

POLITECHNIKA KRAKOWSKA IM. TADEUSZA KOŚCIUSZKI

KARTA PRZEDMIOTU

obowiązuje studentów rozpoczynających studia w roku akademickim 2022/2023

Wydział Inżynierii Lądowej

Kierunek studiów: Budownictwo

Profil: Ogólnoakademicki

Forma studiów: stacjonarne

Kod kierunku: BUD

Stopień studiów: II

Specjalności: Budowle - informacja i modelowanie (BIM)

1 INFORMACJE O PRZEDMIOCIE

NAZWA PRZEDMIOTU	BIM in Construction Management
NAZWA PRZEDMIOTU W JĘZYKU ANGIELSKIM	
KOD PRZEDMIOTU	WIL BUD oIIS E1 22/23
KATEGORIA PRZEDMIOTU	Przedmioty związane z dyplomem
LICZBA PUNKTÓW ECTS	2.00
SEMESTRY	3

2 RODZAJ ZAJĘĆ, LICZBA GODZIN W PLANIE STUDIÓW

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

3 CELE PRZEDMIOTU

Cel 1 To explain the role and benefits of BIM technology for construction management. To get students acquainted with features and issues of 4D BIM and 5D BIM. To discuss the use of BIM and BIM-related technologies for construction site management. To make students aware of the impact of BIM technology on construction management. To familiarize students with BIM-related technologies. To prepare students to solve basic problems within the field of BIM-based construction management.

Cel 2 To familiarize students with functionalities of dedicated 4D BIM and 5D BIM software. To prepare students for development of BIM-based time and cost analyses of construction works with the use of dedicated BIM tools. To prepare students (at a basic level) to take part in research within the field BIM-based construction management.

4 WYMAGANIA WSTĘPNE W ZAKRESIE WIEDZY, UMIEJĘTNOŚCI I INNYCH KOMPETENCJI

1 Knowledge on technology of construction works. Knowledge and skills on traditional approach to quantity take-off. Knowledge and skills on traditional approach to cost estimation. Knowledge and skills on traditional approach to scheduling of construction works. Completion of courses according to the sequence of learning at Faculty of Civil Engineering CUT.

5 EFEKTY KSZTAŁCENIA

EK1 Wiedza Student knows the role and benefits of BIM implementation in the field of construction management. Student knows the scope of information stored in BIM models essential for the processes of construction management. Student is aware of the changes that arise from the implementation of BIM technology for construction management.

EK2 Wiedza Student knows the features, role and benefits of 4D BIM. Student knows the features, role and benefits of 5D BIM. Student knows the features, role and benefits of BIM technology for construction site management. Students knows the impact of BIM and related technologies on construction management.

EK3 Umiejętności Student is able to discuss the issues of 4D BIM and 5D BIM in the context of construction management. Student is able to work with BIM models and find the information essential for 4D modelling and 5D modelling. Student is able to develop BIM-based cost estimates and BIM-based schedules while working with dedicated BIM tools.

EK4 Kompetencje społeczne Student is responsible for the results of her/his work. Student is able to discuss the results of BIM based time and cost analyses with the others. Student is able to defend constructively his point of view on the results of BIM based time and cost analyses in relation to both her/his own or the others work. Student is open for constructive criticism.

6 TREŚCI PROGRAMOWE

WYKŁAD		
LP	TEMATYKA ZAJĘĆ OPIS SZCZEGÓŁOWY BLOKÓW TEMATYCZNYCH	LICZBA GODZIN
W1	Introduction to BIM based construction management.	4
W2	Discussion of the types of information, stored in BIM models, essential for construction management.	2
W3	4D Building Information Modelling.	4
W4	5D Building Information Modelling.	2
W5	Using BIM for construction site management.	2
W6	Implementation of BIM related modern technologies for construction management.	1

LABORATORIA KOMPUTEROWE		
LP	TEMATYKA ZAJĘĆ OPIS SZCZEGÓŁOWY BLOKÓW TEMATYCZNYCH	LICZBA GODZIN
K1	Basics of BIM models handling with the use of dedicated software (model viewers).	4
K2	Analysis of information, stored in BIM models, essential for construction management.	2
K3	BIM-based quantity take-off.	3
K4	BIM-based cost estimation.	4
K5	BIM-based scheduling of construction works.	2

7 NARZĘDZIA DYDAKTYCZNE

N1 multimedia presentation

N2 computer laboratories

N3 BIM software

8 OBCIĄŻENIE PRACĄ STUDENTA

FORMA AKTYWNOŚCI	ŚREDNIA LICZBA GODZIN NA ZREALIZOWANIE AKTYWNOŚCI
Godziny kontaktowe z nauczycielem akademickim, w tym:	
Godziny wynikające z planu studiów	30
Konsultacje przedmiotowe	1
Egzaminy i zaliczenia w sesji	4
Godziny bez udziału nauczyciela akademickiego wynikające z nakładu pracy studenta, w tym:	
Przygotowanie się do zajęć, w tym studiowanie zalecanej literatury	10
Opracowanie wyników	6
Przygotowanie raportu, projektu, prezentacji, dyskusji	5
SUMARYCZNA LICZBA GODZIN DLA PRZEDMIOTU WYNIKAJĄCA Z CAŁEGO NAKŁADU PRACY STUDENTA	56
SUMARYCZNA LICZBA PUNKTÓW ECTS DLA PRZEDMIOTU	2.00

9 SPOSOBY OCENY

OCENA FORMUJĄCA

F1 Completion of the lecture in the form of a test

F2 Project evaluation

OCENA PODSUMOWUJĄCA

P1 Average rating weight

WARUNKI ZALICZENIA PRZEDMIOTU

W1 passing lecture part

W2 passing project part

W3 Presence for min. 80% of project classes

KRYTERIA OCENY

EFEKT KSZTALCENIA 1	
NA OCENĘ 2.0	Lack of basic knowledge in the field of construction management using BIM technology. Distinguish between levels of detail model. Knowledge of tender documents requiring the use of BIM.
NA OCENĘ 3.0	Student knows the role and benefits of BIM implementation in the field of construction management. Student knows the scope of information stored in BIM models. Student knows a basics of BIM based construction management.
NA OCENĘ 3.5	Basic knowledge of construction management with the use of BIM technology. Distinguish between levels of model detail. Knowledge of tender documents requiring the use of BIM.
NA OCENĘ 4.0	Basic knowledge of construction management with the use of BIM technology. Good knowledge of the levels of detail of the model. Knowledge of tender documents requiring the use of BIM. Knowledge of costing and scheduling methods based on micro and macro BIM models.
NA OCENĘ 4.5	Quite a lot of knowledge in the field of construction management with the use of BIM technology. Very good knowledge of the levels of detail of the model. Knowledge of tender documents requiring the use of BIM. Knowledge of costing and scheduling methods based on micro and macro BIM models. Knowledge of the applicability of BIM in practice on the construction site.
NA OCENĘ 5.0	Extensive knowledge of construction management with the use of BIM technology. Very good knowledge of the levels of detail of the model. Knowledge of tender documents requiring the use of BIM. Knowledge of costing and scheduling methods based on micro and macro BIM models. Knowledge of the applicability of BIM in practice on the construction site.
EFEKT KSZTALCENIA 2	
NA OCENĘ 2.0	Lack of basic knowledge about the use of BIM on the construction site

NA OCENĘ 3.0	Student knows basics of BIM 4D and 5D. Student knows the benefits of using BIM technology on construction site. Students knows the impact of BIM and related technologies on construction management.
NA OCENĘ 3.5	Listing many ways of using BIM technology on the construction site
NA OCENĘ 4.0	Listing and detailed description of the methods of using BIM technology on the construction site.
NA OCENĘ 4.5	Above average knowledge of how to use BIM on a construction site at work of individual people with building qualifications and performing independent functions.
NA OCENĘ 5.0	Very good knowledge of the ways of using BIM on a construction site at the work of individual people with building qualifications and performing independent functions.
EFEKT KSZTAŁCENIA 3	
NA OCENĘ 2.0	Failure to comply with the cost estimate and schedule. No schedule optimization. Lack of individual and team work skills
NA OCENĘ 3.0	Student is able to define 4D BIM and 5D BIM in the context of construction management. Student is able to work with macro and micro BIM models. Student is able to find the basic information essential for 4D modelling and 5D modelling. Student is able to verify BIM model and develop simple BIM-based cost estimates and BIM-based schedules.
NA OCENĘ 3.5	Self-made cost estimate and schedule with a little help from a tutor with minor errors. No schedule optimization. Performing the simulation with the help of the tutor.
NA OCENĘ 4.0	Self-made cost estimate and schedule without the help of the tutor with minor errors. Performing the simulation with the help of the tutor
NA OCENĘ 4.5	Self-made cost estimate and schedule without the help of the tutor with minor errors. Performing the simulation with a little help from the tutor
NA OCENĘ 5.0	Flawless execution of the cost estimate and schedule of construction works. Self-simulation of construction works for an example object
EFEKT KSZTAŁCENIA 4	
NA OCENĘ 2.0	Failure to comply with the cost estimate and schedule. No schedule optimization. Lack of individual and team work skills
NA OCENĘ 3.0	Student is responsible for the results of her/his work. Student is able to work independently with a little help from the lecturer.
NA OCENĘ 3.5	Self-made cost estimate and schedule with a little help from a tutor with minor errors. No schedule optimization. Performing the simulation with the help of the tutor.
NA OCENĘ 4.0	Self-made cost estimate and schedule without the help of the tutor with minor errors. Performing the simulation with the help of the tutor

NA OCENĘ 4.5	Self-made cost estimate and schedule without the help of the tutor with minor errors. Performing the simulation with a little help from the tutor
NA OCENĘ 5.0	Flawless execution of the cost estimate and schedule of construction works. Self-simulation of construction works for an example object

10 MACIERZ REALIZACJI PRZEDMIOTU

EFEKT KSZTAŁCENIA	ODNIESIENIE DANEGO EFEKTU DO SZCZEGÓLOWYCH EFEKTÓW ZDEFINIOWANYCH DLA PROGRAMU	CELE PRZEDMIOTU	TREŚCI PROGRAMOWE	NARZĘDZIA DYDAKTYCZNE	SPOSOBY OCENY
EK1	K_W10	Cel 1	w1 w2 w5 w6	N1	F1 P1
EK2	K_W10	Cel 1	w3 w4	N1	F1 P1
EK3	K_U05 K_U12 K_U13	Cel 2	k1 k2 k3 k4 k5	N2 N3	F2 P1
EK4	K_K01 K_K02 K_K03 K_K06	Cel 2	k1 k2 k3 k4 k5	N2 N3	F2 P1

11 WYKAZ LITERATURY

LITERATURA PODSTAWOWA

- [1] **Underwood, Jason; Isikdag, Umit.** — *Handbook of research on building information modeling and construction informatics : concepts and technologies*, New York, 2010, IGI Global
- [2] **Sacks, Rafael; Eastman, Charles M; Lee, Ghang; Teicholz, Paul M.** — *BIM handbook : a guide to building information modeling for owners, designers, engineers, contractors, and facility managers*, Hoboken, 2018, John Wiley & Sons

LITERATURA UZUPEŁNIAJĄCA

- [1] **Tomana, Andrzej.** — *BIM : innowacyjna technologia w budownictwie : podstawy, standardy, narzędzia*, Warszawa, 2016, PWB Media Zdziebłowski
- [2] **Kaszniak, Dariusz; Magiera, Jacek; Wierzowiecki, Paweł.** — *BIM w praktyce : standardy, wdrożenie, case study*, Warszawa, 2017, Wydawnictwo Naukowe PWN

12 INFORMACJE O NAUCZYCIELACH AKADEMICKICH

OSOBA ODPOWIEDZIALNA ZA KARTĘ

dr hab. inż. prof. PK Krzysztof Zima (kontakt: kzima@izwbit.pk.edu.pl)

OSOBY PROWADZĄCE PRZEDMIOT

1 dr hab. inż. prof. PK Krzysztof Zima (kontakt: kzima@17.pk.edu.pl)

2 dr hab. inż., prof. PK Michał Juszczyk (kontakt: mjuszczyk@17.pk.edu.pl)

3 dr inż. Damian Wieczorek (kontakt: dwieczorek@17.pk.edu.pl)

4 dr inż. Grzegorz Śladowski (kontakt: gsladowski@17.pk.edu.pl)

5 mgr inż. Ewelina Mitera-Kielbasa (kontakt: emitera@17.pk.edu.pl)

13 ZATWIERDZENIE KARTY PRZEDMIOTU DO REALIZACJI

(miejsowość, data)

(odpowiedzialny za przedmiot)

(dziekan)

PRZYJMUJĘ DO REALIZACJI (data i podpisy osób prowadzących przedmiot)

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