

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: I

Specjalności: Bez specjalności - studia w języku angielskim

1 INFORMACJE O PRZEDMIOCIE

NAZWA PRZEDMIOTU	Technologia, mechanizacja i automatyzacja robót budowlanych
NAZWA PRZEDMIOTU W JĘZYKU ANGIELSKIM	Technology, mechanisation and automatisisation of construction works
KOD PRZEDMIOTU	WIL BUD oIS C26 22/23
KATEGORIA PRZEDMIOTU	Przedmioty kierunkowe
LICZBA PUNKTÓW ECTS	5.00
SEMESTRY	3 4

2 RODZAJ ZAJĘĆ, LICZBA GODZIN W PLANIE STUDIÓW

SEMESTR	WYKŁAD	ĆWICZENIA AUDYTORYJNE	LABORATORIA	LABORATORIA KOMPUTERO- WE	PROJEKTY	SEMINARIUM
3	30	0	0	0	15	0
4	15	0	0	0	15	0

3 CELE PRZEDMIOTU

Cel 1 To provide information related to technology of construction works. To get students acquainted with various types of technologies, mechanization and automation of construction works. To prepare students to solve problems within the field of construction technology.

Cel 2 To familiarize students with various types of construction machines. To prepare students for analyses of efficiency of labour, machines and the use of construction materials. To familiarize students with various kinds of automation of construction works. To prepare students (at a basic level) to take part in research within the field of technology, mechanisation and automatisisation of construction works.

4 WYMAGANIA WSTĘPNE W ZAKRESIE WIEDZY, UMIEJĘTNOŚCI I INNYCH KOMPETENCJI

1 Knowledge on classification and types of building materials. Knowledge on classification and types of construction objects and their elements. Completion of courses according to the sequence of learning at Faculty of Civil Engineering CUT.

5 EFEKTY KSZTAŁCENIA

EK1 Wiedza Basic knowledge within the field of technology, mechanisation and automation of construction works.

EK2 Wiedza Basic knowledge on the use of resources (labour, machines, materials) in technology, mechanisation and automation of construction works.

EK3 Umiejętności Ability to solve basic problems within the field of technology, mechanisation and automation of construction works.

EK4 Kompetencje społeczne Ability to work in team. Ability to work individually. Critical approach to own work and results of analyzes. Ability to discuss results of own or others work.

6 TREŚCI PROGRAMOWE

WYKŁAD		
LP	TEMATYKA ZAJĘĆ OPIS SZCZEGÓŁOWY BLOKÓW TEMATYCZNYCH	LICZBA GODZIN
W1	Course description. Presentation of requirements to complete the course. Introduction to construction technology, mechanisation and automation of construction works.	2
W2	Definitions and concepts of technology of construction works. Definitions and concepts of mechanization of construction works. Definitions and concepts of automation of construction works.	2
W3	Earthworks technology. Earthworks machines. Technologies of soil stabilization and strengthening.	6
W4	Deep excavation supports. Deep foundation technologies.	4
W6	Reinforced concrete technology - technology of reinforcement works.	2
W7	Reinforced concrete technology - formworks and scaffoldings.	4
W8	Reinforced concrete technology - technology for concrete transportation, placement and curing.	2
W9	Technological transport on a construction site. Mechanisation of transport on a construction site.	4

WYKŁAD		
LP	TEMATYKA ZAJĘĆ OPIS SZCZEGÓŁOWY BLOKÓW TEMATYCZNYCH	LICZBA GODZIN
W11	Technology of masonry works. Technology of insulation works. Technology of finishing works.	4
W12	Automation of earthworks.	4
W13	Technology of assembly works.	4
W14	Mechanisation and automation of reinforced concrete construction works.	4
W15	Chosen aspects of automation and robotics in construction works.	3

PROJEKTY		
LP	TEMATYKA ZAJĘĆ OPIS SZCZEGÓŁOWY BLOKÓW TEMATYCZNYCH	LICZBA GODZIN
P1	Earthworks technology - individual/team assignment.	8
P2	Reinforced concrete technology - individual/team assignment.	7
P3	Technological transport on a construction site and technology of assembly works - individual/team assignment.	8
P4	Presentation of a chosen aspect of automation of construction works - - individual/team assignment.	7

7 NARZĘDZIA DYDAKTYCZNE

N1 Lectures, multimedia presentations

N2 Design exercises: individual tasks and team tasks

N3 E-learning

8 OBCIĄŻENIE PRACĄ STUDENTA

FORMA AKTYWNOŚCI	ŚREDNIA LICZBA GODZIN NA ZREALIZOWANIE AKTYWNOŚCI
Godziny kontaktowe z nauczycielem akademickim, w tym:	
Godziny wynikające z planu studiów	75
Konsultacje przedmiotowe	0
Egzaminy i zaliczenia w sesji	6
Godziny bez udziału nauczyciela akademickiego wynikające z nakładu pracy studenta, w tym:	
Przygotowanie się do zajęć, w tym studiowanie zalecanej literatury	28
Opracowanie wyników	20
Przygotowanie raportu, projektu, prezentacji, dyskusji	22
SUMARYCZNA LICZBA GODZIN DLA PRZEDMIOTU WYNIKAJĄCA Z CAŁEGO NAKŁADU PRACY STUDENTA	151
SUMARYCZNA LICZBA PUNKTÓW ECTS DLA PRZEDMIOTU	5.00

9 SPOSOBY OCENY

OCENA FORMUJĄCA

F1 Design exercises: individual tasks, team tasks

OCENA PODSUMOWUJĄCA

P1 Exam after winter semester. Exam after summer semester.

WARUNKI ZALICZENIA PRZEDMIOTU

W1 Completion of all design exercises within the deadlines.

W3 Positive exam grade.

KRYTERIA OCENY

EFEKT KSZTAŁCENIA 1	
NA OCENĘ 2.0	x

NA OCENĘ 3.0	<p>Student is able to give definitions of technology of construction works. Student is able to give definitions of mechanisation and robotics of construction works. Student is able to explain and discuss the role of technology, mechanisation and robotics of construction works. Student is able to explain technological processes in terms of earthworks, soil stabilization and strengthening, deep excavation supports, deep foundation technologies, reinforced concrete technology, technological transport on a construction site, masonry works, insulation works, finishing works, assembly works. Student is able to explain issues of productivity and efficiency of labour and equipment in terms of execution of construction works. Student is able to solve productivity and efficiency related tasks and problems. Student is able to analyse productivity and efficiency of resources on the basis of given or collected data. Student is able to mention and discuss applicability of construction machines and equipment. Student is able to provide computations necessary for selection of resources (labour, equipment and materials) needed for execution assumed scope of construction works in terms of earthworks, soil stabilization and strengthening, deep excavation supports, deep foundation technologies, reinforced concrete technology, technological transport on a construction site, masonry works, insulation works, finishing works, assembly works in terms of technology, mechanisation and robotics of construction works. Student is able to mention and discuss applicability of systems and solutions specific for various types of construction works. Student is able to mention, discuss and explain solutions applicable for mechanisation and automation of construction works. Student is able to mention, discuss and explain the way of processing construction materials applicable for technology, mechanisation and automation of construction works. Student is able to explain working cycles of construction machines. Student knows the formulas applicable for computations of construction machines productivity and is able to solve productivity and efficiency related tasks. Student is able to present, explain and discuss issues related to earthworks technology, soil stabilization and strengthening, deep excavation supports, deep foundation technologies, reinforced concrete technology, technological transport on a construction site, masonry works, insulation works, finishing works, assembly works in terms of technology, mechanisation and robotics of construction works. Student is able to solve problems and tasks related to earthworks technology, soil stabilization and strengthening, deep excavation supports, deep foundation technologies, reinforced concrete technology, technological transport on a construction site, masonry works, insulation works, finishing works, assembly works in terms of technology, mechanisation and robotics of construction works. Student is able to provide analyses and justifications for selection of resources (labour, equipment and materials) needed for execution assumed scope of construction works in terms of earthworks, soil stabilization and strengthening, deep excavation supports, deep foundation technologies, reinforced concrete technology, technological transport on a construction site, masonry works, insulation works, finishing works, assembly works in terms of technology, mechanisation and robotics of construction works.</p>
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<p>EFEKT KSZTAŁCENIA 2</p>	
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<p>EFEKT KSZTAŁCENIA 3</p>	
<p>NA OCENĘ 2.0</p>	<p>x</p>

<p>NA OCENĘ 3.0</p>	<p>Student is able to give definitions of technology of construction works. Student is able to give definitions of mechanisation and robotics of construction works. Student is able to explain and discuss the role of technology, mechanisation and robotics of construction works. Student is able to explain technological processes in terms of earthworks, soil stabilization and strengthening, deep excavation supports, deep foundation technologies, reinforced concrete technology, technological transport on a construction site, masonry works, insulation works, finishing works, assembly works. Student is able to explain issues of productivity and efficiency of labour and equipment in terms of execution of construction works. Student is able to solve productivity and efficiency related tasks and problems. Student is able to analyse productivity and efficiency of resources on the basis of given or collected data. Student is able to mention and discuss applicability of construction machines and equipment. Student is able to provide computations necessary for selection of resources (labour, equipment and materials) needed for execution assumed scope of construction works in terms of earthworks, soil stabilization and strengthening, deep excavation supports, deep foundation technologies, reinforced concrete technology, technological transport on a construction site, masonry works, insulation works, finishing works, assembly works in terms of technology, mechanisation and robotics of construction works. Student is able to mention and discuss applicability of systems and solutions specific for various types of construction works. Student is able to mention, discuss and explain solutions applicable for mechanisation and automation of construction works. Student is able to mention, discuss and explain the way of processing construction materials applicable for technology, mechanisation and automation of construction works. Student is able to explain working cycles of construction machines. Student knows the formulas applicable for computations of construction machines productivity and is able to solve productivity and efficiency related tasks. Student is able to present, explain and discuss issues related to earthworks technology, soil stabilization and strengthening, deep excavation supports, deep foundation technologies, reinforced concrete technology, technological transport on a construction site, masonry works, insulation works, finishing works, assembly works in terms of technology, mechanisation and robotics of construction works. Student is able to solve problems and tasks related to earthworks technology, soil stabilization and strengthening, deep excavation supports, deep foundation technologies, reinforced concrete technology, technological transport on a construction site, masonry works, insulation works, finishing works, assembly works in terms of technology, mechanisation and robotics of construction works. Student is able to provide analyses and justifications for selection of resources (labour, equipment and materials) needed for execution assumed scope of construction works in terms of earthworks, soil stabilization and strengthening, deep excavation supports, deep foundation technologies, reinforced concrete technology, technological transport on a construction site, masonry works, insulation works, finishing works, assembly works in terms of technology, mechanisation and robotics of construction works.</p>
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NA OCENĘ 3.5	<p>Student is able to give definitions of technology of construction works. Student is able to give definitions of mechanisation and robotics of construction works. Student is able to explain and discuss the role of technology, mechanisation and robotics of construction works. Student is able to explain technological processes in terms of earthworks, soil stabilization and strengthening, deep excavation supports, deep foundation technologies, reinforced concrete technology, technological transport on a construction site, masonry works, insulation works, finishing works, assembly works. Student is able to explain issues of productivity and efficiency of labour and equipment in terms of execution of construction works. Student is able to solve productivity and efficiency related tasks and problems. Student is able to analyse productivity and efficiency of resources on the basis of given or collected data. Student is able to mention and discuss applicability of construction machines and equipment. Student is able to provide computations necessary for selection of resources (labour, equipment and materials) needed for execution assumed scope of construction works in terms of earthworks, soil stabilization and strengthening, deep excavation supports, deep foundation technologies, reinforced concrete technology, technological transport on a construction site, masonry works, insulation works, finishing works, assembly works in terms of technology, mechanisation and robotics of construction works. Student is able to mention and discuss applicability of systems and solutions specific for various types of construction works. Student is able to mention, discuss and explain solutions applicable for mechanisation and automation of construction works. Student is able to mention, discuss and explain the way of processing construction materials applicable for technology, mechanisation and automation of construction works. Student is able to explain working cycles of construction machines. Student knows the formulas applicable for computations of construction machines productivity and is able to solve productivity and efficiency related tasks. Student is able to present, explain and discuss issues related to earthworks technology, soil stabilization and strengthening, deep excavation supports, deep foundation technologies, reinforced concrete technology, technological transport on a construction site, masonry works, insulation works, finishing works, assembly works in terms of technology, mechanisation and robotics of construction works. Student is able to solve problems and tasks related to earthworks technology, soil stabilization and strengthening, deep excavation supports, deep foundation technologies, reinforced concrete technology, technological transport on a construction site, masonry works, insulation works, finishing works, assembly works in terms of technology, mechanisation and robotics of construction works. Student is able to provide analyses and justifications for selection of resources (labour, equipment and materials) needed for execution assumed scope of construction works in terms of earthworks, soil stabilization and strengthening, deep excavation supports, deep foundation technologies, reinforced concrete technology, technological transport on a construction site, masonry works, insulation works, finishing works, assembly works in terms of technology, mechanisation and robotics of construction works.</p>
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NA OCENĘ 4.0	<p>Student is able to give definitions of technology of construction works. Student is able to give definitions of mechanisation and robotics of construction works. Student is able to explain and discuss the role of technology, mechanisation and robotics of construction works. Student is able to explain technological processes in terms of earthworks, soil stabilization and strengthening, deep excavation supports, deep foundation technologies, reinforced concrete technology, technological transport on a construction site, masonry works, insulation works, finishing works, assembly works. Student is able to explain issues of productivity and efficiency of labour and equipment in terms of execution of construction works. Student is able to solve productivity and efficiency related tasks and problems. Student is able to analyse productivity and efficiency of resources on the basis of given or collected data. Student is able to mention and discuss applicability of construction machines and equipment. Student is able to provide computations necessary for selection of resources (labour, equipment and materials) needed for execution assumed scope of construction works in terms of earthworks, soil stabilization and strengthening, deep excavation supports, deep foundation technologies, reinforced concrete technology, technological transport on a construction site, masonry works, insulation works, finishing works, assembly works in terms of technology, mechanisation and robotics of construction works. Student is able to mention and discuss applicability of systems and solutions specific for various types of construction works. Student is able to mention, discuss and explain solutions applicable for mechanisation and automation of construction works. Student is able to mention, discuss and explain the way of processing construction materials applicable for technology, mechanisation and automation of construction works. Student is able to explain working cycles of construction machines. Student knows the formulas applicable for computations of construction machines productivity and is able to solve productivity and efficiency related tasks. Student is able to present, explain and discuss issues related to earthworks technology, soil stabilization and strengthening, deep excavation supports, deep foundation technologies, reinforced concrete technology, technological transport on a construction site, masonry works, insulation works, finishing works, assembly works in terms of technology, mechanisation and robotics of construction works. Student is able to solve problems and tasks related to earthworks technology, soil stabilization and strengthening, deep excavation supports, deep foundation technologies, reinforced concrete technology, technological transport on a construction site, masonry works, insulation works, finishing works, assembly works in terms of technology, mechanisation and robotics of construction works. Student is able to provide analyses and justifications for selection of resources (labour, equipment and materials) needed for execution assumed scope of construction works in terms of earthworks, soil stabilization and strengthening, deep excavation supports, deep foundation technologies, reinforced concrete technology, technological transport on a construction site, masonry works, insulation works, finishing works, assembly works in terms of technology, mechanisation and robotics of construction works.</p>
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<p>EFEKT KSZTAŁCENIA 4</p>	
<p>NA OCENĘ 2.0</p>	<p>x</p>

NA OCENĘ 3.0	<p>Student is able to give definitions of technology of construction works. Student is able to give definitions of mechanisation and robotics of construction works. Student is able to explain and discuss the role of technology, mechanisation and robotics of construction works. Student is able to explain technological processes in terms of earthworks, soil stabilization and strengthening, deep excavation supports, deep foundation technologies, reinforced concrete technology, technological transport on a construction site, masonry works, insulation works, finishing works, assembly works. Student is able to explain issues of productivity and efficiency of labour and equipment in terms of execution of construction works. Student is able to solve productivity and efficiency related tasks and problems. Student is able to analyse productivity and efficiency of resources on the basis of given or collected data. Student is able to mention and discuss applicability of construction machines and equipment. Student is able to provide computations necessary for selection of resources (labour, equipment and materials) needed for execution assumed scope of construction works in terms of earthworks, soil stabilization and strengthening, deep excavation supports, deep foundation technologies, reinforced concrete technology, technological transport on a construction site, masonry works, insulation works, finishing works, assembly works in terms of technology, mechanisation and robotics of construction works. Student is able to mention and discuss applicability of systems and solutions specific for various types of construction works. Student is able to mention, discuss and explain solutions applicable for mechanisation and automation of construction works. Student is able to mention, discuss and explain the way of processing construction materials applicable for technology, mechanisation and automation of construction works. Student is able to explain working cycles of construction machines. Student knows the formulas applicable for computations of construction machines productivity and is able to solve productivity and efficiency related tasks. Student is able to present, explain and discuss issues related to earthworks technology, soil stabilization and strengthening, deep excavation supports, deep foundation technologies, reinforced concrete technology, technological transport on a construction site, masonry works, insulation works, finishing works, assembly works in terms of technology, mechanisation and robotics of construction works. Student is able to solve problems and tasks related to earthworks technology, soil stabilization and strengthening, deep excavation supports, deep foundation technologies, reinforced concrete technology, technological transport on a construction site, masonry works, insulation works, finishing works, assembly works in terms of technology, mechanisation and robotics of construction works. Student is able to provide analyses and justifications for selection of resources (labour, equipment and materials) needed for execution assumed scope of construction works in terms of earthworks, soil stabilization and strengthening, deep excavation supports, deep foundation technologies, reinforced concrete technology, technological transport on a construction site, masonry works, insulation works, finishing works, assembly works in terms of technology, mechanisation and robotics of construction works.</p>
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<p>NA OCENĘ 3.5</p>	<p>Student is able to give definitions of technology of construction works. Student is able to give definitions of mechanisation and robotics of construction works. Student is able to explain and discuss the role of technology, mechanisation and robotics of construction works. Student is able to explain technological processes in terms of earthworks, soil stabilization and strengthening, deep excavation supports, deep foundation technologies, reinforced concrete technology, technological transport on a construction site, masonry works, insulation works, finishing works, assembly works. Student is able to explain issues of productivity and efficiency of labour and equipment in terms of execution of construction works. Student is able to solve productivity and efficiency related tasks and problems. Student is able to analyse productivity and efficiency of resources on the basis of given or collected data. Student is able to mention and discuss applicability of construction machines and equipment. Student is able to provide computations necessary for selection of resources (labour, equipment and materials) needed for execution assumed scope of construction works in terms of earthworks, soil stabilization and strengthening, deep excavation supports, deep foundation technologies, reinforced concrete technology, technological transport on a construction site, masonry works, insulation works, finishing works, assembly works in terms of technology, mechanisation and robotics of construction works. Student is able to mention and discuss applicability of systems and solutions specific for various types of construction works. Student is able to mention, discuss and explain solutions applicable for mechanisation and automation of construction works. Student is able to mention, discuss and explain the way of processing construction materials applicable for technology, mechanisation and automation of construction works. Student is able to explain working cycles of construction machines. Student knows the formulas applicable for computations of construction machines productivity and is able to solve productivity and efficiency related tasks. Student is able to present, explain and discuss issues related to earthworks technology, soil stabilization and strengthening, deep excavation supports, deep foundation technologies, reinforced concrete technology, technological transport on a construction site, masonry works, insulation works, finishing works, assembly works in terms of technology, mechanisation and robotics of construction works. Student is able to solve problems and tasks related to earthworks technology, soil stabilization and strengthening, deep excavation supports, deep foundation technologies, reinforced concrete technology, technological transport on a construction site, masonry works, insulation works, finishing works, assembly works in terms of technology, mechanisation and robotics of construction works. Student is able to provide analyses and justifications for selection of resources (labour, equipment and materials) needed for execution assumed scope of construction works in terms of earthworks, soil stabilization and strengthening, deep excavation supports, deep foundation technologies, reinforced concrete technology, technological transport on a construction site, masonry works, insulation works, finishing works, assembly works in terms of technology, mechanisation and robotics of construction works.</p>
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<p>NA OCENĘ 5.0</p>	<p>Student is able to give definitions of technology of construction works. Student is able to give definitions of mechanisation and robotics of construction works. Student is able to explain and discuss the role of technology, mechanisation and robotics of construction works. Student is able to explain technological processes in terms of earthworks, soil stabilization and strengthening, deep excavation supports, deep foundation technologies, reinforced concrete technology, technological transport on a construction site, masonry works, insulation works, finishing works, assembly works. Student is able to explain issues of productivity and efficiency of labour and equipment in terms of execution of construction works. Student is able to solve productivity and efficiency related tasks and problems. Student is able to analyse productivity and efficiency of resources on the basis of given or collected data. Student is able to mention and discuss applicability of construction machines and equipment. Student is able to provide computations necessary for selection of resources (labour, equipment and materials) needed for execution assumed scope of construction works in terms of earthworks, soil stabilization and strengthening, deep excavation supports, deep foundation technologies, reinforced concrete technology, technological transport on a construction site, masonry works, insulation works, finishing works, assembly works in terms of technology, mechanisation and robotics of construction works. Student is able to mention and discuss applicability of systems and solutions specific for various types of construction works. Student is able to mention, discuss and explain solutions applicable for mechanisation and automation of construction works. Student is able to mention, discuss and explain the way of processing construction materials applicable for technology, mechanisation and automation of construction works. Student is able to explain working cycles of construction machines. Student knows the formulas applicable for computations of construction machines productivity and is able to solve productivity and efficiency related tasks. Student is able to present, explain and discuss issues related to earthworks technology, soil stabilization and strengthening, deep excavation supports, deep foundation technologies, reinforced concrete technology, technological transport on a construction site, masonry works, insulation works, finishing works, assembly works in terms of technology, mechanisation and robotics of construction works. Student is able to solve problems and tasks related to earthworks technology, soil stabilization and strengthening, deep excavation supports, deep foundation technologies, reinforced concrete technology, technological transport on a construction site, masonry works, insulation works, finishing works, assembly works in terms of technology, mechanisation and robotics of construction works. Student is able to provide analyses and justifications for selection of resources (labour, equipment and materials) needed for execution assumed scope of construction works in terms of earthworks, soil stabilization and strengthening, deep excavation supports, deep foundation technologies, reinforced concrete technology, technological transport on a construction site, masonry works, insulation works, finishing works, assembly works in terms of technology, mechanisation and robotics of construction works.</p>
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10 MACIERZ REALIZACJI PRZEDMIOTU

EFEKT KSZTAŁCENIA	ODNIESIENIE DANEGO EFEKTU DO SZCZEGÓŁOWYCH EFEKTÓW ZDEFINIOWANYCH DLA PROGRAMU	CELE PRZEDMIOTU	TREŚCI PROGRAMOWE	NARZĘDZIA DYDAKTYCZNE	SPOSOBY OCENY
EK1	K_W18 K_U22	Cel 1 Cel 2	w1 w2 w3 w4 w6 w7 w8 w9 w11 w12 w13 w14 w15 p1 p2 p3 p4	N1 N2 N3	F1 P1
EK2	K_W18 K_U22	Cel 1 Cel 2	w1 w2 w3 w4 w6 w7 w8 w9 w11 w12 w13 w14 w15 p1 p2 p3 p4	N1 N2 N3	F1 P1
EK3	K_W18 K_U22 K_K03 K_K09	Cel 1 Cel 2	w1 w2 w3 w4 w6 w7 w8 w9 w11 w12 w13 w14 w15 p1 p2 p3 p4	N1 N2 N3	F1 P1
EK4	K_K02 K_K03 K_K07	Cel 1 Cel 2	p1 p2 p3 p4	N1 N2 N3	F1

11 WYKAZ LITERATURY

LITERATURA PODSTAWOWA

- [1] | **Andrew J. Charlett** — *Fundamental building technology*, , 2007, Taylor&Francis
- [2] | **Eric Fleming** — *Construction technology: an illustrated introduction*, , 2005, Blackwell Publishing
- [3] | **Ivor H. Seeley** — *Building technology*, , 1995, MacMillan
- [4] | **Roy Chudley, Roger Greeno** — *Construction technology*, , 2005, Pearson Education Limited
- [5] | **Roy Chudley, Roger Greeno** — *Building construction handbook*, , 2010, Elsevier Science & Technology
- [6] | **AutorPeurifoy R.L., Schexnayder C.J., Shapira A.** — *CONSTRUCTION PLANNING EQUIPMENT AND METHODS*, , 2006, McGrawHill

LITERATURA UZUPEŁNIAJĄCA

- [1] | **Henry J. Cowan, Peter R. Smith, W. K. Chow** — *Dictionary of architectural and building technology*, , 2004, Taylor&Francis
- [2] | — *WARUNKI TECHNICZNE WYKONANIA I ODBIORU ROBÓT BUDOWLANYCH*, , 2006, Verlag Dashofer

12 INFORMACJE O NAUCZYCIELACH AKADEMICKICH

OSOBA ODPOWIEDZIALNA ZA KARTĘ

dr inż. Michał Juszczyk (kontakt: mjuszczuk@L7.pk.edu.pl)

OSOBY PROWADZĄCE PRZEDMIOT

1 dr hab inż. Michał Juszczyk (kontakt: mjuszczuk@L7.pk.edu.pl)

2 dr inż. Damian Wieczorek (kontakt: dwieczorek@L7.pk.edu.pl)

3 dr inż. Jarosław Malara (kontakt: jmalara@L7.pk.edu.pl)

4 mgr inż. Patrycja Karcińska (kontakt: pkarcinska@L7.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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