Lodz University of Technology

Study programme

Faculty:	Faculty of Civil Engineering, Architecture and Environmental Engineering
Major:	brak
Level of study:	second-cycle programme (magister)
Form of study:	full-time studies
Academic year:	2025/26

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Basic information

Name of the field of study:	brak
Level of study:	second-cycle programme (magister)
Study profile:	practical
Form of studies:	full-time studies
Duration of studies (number of semesters):	3
The number of ECTS points required to complete studies:	90
Total number of hours of classes:	1175
The number of ECTS points a student obtains as part of classes conducted with the direct participation of academic teachers or other persons conducting classes:	47
Professional title awarded to graduates:	magister
ISCED code:	0732
Language of study:	polish

Assigning the course to the disciplines to which the learning outcomes relate

Discipline	Percentage share
Civil engineering and transport	100%

Learning outcomes (in relation to the PQF)

No.	Learning outcome code	Learning Outcome Content	Reference to the universal characteristics of the first level of PRK	Reference to the second-level characteristics of the PRK, taking into account the second-level characteristics enabling the acquisition of engineering competences
1	**2BIM1**	Possesses advanced knowledge of the principles governing the design, construction, operation and maintenance, and deconstruction of buildings, utilizing Building Information Modeling (BIM) methodology in compliance with applicable standards, codes and building industry regulations, with consideration of the lifecycle of building structures.	P7U_W	P7S_WG
2	**2BIM10**	Is prepared to independently and responsibly perform professional duties associated with BIM, in compliance with the ethical standards governing BIM-related professions, and is capable of demonstrating an entrepreneurial approach and proactively initiating activities in the public interest.	P7U_K	P7S_KO, P7S_KR
3	**2BIM2**	Demonstrates comprehensive knowledge and understanding of the principles and practical aspects of defining models within the BIM environment. The graduate possesses advanced knowledge of current trends and directions in the development of BIM technology, and identifies complex interrelations between sectors of building industry involved in the investment-building process.	P7U_W	P7S_WG
4	**2BIM3**	Demonstrates well-structured knowledge in the planning and implementation of various forms of entrepreneurship within the construction industry sector. The graduate applies entrepreneurial principles and evaluates their economic, social, and environmental impacts, while maintaining legal compliance with applicable legal regulations, professional ethical standards, and intellectual property protection regulations.	P7U_W	P7S_WK
5	**2BIM4**	Can communicate with a diverse target audience, both related and unrelated to the construction industry, present their own ideas, and debate in Polish or a foreign language at a B2+ level issues related to information management in the construction process.	P7U_U	P7S_UK
6	**2BIM5**	Is able to collaborate effectively within a team involved in the design of a construction, undertaking various roles, including leadership role demanding managing skills and is able to plan and engage in self-directed learning, while inspiring others to undertake similar lifelong learning initiatives.	P7U_U	P7S_UO, P7S_UU
7	**2BIM6**	Is able to critically analyze and verify data related to the construction process contained within a BIM model, formulate conclusions, and effectively communicate them. The graduate designs new solutions as well as modernizes or adapts existing methods and tools for the purpose of the specific requirements of professional practice.	P7U_U	P7S_UW
8	**2BIM7**	Is capable of formulating basic hypotheses related to the identification and resolution of problems arising during the implementation of systems, processes, or technologies. The graduate critically extracts highly detailed data from BIM models, interprets the information and prepares project schedules and cost estimates based on the data.	P7U_U	P7S_UW

No.	Learning outcome code	Learning Outcome Content	Reference to the universal characteristics of the first level of PRK	Reference to the second-level characteristics of the PRK, taking into account the second-level characteristics enabling the acquisition of engineering competences
9	**2BIM8**	Is able to independently design and implement information management procedures and data exchange workflows among stakeholders in construction process in projects elaborated within a BIM environment, taking into account diverse roles and responsibilities, as well as established standards for collaboration and digital documentation.	P7U_U	P7S_UW
10	**2BIM9**	Is prepared to critically evaluate their specialized knowledge related to construction processes and to acknowledge the significance of construction expertise in solving practical problems. The graduate is capable of consulting with other building industry experts when confronted with challenges and difficulties that cannot be resolved independently.	P7U_K	P7S_KK

Matrix of course modules in relation to learning outcomes and curriculum content

No.	Course name	Program content	2BIM1	2BIM10	2BIM2	2BIM3	2BIM4	2BIM5	2BIM6	2BIM7	2BIM8	2BIM9
1	Introduction to architectural design and BIM methodology	Architectural design. Universal design. Introduction to Building Information Modelling methodology.	x		x							
2	Fundamentals of civil engineering with elements of military design	Fundamentals of civil engineering. Introduction to designing infrastructure resistant to crisis situations.	x	x								
3	Building Information Modelling	Creating a BIM model, preparing documentation.	x						x	x		
4	BIM with elements of AI	Advanced BIM modelling.							x	x	x	
5	Certification in civil engineering	Environmental certification systems. Decarbonisation.	x			x				x		
6	Foreign Language for Specialist Purposes	Foreign language course at B2+ level; developing the ability to communicate effectively in speech and writing, using specialist terminology from the field of study.					x			x		
7	Internship 1	Acquiring practical knowledge and professional skills (related to organisation) in the workplace.		x					x			x
8	Designing in a BIM environment	Infrastructure design in BIM. Use of IT tools for structural design.							x	x	x	
9	BIM management	Project management in large construction projects.			x			x			x	
10	Coordination and information transfer in BIM	Coordination and communication in construction projects. CDE Platforms.			x			x			x	
11	Process automation in BIM	Supporting the designer's work. Construction planning and scheduling.							x	x		
12	Digital tools supporting the design process	Models of urbanised environments.							x	x		x
13	Financial aspects of construction processes	Cost estimates and purchases for construction purposes.		x		x			x	x		
14	Interships 2	Acquiring practical knowledge and professional skills (related to the project) in the workplace.		x					x			x
15	Legal and organisational issues in construction processes	Construction law. Tendering procedures.	x	x		x			x			
16	Communication and negotiations with the economy	Communication and interpersonal interactions of a communicative and decision-making nature. Basic economics.		x		x	x					x

No.	Course name	Program content	2BIM1	2BIM10	2BIM2	2BIM3	2BIM4	2BIM5	2BIM6	2BIM7	2BIM8	2BIM9
17	Installations in BIM	Modelowanie instalacji w BIM.					x		x		x	
18	Communication and self-presentation with economics	Communication and consciously shaping the impression we make on others. Business economics.		x		x	x					x
19	Group project	Group interdisciplinary project, case study.						x	x	x		x
20	Diploma Seminar	Methodology for writing dissertations.							x	x		
21	Final Project	Completion of a diploma thesis.		x					x	x		x

ECTS - subjects

No.	Course name	ECTS	Subjects in the field of humanities and social sciences	Elective subjects	Profile items	Classes in a foreign language
1	Introduction to architectural design and BIM methodology	4			4	
2	Fundamentals of civil engineering with elements of military design	4			4	
3	Building Information Modelling	5		5	5	
4	BIM with elements of AI	5		5	5	
5	Certification in civil engineering	4			4	
6	Foreign Language for Specialist Purposes	2				
7	Internship 1	6			6	
8	Designing in a BIM environment	5		5	5	
9	BIM management	6			6	6
10	Coordination and information transfer in BIM	3			3	
11	Process automation in BIM	3		3	3	
12	Digital tools supporting the design process	4		4	4	
13	Financial aspects of construction processes	3	3		3	
14	Interships 2	6			6	
15	Legal and organisational issues in construction processes	2				
16	Communication and negotiations with the economy	2	2	2		
17	Installations in BIM	2			2	
18	Communication and self-presentation with economics	2	2	2		
19	Group project	2		2	2	
20	Diploma Seminar	2			2	
21	Final Project	20		20	20	

ECTS indicators

Name	Value
The total number of ECTS credits that a student must obtain through elective courses (amounting to no less than 30% of the total ECTS credits required to obtain the qualification corresponding to the given level of study)	46/90 (51.11%)
The total number of ECTS credits to be earned by a student through courses in the fields of humanities or social sciences	5
The total number of ECTS credits that a student must obtain from courses developing practical skills, amounting to more than 50% of the total ECTS credits required to graduate from a given level of study	81/90 (90%)

Methods of verifying and assessing learning outcomes

The verification of achieved learning outcomes requires the use of diverse assessment methods appropriate to the categories of knowledge, skills, and social competencies to which these outcomes pertain. The selection of suitable tools also depends on the specific nature of the subject and the format of the classes and is described in detail in the course syllabi. The achievement of the required learning outcomes is assessed through:

1. Written assignments (exams, quizzes, reports, essays, projects, posters, thesis, etc.);
2. Oral assessments (oral exams, public speaking, e.g., delivering a paper, presentation, etc.);
3. Practical and/or project-based tasks (both individual and group work);
4. Observation and evaluation of students' participation and activity during classes;
5. Self-assessment and peer evaluation (especially in the case of group projects);
6. Competency exams and final diploma examinations.

Verification can be formative (partial, conducted multiple times during the course) and/or summative (final grade assessment). The final verification result is given according to the currently applicable grading scale.

The course coordinator or instructor is required to present the course syllabus during the first class and to clearly define and formally communicate the assessment methods and conditions for verifying learning outcomes.

Professional internships

Duration: 3 months

ECTS credits: 12

Internships are carried out in accordance with the study program in a format adapted to the profile and specifics of the field of study, following the regulations set by the faculty and the university.

Characteristics of the course

Graduate profile

A graduate of the master's degree studies “BIM, Modelling and Coordination” is a highly qualified specialist possessing advanced, interdisciplinary knowledge and skills in the field of digital information management within the contemporary construction industry. The graduate’s competencies encompass technical, legal, economic, and ethical aspects, thus positioning them as a valuable member of project teams. During the course of study, the graduate acquired comprehensive proficiency in Building Information Modelling (BIM) across multiple software platforms, enabling the effective application of contemporary digital tools in the processes of structural design as well as in the planning and organization of construction works for both building and infrastructure projects. The graduate’s competencies—including the automation of design processes, data analysis, coordination and management of information flow among stakeholders, as well as thorough knowledge of construction law, applicable regulations, and procedural requirements—significantly contribute to project optimization and are critical to the successful execution of construction projects. In the short-term professional trajectory, the graduate is prepared to undertake roles such as BIM Modeller and BIM Coordinator in a reputable construction company, contributing to the efficient management and implementation of construction projects. In the long term, their goal is to develop a career as a BIM Manager, with the capability to introduce innovative technological solutions into construction processes and to support the strategic optimisation of project and information management systems.

The relationship between the field of study and the university's strategy

The proposed program is fully consistent with the strategic objectives of the University, aligning with numerous priority areas. In particular, substantial potential for development is identified within the domains of IMPACT, INNOVATION, LEADERSHIP, SCIENCE, INFRASTRUCTURE, STAFF, TALENTS, SUSTAINABILITY, EDUCATION, and STUDENTS. The program is designed to attract candidates seeking education within a modern, future-oriented field of study. The proposed studies incorporate the most current trends in the architecture, engineering, and construction sector and integrate the participation of numerous industry practitioners in the teaching process (with over 40% of courses planned to be delivered by external specialists) who implement BIM technologies in enterprises on a daily basis. It is anticipated that graduates will participate in and contribute to the deployment of innovative technologies, thereby exerting a meaningful influence on the socio-economic environment. The application of BIM systems enhances the efficiency of infrastructure development while promoting responsible resource management. Major national investment projects in Poland, including the Central Communication Port (CPK), emphasise the strategic role of BIM technologies in the investment lifecycle. Sustainable development is achieved through meticulous project planning, the elimination of documentation inconsistencies, and the promotion of appropriate organisational culture and process management standards. Furthermore, the program is expected to strengthen the research potential of Lodz University of Technology, fostering collaborative research initiatives between external specialists engaged in teaching and enrolled students. Given the global dimension of investment processes and the international scope of enterprises involved in the implementation of BIM technologies, the program is also projected to develop a strong international character.

Educational objectives and employment and continuing education opportunities

The objective of the program is to educate a specialist in BIM technologies capable of assuming professional responsibilities in modern construction sector enterprises. Due to the increasing number of complex construction projects, BIM models are becoming an indispensable tool, and consequently, the demand for qualified professionals in this field is expected to grow.

Description of the process and outcome of consultations on the proposed study program with the socio-economic environment

The programme was created in response to a market need expressed by partners from the Innovation and Development Council. The programme received a positive review from the Łódź District Chamber of Civil Engineers.

Description of competencies expected from a candidate applying for admission to studies

The admission process will consider graduates of first-cycle (bachelor’s and engineer) programs, second-cycle (master’s) programs, as well as long-cycle programs in the following or related fields: Civil Engineering, Architecture, Urban Planning, Environmental Engineering, Intelligent Building Systems, Environmental Engineering in Civil Construction, Real Estate Management, Management, Economics, Eco-City Studies, or other closely related disciplines.

The unit organizing education

Faculty of Civil Engineering, Architecture and Environmental Engineering

Education program

Semester 1

Course	Number of hours	ECTS points	Form of verification	Obligatory
Introduction to architectural design and BIM methodology	Lecture: 30	4	Exam	Obligatory
Fundamentals of civil engineering with elements of military design	Lecture: 40	4	Graded assignment	Obligatory
Building Information Modelling	Laboratory classes: 60	5	Graded assignment	Obligatory subjects to choose from
BIM with elements of AI	Project work: 60	5	Graded assignment	Obligatory subjects to choose from
Certification in civil engineering	Tutorials: 10 Lecture: 35	4	Graded assignment	Obligatory
Foreign Language for Specialist Purposes	Tutorials: 45	2	Graded assignment	Obligatory
Internship 1	Internship: 0	6	Pass	Obligatory
Sum	**280**	**30**		

Semester 2

Course	Number of hours	ECTS points	Form of verification	Obligatory
Designing in a BIM environment	Laboratory classes: 60	5	Graded assignment	Obligatory subjects to choose from
BIM management	Tutorials: 22 Project work: 15 Lecture: 28	6	Exam	Obligatory

Course	Number of hours	ECTS points	Form of verification	Obligatory
Coordination and information transfer in BIM	Tutorials: 15 Laboratory classes: 10 Lecture: 19	3	Graded assignment	Obligatory
Process automation in BIM	Laboratory classes: 20 Project work: 15	3	Graded assignment	Obligatory subjects to choose from
Digital tools supporting the design process	Laboratory classes: 60	4	Graded assignment	Obligatory subjects to choose from
Financial aspects of construction processes	Tutorials: 28 Lecture: 28	3	Graded assignment	Obligatory
Interships 2	Internship: 0	6	Pass	Obligatory
Sum	**320**	**30**		

Semester 3

Course	Number of hours	ECTS points	Form of verification	Obligatory
Legal and organisational issues in construction processes	Project work: 30 Lecture: 15	2	Graded assignment	Obligatory
Installations in BIM	Project work: 30	2	Pass	Obligatory
Elective Course 1		2	Graded assignment	Obligatory group
The student chooses 1 subject.				
Communication and negotiations with the economy	Tutorials: 30 Lecture: 15	2	Graded assignment	Optional
Communication and self-presentation with economics	Tutorials: 30 Lecture: 15	2	Graded assignment	Optional
Group project	Project work: 20	2	Graded assignment	Obligatory subjects to choose from

Course	Number of hours	ECTS points	Form of verification	Obligatory
Diploma Seminar	Seminar: 15	2	Graded assignment + exam	Obligatory
Final Project	Diploma Thesis: 0	20	Pass	Obligatory subjects to choose from
Sum	**155**	**30**		