COURSE DESCRIPTION CARD - SYLLABUS

Course name
BIM technology [S2Bud1E>TBIM1]

Course

Field of study
Civil Engineering

Year/Semester
1/1

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

Student should have: – knowledge of structural design and the investment process; – ability to prepare technical documentation in a CAD environment; – language skills (English) at a minimum B2 level.

Course objective

An introduction to BIM methodology and the acquisition of basic skills in modelling and organising information within a digital model.

Course-related learning outcomes

Knowledge
Student:
– has in-depth knowledge of the algorithms used in design support programmes, including BIM technology;
– knows the principles of designing and operating buildings in the context of their life cycle;
– knows the basic standards, norms and regulations related to BIM

Skills
Student:

– is able to develop a building design and prepare documentation in a BIM environment;
– is able to use specialized IT tools to support the design process;
– is able to integrate information and present the results of modelling work.

Social competences
Student:
– is ready to develop competences in the field of modern technologies in construction (KB_K03);
– understands the importance of responsibility for the reliability of the developed model and data (KB_K01);
– complies with the principles of professional ethics and intellectual property protection.

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, correct model execution and export to IFC. 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 as an information management process; the life cycle of a building in a digital environment; the structure and semantics of a BIM model; levels of detail (LOD/LOI/LOIN); BIM dimensions; ISO 19650 standard – basics; IFC format and the openBIM concept; modelling steel structures; model coordination and data validation.

Course topics

– Lectures
• Introduction to BIM technology and digital transformation
• BIM as a process – differences between CAD and BIM
• The life cycle of a building in a BIM environment
• Dimensions of a BIM model
• Information structure and model organisation
• Levels of detail (LOD), levels of information (LOI), and Levels of Information Need (LOIN)
• BIM maturity and implementation levels
• ISO 19650 standard – basics
• IFC format and the openBIM concept
• Interoperability and data exchange
• BIM Execution Plan – introduction
• Interdisciplinary coordination
• Examples of BIM implementations

– Laboratories
• BIM programme interface and working environment
• Creating a structural grid
• Modelling main steel hall elements
• Modelling secondary elements
• Relationships and dependencies in the model
• Organising views and project structure
• Element lists
• Generating drawing documentation
• Verifying the correctness of the model
• Exporting to IFC format
• Analysing the IFC model
• Correcting and optimising the model
• Presenting projects

Teaching methods

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

Bibliography

Basic
1. Eastman, C. et al. (2018). BIM Handbook. Wiley.
2. Borrmann A., Koenig M., Koch C., Beetz J., 2018, Building Infor¬mation Modeling: Technology foundations and industry prac¬tice. Springer.
3. ISO 19650 Organization and digitization of information about buildings and civil engineering works, including building information modelling (BIM).
4. EN 17412:2020, BIM – Level of Information Need

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