COURSE DESCRIPTION CARD - SYLLABUS

Course name
BIM technology [S2Bud1E>TBIM3]

Course

Field of study
Civil Engineering

Year/Semester
2/3

Area of study (specialization)
Structural Engineering

Profile of study
general academic

Level of study
second-cycle

Course offered in
English

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
15

Laboratory classes
15

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

2,00

Coordinators

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Lecturers

Prerequisites

Students should have: – passed BIM Technology sem.1 and 2 II courses; – the ability to model and coordinate BIM models; – knowledge of the principles of technical documentation preparation; – basic knowledge of the investment process; – language skills (English) at a minimum B2 level.

Course objective

Acquiring skills in information management, data integration and working in advanced BIM environments, including CDE and as-built data.

Course-related learning outcomes

Knowledge
Student:
– has in-depth knowledge of BIM technology and the algorithms used in design and information management software;
– has structured knowledge of managing processes in the life cycle of a facility;
– knows the principles of creating procedures for managing the quality and efficiency of construction projects;

– knows the standards and regulations concerning documentation and data exchange in the construction process.

Skills
– is able to use advanced IT tools for the integration and management of project data;
– can develop a BIM model based on external data (e.g. point clouds) and prepare technical documentation;
– can integrate information from various digital sources and interpret it;
– is able to work in a team and manage information flow in a digital environment.

Social competences
Student:
– is responsible for the reliability and quality of digital data;
– is willing to continuously develop their skills in the field of modern technologies ;
– complies with the principles of professional ethics and intellectual property protection in the digital environment.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture – written test, preparation of required documents. When assessing learning outcomes, the grading scale and the allocation of marks to percentage bands set out in the Study Regulations apply.

Laboratory – activity and progress during classes, creation of a model based on a point cloud, and work in CDE. When assessing learning outcomes, the grading scale and the allocation of marks to percentage bands set out in the Study Regulations apply.

Programme content

BIM implementation strategies in organisations; openBIM and interoperability; information exchange standards; Common Data Environment (CDE); version management and data quality control; BIM integration with cost estimation (5D); BIM integration with scheduling (4D); real data acquisition – scanning and point clouds; point cloud-based modelling; information management throughout the facility lifecycle.

Course topics

– Lectures
• BIM implementation strategies in companies
• openBIM and system interoperability
• Data exchange standards (IFC, ISO 19650 – extension)
• CDE environment – structure and functioning
• Version management and data responsibility
• BIM as an information management process
• Introduction to 4D BIM (scheduling)
• Introduction to 5D BIM (cost estimation)
• Integration of data from various sources
• Digital mapping of existing objects
• 3D scanning and point clouds
• Information quality management
• Organisation of teamwork in CDE

– Laboratories
• Introduction to point clouds
• Importing and basic processing of point clouds
• Modelling elements based on scans
• Creating a BIM model of an existing object
• Verifying the model's compliance with the scan
• Linking the model to the schedule (4D – basics)
• Linking the model to costs (5D – basics)
• Introduction to the CDE platform

• Folder structure and assigning permissions
• Uploading and versioning files
• Defect tracking in the CDE environment
• Quality control and data responsibility
• Project presentation

Teaching methods

• Problem-based lecture with multimedia presentation
• Demonstration of work in a BIM environment
• Design exercises in the laboratory
• Analysis of BIM implementation cases
• Discussion and student presentations

Bibliography

Basic
1. Eastman, C. et al. (2018). BIM Handbook. Wiley.
2. Borrmann A. et al. (2018). Building Information Modeling: Technology foundations and industry practice. Springer.
3. ISO 19650 Organization and digitization of information about buildings and civil engineering works, including building information modelling (BIM).

Additional
1. Hardin, B., McCool, D. (2015). BIM and Construction Management. Wiley.
2. Succar, B. (2015). BIM Framework and Maturity Models.
3. Smith, P. (2014). BIM Implementation – Global Strategies.
4. buildingSMART International. IFC Specification Documentation.

Breakdown of average student's workload

	Hours	ECTS
Total workload	60	2,00
Classes requiring direct contact with the teacher	30	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	30	1,00