

# Tadeusz Kosciuszko Cracow University of Technology

## Course Card

Faculty of Civil Engineering

Field of study: Civil Engineering

Study profile: general academic

Study form: full-time

Field of study code: BUD

Study cycle: 2st

Specialty: Structural Design and Management in Civil Engineering (profile: Construction Technology and Management)

### 1 COURSE INFORMATION

Course name	BIM w zarządzaniu budową
Course name in English	BIM in Construction Management
Course code	WIL BUD oIIS D15 23/24
Course category	Specialty subjects (profile: Construction Technology and Management)
No. of ECTS points	4.00
Semester	2

### 2 CLASS TYPE, NUMBER OF HOURS ACCORDING TO THE STUDY PLAN

Semester	Lecture	Class exercise	Laboratory	Laboratory Computer	Design exercise	Seminar
2	15	0	0	30	0	0

### 3 COURSE OBJECTIVES

**Objective 1** To explain the role and benefits of BIM technology for construction management.

**Objective 2** 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.

**Objective 3** To prepare students for development of BIM-based time and cost analyses of construction works with the use of dedicated BIM tools.

**Objective 4** To familiarize students with functionalities of dedicated 4D BIM and 5D BIM software.

**Objective 5** Individual and team work in the preparation of construction projects based on BIM technology. To prepare students (at a basic level) to take part in research within the field BIM-based construction management.

## 4 PREREQUISITES IN TERMS OF KNOWLEDGE, SKILLS AND OTHER COMPETENCES

## 5 LEARNING OUTCOMES

**LO1 Knowledge** 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.

**LO2 Skills** Student is able to work with BIM models and find the information essential for 4D modelling and 5D modelling.

**LO3 Skills** Student is able to develop BIM-based cost estimates and BIM-based schedules while working with dedicated BIM tools.

**LO4 Social competences** 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.

**LO5 Social competences** Ability to conduct independent and team research using BIM technology and publishing in the field of management based on BIM modeling.

## 6 COURSE CONTENT

Lecture		
No.	Subject matter of the course Detailed description of thematic blocks	No. of class hours
<b>L1</b>	BIM in management - introduction, definitions, divisions, idea. Maturity and development levels BIM (LOD - Level of Development).	2
<b>L2</b>	IPD - Integrated Project Delivery.	2
<b>L3</b>	Classifications of construction works - OmniClass, Unifomat, Masterformat and others. The use of classification in management.	2
<b>L4</b>	BIM-based cost-estimations and scheduling of construction works.	4
<b>L5</b>	BIM and other digital techniques at the construction site (digitization of construction, unmanned aerial vehicles, printing techniques, augmented reality, etc.)	5

Computer laboratory		
No.	Subject matter of the course Detailed description of thematic blocks	No. of class hours
<b>K1</b>	Basics of BIM models handling with the use of dedicated software (model viewers).	8
<b>K2</b>	Cost estimation based on BIM models (e.g. system BIMestiMate and BIM Vision, Norma Expert).	8
<b>K3</b>	Scheduling and simulations of construction works (e.g. BIMestiMate, Navisworks).	6
<b>K4</b>	Creating revisions, checking objects, measuring, checking collisions (e.g. Navisworks Manage, Trimble Connect for Desktop).	4
<b>K5</b>	Project management (BIM 360 cloud tools)	4

## 7 TEACHING TOOLS

N1 multimedia presentation

N2 computer laboratories

N3 BIM software

## 8 STUDENT WORKLOAD

Activity form	Number of hours of activity
<b>Hours realized in contact with the teacher</b>	
Hours resulting from the study plan	45
Consultation hours	2
Exams and tests during session	4
<b>Hours of autonomous student work</b>	
Preparing for classes, studying literature	20
Developing results	25
Preparing of reports, projects presentations, discussion	20
<b>Total number of hours devoted to the subject</b>	<b>116</b>
Total number of ECTS points	4.00

## **9 Methods of grading**

### **Partial grades**

F1 Completion of the lecture in the form of a test

F2 Project evaluation

### **Summary grade**

P1 Average rating weight

### **Conditions for passing the course**

L1 passing lecture part

L2 passing project part

L3 Presence for min. 80% of laboratories classes

# Tadeusz Kosciuszko Cracow University of Technology

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Study profile: general academic

Study form: full-time

Field of study code: BUD

Study cycle: 2st

Specialty: Structural Design and Management in Civil Engineering (profile: Construction Technology and Management)

### 1 COURSE INFORMATION

Course name	Komputerowe wspomaganie zarządzania projektami
Course name in English	Computer Aided Project Management
Course code	WIL BUD oIIS D19 23/24
Course category	Specialty subjects (profile: Construction Technology and Management)
No. of ECTS points	2.00
Semester	3

### 2 CLASS TYPE, NUMBER OF HOURS ACCORDING TO THE STUDY PLAN

Semester	Lecture	Class exercise	Laboratory	Laboratory Computer	Design exercise	Seminar
3	10	0	0	20	0	0

### 3 COURSE OBJECTIVES

**Objective 1** To familiarize students with the operation of project management software.

**Objective 2** To prepare students to conduct research.

## 4 PREREQUISITES IN TERMS OF KNOWLEDGE, SKILLS AND OTHER COMPETENCES

## 5 LEARNING OUTCOMES

**LO1 Knowledge** A student knows the functional capabilities of the selected project management software programs.

**LO2 Skills** A student is able to use project management software to effectively plan construction projects.

**LO3 Skills** A student is able to use project management software to monitor the progress of construction projects.

**LO4 Social competences** A student reliably interprets the results of his work and presents them to those interested in an understandable way.

## 6 COURSE CONTENT

Lecture		
No.	Subject matter of the course Detailed description of thematic blocks	No. of class hours
<b>L1</b>	Presentation of selected project management software.	2
<b>L2</b>	The use of project management software for scheduling construction projects.	4
<b>L3</b>	The use of project management software for monitoring the progress of construction projects. Changes in the schedule.	4

Computer laboratory		
No.	Subject matter of the course Detailed description of thematic blocks	No. of class hours
<b>K1</b>	Presentation of the basic functions of project management software.	2
<b>K2</b>	Individual exercises related to the development of an example project schedule using project management software.	10
<b>K3</b>	Individual exercises related to tracking the progress of an example project using project management software. Making changes to the project schedule.	8

## 7 TEACHING TOOLS

**N1** Laboratory exercises

**N2** Multimedia presentations

**N3** Consultations

## 8 STUDENT WORKLOAD

Activity form	Number of hours of activity
<b>Hours realized in contact with the teacher</b>	
Hours resulting from the study plan	30
Consultation hours	1
Exams and tests during session	1
<b>Hours of autonomous student work</b>	
Preparing for classes, studying literature	28
Developing results	0
Preparing of reports, projects presentations, discussion	0
<b>Total number of hours devoted to the subject</b>	<b>60</b>
Total number of ECTS points	2.00

## 9 Methods of grading

### Partial grades

F1 Test - lecture

F2 Test - computer laboratories

### Summary grade

P1 Weighted average of formative grades (weights: 0.6 for lecture grade and 0.4 for computer laboratory grade)

### Conditions for passing the course

L1 Passing the lecture test.

L2 Passing the test from computer laboratories.

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Study form: full-time

Field of study code: BUD

Study cycle: 2st

Specialty: Structural Design and Management in Civil Engineering (profile: Construction Technology and Management)

### 1 COURSE INFORMATION

Course name	Kontrakty budowlane wg FIDIC
Course name in English	FIDIC contracts
Course code	WIL BUD oIIS E13 23/24
Course category	Subjects Related to Diploma Projects
No. of ECTS points	1.00
Semester	3

### 2 CLASS TYPE, NUMBER OF HOURS ACCORDING TO THE STUDY PLAN

Semester	Lecture	Class exercise	Laboratory	Laboratory Computer	Design exercise	Seminar
3	0	15	0	0	0	0

### 3 COURSE OBJECTIVES

**Objective 1** To familiarize students with the principles of implementation construction projects in accordance with the FIDIC Forms of Contract.



## 4 PREREQUISITES IN TERMS OF KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1 General knowledge of organization and construction management

## 5 LEARNING OUTCOMES

**LO1 Knowledge** Student has a basic knowledge in the field of Conditions of Contract proposed by FIDIC, of the basic forms of contract, the basic procedures, the rights and duties of contract participants.

**LO2 Skills** Student is able to use FIDIC Contract for Construction for Building and Engineering Works) and take actions in accordance with the procedures described there.

**LO3 Skills** Student can prepare a monthly financial statement of completed construction works according to FIDIC procedure.

**LO4 Social competences** Student works on project individually or by team work and presents the results.

## 6 COURSE CONTENT

Class exercise		
No.	Subject matter of the course Detailed description of thematic blocks	No. of class hours
<b>C1</b>	Forms of FIDIC Contract Conditions; General Conditions, Particular Conditions - Contract structure. Analysis of examples of changes in clauses - teamwork.	4
<b>C2</b>	Parties to the Contract - rights and duties. Engineer as a participant of the Contract. Client requirements for the Engineer - student's individual work.	3
<b>C3</b>	Analysis of procedures applicable to construction contracts according to FIDIC - team work.	4
<b>C4</b>	Preparation of the Contractor's monthly financial settlement for the given example - student's individual work	2
<b>C5</b>	Preparation of the Contractor's application for approval of building material - team work.	2

## 7 TEACHING TOOLS

**N1** Multimedia presentations

**N2** discussions

**N3** exercises

**N4** Team work

## 8 STUDENT WORKLOAD

Activity form	Number of hours of activity
<b>Hours realized in contact with the teacher</b>	
Hours resulting from the study plan	15
Consultation hours	1
Exams and tests during session	0
<b>Hours of autonomous student work</b>	
Preparing for classes, studying literature	5
Developing results	2
Preparing of reports, projects presentations, discussion	5
<b>Total number of hours devoted to the subject</b>	<b>28</b>
Total number of ECTS points	1.00

## 9 Methods of grading

### Summary grade

P1 Final test

### Conditions for passing the course

L1 participation in classes, doing exercises, positive grade on the final test

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Study cycle: 2st

Specialty: Structural Design and Management in Civil Engineering (profile: Construction Technology and Management)

### 1 COURSE INFORMATION

Course name	Metody statystyczne w zarządzaniu
Course name in English	Statistical Methods in Management
Course code	WIL BUD oIIS D14 23/24
Course category	Specialty subjects (profile: Construction Technology and Management)
No. of ECTS points	1.00
Semester	2

### 2 CLASS TYPE, NUMBER OF HOURS ACCORDING TO THE STUDY PLAN

Semester	Lecture	Class exercise	Laboratory	Laboratory Computer	Design exercise	Seminar
2	0	0	0	15	0	0

### 3 COURSE OBJECTIVES

**Objective 1** To familiarize students with statistical methods of data analysis and their use in management.

**Objective 2** To prepare students to conduct research.

## 4 PREREQUISITES IN TERMS OF KNOWLEDGE, SKILLS AND OTHER COMPETENCES

## 5 LEARNING OUTCOMES

LO1 **Knowledge** A student knows the selected statistical methods.

LO2 **Skills** A student is able to analyze data using selected statistical methods.

LO3 **Skills** A student is able to verify statistical hypotheses.

LO4 **Social competences** A student reliably interprets the results of calculations.

## 6 COURSE CONTENT

Computer laboratory		
No.	Subject matter of the course Detailed description of thematic blocks	No. of class hours
<b>K1</b>	Parametric description of a sampling distribution.	4
<b>K2</b>	Verification of statistical hypotheses. Statistical tests.	4
<b>K3</b>	Interdependence of phenomena.	3
<b>K4</b>	Regression Analysis.	4

## 7 TEACHING TOOLS

N1 Laboratory exercises

N2 Multimedia presentations

N3 Consultations

## 8 STUDENT WORKLOAD

Activity form	Number of hours of activity
<b>Hours realized in contact with the teacher</b>	
Hours resulting from the study plan	15
Consultation hours	1
Exams and tests during session	1
<b>Hours of autonomous student work</b>	
Preparing for classes, studying literature	13
Developing results	0
Preparing of reports, projects presentations, discussion	0
<b>Total number of hours devoted to the subject</b>	<b>30</b>
Total number of ECTS points	1.00

## 9 Methods of grading

### Partial grades

F1 Test

### Summary grade

P1 Test

### Conditions for passing the course

L1 Passing the test.

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Study cycle: 2st

Specialty: Structural Design and Management in Civil Engineering (profile: Construction Technology and Management)

### 1 COURSE INFORMATION

Course name	Projekty deweloperskie
Course name in English	Property Development Projects
Course code	WIL BUD oIIS D16 23/24
Course category	Specialty subjects (profile: Construction Technology and Management)
No. of ECTS points	2.00
Semester	2

### 2 CLASS TYPE, NUMBER OF HOURS ACCORDING TO THE STUDY PLAN

Semester	Lecture	Class exercise	Laboratory	Laboratory Computer	Design exercise	Seminar
2	15	0	0	0	15	0

### 3 COURSE OBJECTIVES

**Objective 1** Knowledge about the activities of development companies and the conduct and management of a development project.

**Objective 2** The ability to plan a development project.

## 4 PREREQUISITES IN TERMS OF KNOWLEDGE, SKILLS AND OTHER COMPETENCES

## 5 LEARNING OUTCOMES

**LO1 Knowledge** General knowledge in the field of development activity.

**LO2 Knowledge** of property development management - location, cost, supply, demand analysis and feasibility studies, etc. investment monitoring and accounting.

**LO3 Skills** Ability to perform location, cost, demand and supply analyzes, feasibility studies, etc.

**LO4 Social competences** Individual and team work in preparation of a development project.

## 6 COURSE CONTENT

Design exercise		
No.	Subject matter of the course Detailed description of thematic blocks	No. of class hours
<b>P1</b>	Conceptual planning - location analysis, building shape analysis.	5
<b>P2</b>	Demand and supply analyzes	4
<b>P3</b>	Multi-criteria evaluation of a property developer investments.	6

Lecture		
No.	Subject matter of the course Detailed description of thematic blocks	No. of class hours
<b>L1</b>	Definition of a developer company. Forms of construction and division of developer companies. Types of erected objects. Organizational models of the enterprise developer. property developer investment risk. Sources of funding property development investment.	4
<b>L2</b>	Stages of preparation and performance of investment.	2
<b>L3</b>	Management process. The specificity of managing a developer investment. Investment coordination. A property developer team.	2
<b>L4</b>	The developer system in Poland. Developer Act. An image of a developer company.	2
<b>L5</b>	Factors affecting the assessment of developer investments. Time-cost analysis, investment location analysis, demand and supply analysis, etc.	5

## 7 TEACHING TOOLS

**N1** multimedia presentations

**N2** projects

## 8 STUDENT WORKLOAD

Activity form	Number of hours of activity
<b>Hours realized in contact with the teacher</b>	
Hours resulting from the study plan	30
Consultation hours	1
Exams and tests during session	2
<b>Hours of autonomous student work</b>	
Preparing for classes, studying literature	10
Developing results	10
Preparing of reports, projects presentations, discussion	7
<b>Total number of hours devoted to the subject</b>	<b>60</b>
Total number of ECTS points	2.00

## 9 Methods of grading

### Partial grades

F1 Completion of the lecture in in writing form

F2 Project evaluation

### Summary grade

P1 Average rating weight

### Conditions for passing the course

L1 passing lecture part

L2 passing project part

L3 Presence for min. 80% of project classes

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## Course Card

Faculty of Civil Engineering

Field of study: Civil Engineering

Study profile: general academic

Study form: full-time

Field of study code: BUD

Study cycle: 2st

Specialty: Structural Design and Management in Civil Engineering (profile: Construction Technology and Management)

### 1 COURSE INFORMATION

Course name	Seminarium dyplomowe- Budowlany proces inwestycyjny
Course name in English	Diploma Seminar - Construction Investment Process
Course code	WIL BUD oIIS E11 23/24
Course category	Subjects Related to Diploma Projects
No. of ECTS points	1.00
Semester	3

### 2 CLASS TYPE, NUMBER OF HOURS ACCORDING TO THE STUDY PLAN

Semester	Lecture	Class exercise	Laboratory	Laboratory Computer	Design exercise	Seminar
3	0	0	0	0	0	15

### 3 COURSE OBJECTIVES

**Objective 1** Acquaint students with principles of developing thesis and diploma procedure

**Objective 3** Acquaint students with the methods of collecting materials, methods of analysis and presentation of the results of their own work. The acquired knowledge and skills prepare students to solve engineering problems and to prepare scientific papers

**Objective 4** Presentation and constructive criticism of issues analyzed by students as part of their thesis

## **4 PREREQUISITES IN TERMS OF KNOWLEDGE, SKILLS AND OTHER COMPETENCES**

1 Students is obliged to have a specific topic of thesis

## **5 LEARNING OUTCOMES**

**LO1 Knowledge** Student knows the principles of preparing thesis

**LO2 Knowledge** Student knows the rules of thesis presentation and the result of his/her work

**LO3 Skills** Student is able to collect, analyze and present the results of her/his own work

**LO4 Social competences** Student is ready to work independently on a given task, to formulate and to describe the results of her/his own work in a communicative manner. Student is ready to be responsible for the results of work and their interpretation

## **6 COURSE CONTENT**

Seminar		
No.	Subject matter of the course Detailed description of thematic blocks	No. of class hours
<b>S1</b>	Principles of developing thesis. Diploma procedure. Collecting materials, methods of analysis and presentation of the results of students own work	4
<b>S2</b>	Presentation of the results of theses prepared by students combined with discussion and constructive criticism by all participants of the seminar regarding the form of presentation, obtained results and directions of further work	11

## **7 TEACHING TOOLS**

**N1** Multimedia presentations

**N2** Discussion

## 8 STUDENT WORKLOAD

Activity form	Number of hours of activity
<b>Hours realized in contact with the teacher</b>	
Hours resulting from the study plan	15
Consultation hours	0
Exams and tests during session	0
<b>Hours of autonomous student work</b>	
Preparing for classes, studying literature	5
Developing results	5
Preparing of reports, projects presentations, discussion	5
<b>Total number of hours devoted to the subject</b>	<b>30</b>
Total number of ECTS points	1.00

## 9 Methods of grading

### Partial grades

F1 Evaluation of the presentation

### Summary grade

P1 Evaluation of the presentation

### Conditions for passing the course

L1 Evaluation of the presentation - positive grade

### Assessment of activity without teacher participation

B1 Evaluation of the presentation

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Study profile: general academic

Study form: full-time

Field of study code: BUD

Study cycle: 2st

Specialty: Structural Design and Management in Civil Engineering (profile: Construction Technology and Management)

### 1 COURSE INFORMATION

Course name	Technologia robót remontowych i rozbiórkowych
Course name in English	Technology of Renovation and Demolition Works
Course code	WIL BUD oIIS D17 23/24
Course category	Specialty subjects (profile: Construction Technology and Management)
No. of ECTS points	3.00
Semester	2

### 2 CLASS TYPE, NUMBER OF HOURS ACCORDING TO THE STUDY PLAN

Semester	Lecture	Class exercise	Laboratory	Laboratory Computer	Design exercise	Seminar
2	15	0	0	0	15	0

### 3 COURSE OBJECTIVES

**Objective 1** To provide information related to technology of renovation works. To get students acquainted with various types of technologies of renovation works. To prepare students to solve problems within the field of renovation works.

**Objective 2** To provide information related to technology of demolition works. To get students acquainted with various types of technologies of demolition works. To prepare students to solve problems within the field of demolition works.

#### 4 PREREQUISITES IN TERMS OF KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1 Fulfilling the requirements as stated in law and regulations of studying at Cracow University of Technology. Completion of courses according to the sequence of learning at Faculty of Civil Engineering, Cracow University of Technology. Knowledge of technology of construction works.

#### 5 LEARNING OUTCOMES

**LO1 Knowledge** Selected aspects of knowledge within the field of technology of renovation works. Knowledge on the use of resources (labor, materials, machines) in renovation works.

**LO2 Knowledge** Selected aspects of knowledge within the field of technology of demolition works. Knowledge on the use of resources (labor, materials, machines) in demolition works.

**LO3 Skills** Ability to solve selected problems within the field of technology of renovation and demolition works.

**LO4 Social competences** Ability to work in team, ability to work individually. Critical approach to own work and results of analyzes within the field of renovation and demolition works. Ability to discuss results of own or others work.

#### 6 COURSE CONTENT

Design exercise		
No.	Subject matter of the course Detailed description of thematic blocks	No. of class hours
<b>P1</b>	Introduction to design exercises within the field of renovation and demolition works.	1
<b>P2</b>	Design and presentation of a chosen aspect of renovation works - team or individual assignment.	7
<b>P3</b>	Analysis and presentation of a chosen aspect of demolition works - team or individual assignment.	7

Lecture		
No.	Subject matter of the course Detailed description of thematic blocks	No. of class hours
<b>L1</b>	Organizational matters and course description. Presentation of requirements to complete the course.	1

Lecture		
No.	Subject matter of the course Detailed description of thematic blocks	No. of class hours
<b>L2</b>	Introduction to technology of renovation works. Differences between renovation and current repair. Durability and service life in construction. Discussion of the possibilities of taking part in research within the field of technology of renovation works.	2
<b>L3</b>	Renovation technology of insulation works and layering of elements in the ground floor or basement area of the building and in places exposed to moisture.	2
<b>L4</b>	Renovation technology of structural elements including restoration or strengthening of their surfaces, support zones or replacement with a new element. Renovation technology of industrial floors operating in cracked condition.	3
<b>L5</b>	Introduction to technology of demolition works. Discussion of specific conditions of demolition works. Discussion of the possibilities of taking part in research within the field of technology of demolition works.	1
<b>L6</b>	Technology of manual demolition works. Discussion of tools and methods of manual demolition works	2
<b>L7</b>	Technology of mechanized demolition works. Discussion of machines, equipment and methods used in mechanized demolition works.	2
<b>L8</b>	Technology of explosive demolition methods. Discussion of explosive demolition methods.	2

## 7 TEACHING TOOLS

**N1** Lectures, multimedia presentations

**N2** Individual tasks and/or team tasks, assignments

**N3** E-learning

## 8 STUDENT WORKLOAD

Activity form	Number of hours of activity
<b>Hours realized in contact with the teacher</b>	
Hours resulting from the study plan	30
Consultation hours	0
Exams and tests during session	4
<b>Hours of autonomous student work</b>	
Preparing for classes, studying literature	15
Developing results	15
Preparing of reports, projects presentations, discussion	20
<b>Total number of hours devoted to the subject</b>	<b>84</b>
Total number of ECTS points	3.00

## 9 Methods of grading

### Partial grades

F1 Design exercises: individual or team tasks

### Summary grade

P1 Final test

### Conditions for passing the course

L1 Completion of all tasks and assignments within the deadlines

L2 Positive final test grade

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Field of study code: BUD

Study cycle: 2st

Specialty: Structural Design and Management in Civil Engineering (profile: Construction Technology and Management)

### 1 COURSE INFORMATION

Course name	Teoria zarządzania
Course name in English	Management Theory
Course code	WIL BUD oIIS D13 23/24
Course category	Specialty subjects (profile: Construction Technology and Management)
No. of ECTS points	1.00
Semester	2

### 2 CLASS TYPE, NUMBER OF HOURS ACCORDING TO THE STUDY PLAN

Semester	Lecture	Class exercise	Laboratory	Laboratory Computer	Design exercise	Seminar
2	15	0	0	0	0	0

### 3 COURSE OBJECTIVES

**Objective 1** A holistic view on management science.



## 4 PREREQUISITES IN TERMS OF KNOWLEDGE, SKILLS AND OTHER COMPETENCES

## 5 LEARNING OUTCOMES

**LO1 Knowledge** The student knows the basic directions of management theory.

**LO2 Knowledge** The student knows the management functions.

**LO3 Skills** The student is able to assess the management style.

**LO4 Social competences** The student formulates and communicates opinions on management.

## 6 COURSE CONTENT

Lecture		
No.	Subject matter of the course Detailed description of thematic blocks	No. of class hours
<b>L1</b>	The evolution of management theory. Trends in management science.	4
<b>L2</b>	Manager - roles, skills, work efficiency.	3
<b>L3</b>	Planning as a management function.	2
<b>L4</b>	Organization as a management function.	2
<b>L5</b>	Deciding as a management function.	2
<b>L6</b>	Leading as a management function.	2

## 7 TEACHING TOOLS

**N1** Lecture

**N2** Multimedia presentations

## 8 STUDENT WORKLOAD

Activity form	Number of hours of activity
<b>Hours realized in contact with the teacher</b>	
Hours resulting from the study plan	15
Consultation hours	2
Exams and tests during session	2
<b>Hours of autonomous student work</b>	
Preparing for classes, studying literature	6
Developing results	0
Preparing of reports, projects presentations, discussion	0
<b>Total number of hours devoted to the subject</b>	<b>25</b>
Total number of ECTS points	1.00

## 9 Methods of grading

### Partial grades

F1 Test

### Summary grade

P1 Test

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Field of study code: BUD

Study cycle: 2st

Specialty: Structural Design and Management in Civil Engineering (profile: Construction Technology and Management)

### 1 COURSE INFORMATION

Course name	Zaawansowane technologie w pracach budowlanych
Course name in English	Advanced Technologies in Construction Works
Course code	WIL BUD oIIS D18 23/24
Course category	Specialty subjects (profile: Construction Technology and Management)
No. of ECTS points	1.00
Semester	3

### 2 CLASS TYPE, NUMBER OF HOURS ACCORDING TO THE STUDY PLAN

Semester	Lecture	Class exercise	Laboratory	Laboratory Computer	Design exercise	Seminar
3	15	0	0	0	0	0

### 3 COURSE OBJECTIVES

**Objective 1** To provide information related to advanced technologies in construction works.

**Objective 2** To get students acquainted with various types of advanced technologies of reinforced concrete structures formworking, 3D printing technology for construction industry and advanced technologies for smart buildings.

**Objective 3** To familiarize students with various technologies of fast assembly of modular buildings and fast construction of tall buildings, roads, railroads and bridges.

**Objective 4** To prepare students (at a basic level) to take part in research within the field of advanced technologies in construction works.

## 4 PREREQUISITES IN TERMS OF KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1 Basic knowledge of construction works technology.

## 5 LEARNING OUTCOMES

**LO1 Knowledge** Student has a basic knowledge in the field of advanced technologies in construction works.

**LO2 Knowledge** Student has an expanded range of knowledge on the use of advanced reinforced concrete structures formworking, 3D printing technology for construction industry and various technologies of fast assembly of modular buildings and fast construction of tall buildings.

**LO3 Skills** Student is able to solve basic problems related to the selection of the correct advanced technologies for various construction works.

**LO4 Skills** Student is able to discuss the strengths and weaknesses as well as the advantages and disadvantages of using advanced technologies in construction works.

## 6 COURSE CONTENT

Lecture		
No.	Subject matter of the course Detailed description of thematic blocks	No. of class hours
<b>L1</b>	Introduction to the field of advanced technologies in construction works. Directions of development of construction works technologies and opportunities to take part in research within this field.	1
<b>L2</b>	Basics of concrete works technology. Special concreting techniques.	3
<b>L3</b>	Advanced technologies of reinforced concrete structures formworking.	3
<b>L4</b>	Mechanization and robotization of masonry, concrete and finishing works. 3D printing technology for construction industry.	2
<b>L5</b>	Basics of assembly works technology. Advanced technologies for fast assembly of modular buildings and for fast construction of tall buildings.	4
<b>L6</b>	Assembly of prefabricated timber structures with use of advanced technology of CNC (computerized numerical control) processing of building materials and components.	2

## 7 TEACHING TOOLS

**N1** Lectures, multimedia presentations

N2 E-learning

## 8 STUDENT WORKLOAD

Activity form	Number of hours of activity
<b>Hours realized in contact with the teacher</b>	
Hours resulting from the study plan	15
Consultation hours	0
Exams and tests during session	1
<b>Hours of autonomous student work</b>	
Preparing for classes, studying literature	6
Developing results	0
Preparing of reports, projects presentations, discussion	3
<b>Total number of hours devoted to the subject</b>	<b>25</b>
Total number of ECTS points	1.00

## 9 Methods of grading

### Partial grades

F1 Final test of the lecture part

### Summary grade

P1 Grade resulting from the final test of the lecture part

### Conditions for passing the course

L1 Positive grade on the final test of the lecture part

# Tadeusz Kosciuszko Cracow University of Technology

## Course Card

Faculty of Civil Engineering

Field of study: Civil Engineering

Study profile: general academic

Study form: full-time

Field of study code: BUD

Study cycle: 2st

Specialty: Structural Design and Management in Civil Engineering (profile: Construction Technology and Management)

### 1 COURSE INFORMATION

Course name	Zarządzanie procesem inwestycji budowlanych
Course name in English	Management of construction investment process
Course code	WIL BUD oIIS E12 23/24
Course category	Subjects Related to Diploma Projects
No. of ECTS points	3.00
Semester	2

### 2 CLASS TYPE, NUMBER OF HOURS ACCORDING TO THE STUDY PLAN

Semester	Lecture	Class exercise	Laboratory	Laboratory Computer	Design exercise	Seminar
2	15	0	0	0	30	0

### 3 COURSE OBJECTIVES

**Objective 1** Systematizing and complementing students' knowledge about the investment process in construction

**Objective 2** Familiarize students with the legal, environmental and economic circumstances of activities carried out in subsequent phases of the construction investment process and to prepare them for conducting research on this subject

## 4 PREREQUISITES IN TERMS OF KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1 basic knowledge of construction law

## 5 LEARNING OUTCOMES

**LO1 Knowledge** The student has systematized and quite detailed knowledge about the construction investment process

**LO2 Skills** The student is able to analyze and describe the legal, environmental and economic circumstances of activities carried out in subsequent phases of the construction investment process

**LO3 Skills** The student is able to prepare, analyze and evaluate selected elements of construction investment documentation

**LO4 Social competences** The student communicates the results of their own work and team work and is responsible for the reliability of the obtained results

## 6 COURSE CONTENT

Lecture		
No.	Subject matter of the course Detailed description of thematic blocks	No. of class hours
<b>L1</b>	Construction investment process - definitions and structures. Categories of investors and contractors, entities in the vicinity of the construction investment process. Law regulations.	2
<b>L2</b>	Construction investment planning and preparation stage. Activities, analyzes performed during preparation stage. Legal, environmental and economic circumstances. Feasibility studies	6
<b>L3</b>	The process of obtaining the necessary administrative decisions. Types of administrative decisions. Legal, environmental and economic circumstances. Project documentation. Designer role and responsibility.	3
<b>L4</b>	Construction phase. Rights and duties of building process participants at the construction stage. Legal and environmental circumstances. Deviations from the construction design and consequences of changes.	2
<b>L5</b>	The operation phase of the facility. Use of the building object. Legal and environmental circumstances at the operation stage.	2

Design exercise		
No.	Subject matter of the course Detailed description of thematic blocks	No. of class hours
<b>P1</b>	Preliminary studies and pre-project analyzes in the construction investment process. Case study	14

Design exercise		
No.	Subject matter of the course Detailed description of thematic blocks	No. of class hours
<b>P2</b>	Studies and analysis of selected documentation in the investment process. Legal, technical and economic problems of the investment process in the selected. Case study	16

## 7 TEACHING TOOLS

N1 Design exercises

N2 Discussion

N3 Consultation

N4 Individual and team work

N5 Multimedia presentations

N6 Lectures

## 8 STUDENT WORKLOAD

Activity form	Number of hours of activity
<b>Hours realized in contact with the teacher</b>	
Hours resulting from the study plan	45
Consultation hours	3
Exams and tests during session	4
<b>Hours of autonomous student work</b>	
Preparing for classes, studying literature	15
Developing results	8
Preparing of reports, projects presentations, discussion	15
<b>Total number of hours devoted to the subject</b>	<b>90</b>
Total number of ECTS points	3.00

## 9 Methods of grading

### Partial grades

F1 individual and team project



F2 test on lecture topics

**Summary grade**

P1 Weighted average of forming grades 50% + 50%

**Conditions for passing the course**

L1 Rating 1

L2 participation in 80% of design exercise classes

**Assessment of activity without teacher participation**

B1 Test

B1 Projects

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# Tadeusz Kosciuszko Cracow University of Technology

## Course Card

Faculty of Civil Engineering

Field of study: Civil Engineering

Study profile: general academic

Study form: full-time

Field of study code: BUD

Study cycle: 2st

Specialty: Structural Design and Management in Civil Engineering (profile: Construction Technology and Management)

### 1 COURSE INFORMATION

Course name	Zarządzanie ryzykiem w procesie budowlanym
Course name in English	Risk management in construction process
Course code	WIL BUD oIIS E14 23/24
Course category	Subjects Related to Diploma Projects
No. of ECTS points	2.00
Semester	3

### 2 CLASS TYPE, NUMBER OF HOURS ACCORDING TO THE STUDY PLAN

Semester	Lecture	Class exercise	Laboratory	Laboratory Computer	Design exercise	Seminar
3	15	0	0	0	15	0

### 3 COURSE OBJECTIVES

**Objective 1** The ability to make decisions aimed at maximizing income over a longer time horizon when taking an acceptable level of risk.

**Objective 2** Knowledge of risk management in a construction company.

## 4 PREREQUISITES IN TERMS OF KNOWLEDGE, SKILLS AND OTHER COMPETENCES

## 5 LEARNING OUTCOMES

**LO1 Knowledge** of risk management in construction projects.

**LO2 Skills** The ability to identify, analyze and respond to risk in construction projects.

**LO3 Social competences** Independent and team making decisions aimed at maximizing income in a longer time horizon when making an acceptable level risks in construction.

**LO4 Skills** The ability to make decisions and implement actions leading to the construction company reaching an acceptable level of risk.

## 6 COURSE CONTENT

Design exercise		
No.	Subject matter of the course Detailed description of thematic blocks	No. of class hours
<b>P1</b>	Identification and analysis of construction risk.	9
<b>P2</b>	Risk response plan.	6

Lecture		
No.	Subject matter of the course Detailed description of thematic blocks	No. of class hours
<b>L1</b>	Basic concepts and definitions of risk. The specificity of construction and risk sharing. Risk and uncertainty in decision making.	4
<b>L2</b>	Risk Management Diagram.	2
<b>L3</b>	Basic techniques for identifying construction risks.	2
<b>L4</b>	Qualitative and quantitative risk analysis. Occurrence frequency and size of damage.	4
<b>L5</b>	Methods of risk response.	3

## 7 TEACHING TOOLS

**N1** Multimedia lecture

**N2** Projects

**N3** Consultation

## 8 STUDENT WORKLOAD

Activity form	Number of hours of activity
<b>Hours realized in contact with the teacher</b>	
Hours resulting from the study plan	30
Consultation hours	2
Exams and tests during session	2
<b>Hours of autonomous student work</b>	
Preparing for classes, studying literature	10
Developing results	6
Preparing of reports, projects presentations, discussion	7
<b>Total number of hours devoted to the subject</b>	<b>57</b>
Total number of ECTS points	2.00

## 9 Methods of grading

### Partial grades

F1 Completion of the lecture in the form of a test

F2 Project evaluation

### Summary grade

P1 Average rating weight

### Conditions for passing the course

L1 passing lecture part

L2 passing project part

L3 presence for min. 80% of project classes