZIN
W2	Basis of design for concrete and masonry structures in fire conditions. General methods for identification of values for actions and material properties. Levels of analysis for structure. Fire scenarios for structures. Design procedure - thermal and mechanical analysis. Verification of condition for load-bearing capacity in fire situation..	3
W3	Material properties in fire conditions. Influence of fire temperature onto thermal and mechanical properties of concrete and reinforcing steel as well as of masonry elements.	2
W4	Methods of fire resistance verification for structural elements. Descriptive methods (for different types of structural elements), simplified methods (boundary isotherm method, zone method), fire tests. Ranges of application and limitations for presented methods.	6
W5	High strength concretes (HSC). General characteristic of behavior of HSC - differences in comparison with NSC. Fire resistance verification methods for elements made of HSC.	2

7 NARZĘDZIA DYDAKTYCZNE

N1 Wykłady / Lectures

N2 Projekty/ Design workshops

8 OBCIĄŻENIE PRACĄ STUDENTA

FORMA AKTYWNOŚCI	ŚREDNIA LICZBA GODZIN NA ZREALIZOWANIE AKTYWNOŚCI
Godziny kontaktowe z nauczycielem akademickim, w tym:	
Godziny wynikające z planu studiów	45
Konsultacje przedmiotowe	0
Egzaminy i zaliczenia w sesji	0
Godziny bez udziału nauczyciela akademickiego wynikające z nakładu pracy studenta, w tym:	
Przygotowanie się do zajęć, w tym studiowanie zalecanej literatury	0
Opracowanie wyników	10
Przygotowanie raportu, projektu, prezentacji, dyskusji	5
SUMARYCZNA LICZBA GODZIN DLA PRZEDMIOTU WYNIKAJĄCA Z CAŁEGO NAKŁADU PRACY STUDENTA	60
SUMARYCZNA LICZBA PUNKTÓW ECTS DLA PRZEDMIOTU	2.00

9 SPOSOBY OCENY

OCENA FORMUJĄCA

F1 Kolokwium / Colloquium

F2 Projekt indywidualny / Individual project

OCENA PODSUMOWUJĄCA

P1 Średnia ważona ocen formujących / Average from the forming marks

KRYTERIA OCENY

EFEKT KSZTAŁCENIA 1	
NA OCENĘ 2.0	student can't explain the basic terms connected with design of concrete and masonry structures in fire situation
NA OCENĘ 3.0	student can explain the basic terms connected with design of concrete and masonry structures in fire situation
NA OCENĘ 3.5	student can explain the basic terms connected with design of concrete and masonry structures in fire situation as well as to describe generally the specific of structure design in fire situation

NA OCENĘ 4.0	student can explain the basic terms connected with design of concrete and masonry structures in fire situation as well as to describe in details the specific of structure design in fire situation
NA OCENĘ 4.5	student can explain the basic terms connected with design of concrete and masonry structures in fire situation as well as to comment generally the design procedures for concrete and for masonry
NA OCENĘ 5.0	student can explain the basic terms connected with design of concrete and masonry structures in fire situation as well as to comment in details the design procedures for concrete and for masonry
EFEKT KSZTAŁCENIA 2	
NA OCENĘ 2.0	student does not understand the term of fire resistance
NA OCENĘ 3.0	student understands the term of fire resistance
NA OCENĘ 3.5	student understands the term of fire resistance and can generally define the fire resistance requirements for RC and masonry structural elements
NA OCENĘ 4.0	student understands the term of fire resistance and can define in details the fire resistance requirements for RC and masonry structural elements
NA OCENĘ 4.5	student understands the term of fire resistance and can generally describe the ways of fire resistance requirements formulations for RC and masonry structural elements
NA OCENĘ 5.0	student understands the term of fire resistance and can describe in details the ways of fire resistance requirements formulations for RC and masonry structural elements
EFEKT KSZTAŁCENIA 3	
NA OCENĘ 2.0	student can't give the basic material properties important in analysis of structure in fire situation
NA OCENĘ 3.0	student can give the basic material properties important in analysis of structure in fire situation
NA OCENĘ 3.5	student can give the basic material properties important in analysis of structure in fire situation as well as to classify them generally into thermal and mechanical properties
NA OCENĘ 4.0	student can give the basic material properties important in analysis of structure in fire situation as well as to classify them in details into thermal and mechanical properties
NA OCENĘ 4.5	student can give the basic material properties important in analysis of structure in fire situation as well as to explain generally the character of changes in material properties as a function of temperature
NA OCENĘ 5.0	student can give the basic material properties important in analysis of structure in fire situation as well as to explain in details the character of changes in material properties as a function of temperature

EFEKT KSZTAŁCENIA 4	
NA OCENĘ 2.0	student can't identify how material properties change as a function of temperature
NA OCENĘ 3.0	student can identify how material properties change as a function of temperature
NA OCENĘ 3.5	student can identify how material properties change as a function of temperature as well as to estimate generally their values for a given level of temperature
NA OCENĘ 4.0	student can identify how material properties change as a function of temperature as well as to estimate in details their values for a given level of temperature
NA OCENĘ 4.5	student can identify how material properties change as a function of temperature as well as to determine generally the values of thermal and mechanical properties for a given level of temperature
NA OCENĘ 5.0	student can identify how material properties change as a function of temperature as well as to determine in details the values of thermal and mechanical properties for a given level of temperature
EFEKT KSZTAŁCENIA 5	
NA OCENĘ 2.0	student can't give the methods of fire resistance verification for different structural elements
NA OCENĘ 3.0	student can give the methods of fire resistance verification for different structural elements
NA OCENĘ 3.5	student can give the methods of fire resistance verification for different structural elements as well as to describe generally their basis
NA OCENĘ 4.0	student can give the methods of fire resistance verification for different structural elements as well as to describe in details their basis
NA OCENĘ 4.5	student can give the methods of fire resistance verification for different structural elements as well as to show generally the way of their applications for different structural elements
NA OCENĘ 5.0	student can give the methods of fire resistance verification for different structural elements as well as to show in details the way of their applications for different structural elements
EFEKT KSZTAŁCENIA 6	
NA OCENĘ 2.0	student can't describe the scheme for carrying out fire resistance verification for structural elements
NA OCENĘ 3.0	student can describe the scheme for carrying out fire resistance verification for structural elements
NA OCENĘ 3.5	student can describe the scheme for carrying out fire resistance verification for structural elements as well as to give general classification of methods for fire resistance verification

NA OCENĘ 4.0	student can describe the scheme for carrying out fire resistance verification for structural elements as well as to give in details the classification of methods for fire resistance verification
NA OCENĘ 4.5	student can describe the scheme for carrying out fire resistance verification for structural elements as well as to give general information about methods used in fire resistance verification
NA OCENĘ 5.0	student can describe the scheme for carrying out fire resistance verification for structural elements as well as to give detailed information about methods used in fire resistance verification

10 MACIERZ REALIZACJI PRZEDMIOTU

EFEKT KSZTAŁCENIA	ODNIESIENIE DANEGO EFEKTU DO SZCZEGÓŁOWYCH EFEKTÓW ZDEFINIOWANYCH DLA PROGRAMU	CELE PRZEDMIOTU	TREŚCI PROGRAMOWE	NARZĘDZIA DYDAKTYCZNE	SPOSOBY OCENY
EK1		Cel 1	p1 w1 w2	N1	F1 F2 P1
EK2		Cel 1	p1 w1 w2	N1	F1 F2 P1
EK3		Cel 2	p1 w2 w3 w5	N1	F1 F2 P1
EK4		Cel 2 Cel 3	p1 w2 w3 w5	N1	F1 F2 P1
EK5		Cel 3	w2 w3 w5	N1	F1 F2 P1
EK6		Cel 3 Cel 4 Cel 5	p1 w3 w4 w5	N1	F1 F2 P1

11 WYKAZ LITERATURY

LITERATURA PODSTAWOWA

- [1] **Krzysztof Chudyba** — *Projektowanie konstrukcji z betonu w warunkach pożarowych według Eurokodów*, Kraków, 2008, Wydawnictwo PK
- [2] **Krzysztof Chudyba** — *Weryfikacja odporności pożarowej elementów żelbetowych wg Eurokodów*, Kraków, 2018, Wydawnictwo PK
- [3] **Krzysztof Chudyba** — *Analiza konstrukcji z betonu w warunkach pożarowych*, Kraków, 2019, Wydawnictwo PK

LITERATURA UZUPEŁNIAJĄCA

- [1] **Praca zbiorowa** — *fib bulletin no 38: Fire design of concrete structures - materials, structures and modelling*, Loussane, 2007, fib
- [2] **Praca zbiorowa** — *fib bulletin no 46: Fire design of concrete structures - structural behaviour and assessment*, Lousanne, 2008, fib

LITERATURA DODATKOWA

- [1] PN-EN 1992-1-2: Projektowanie konstrukcji z betonu. Część 1-2: Projektowanie w warunkach pożarowych

12 INFORMACJE O NAUCZYCIELACH AKADEMICKICH**OSOBA ODPOWIEDZIALNA ZA KARTĘ**

dr hab. inż. Krzysztof Chudyba (kontakt: kchudyba@op.pl)

OSOBY PROWADZĄCE PRZEDMIOT

1 dr hab. inż. Krzysztof Chudyba (kontakt: kchudyba@pk.edu.pl)

13 ZATWIERDZENIE KARTY PRZEDMIOTU DO REALIZACJI

(miejscowość, data)

(odpowiedzialny za przedmiot)

(dziekan)

PRZYJMUJĘ DO REALIZACJI (data i podpisy osób prowadzących przedmiot)

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