

THE WORKING PROGRAM OF THE DISCIPLINE

Name of the discipline

BIM-Technology in Construction Management

It is recommended for the direction of preparation

08.04.01 Civil Engineering

Direction of the program (profile)

Civil Engineering and Built Environment,
Mechanics of materials and engineering structures,
Built environment of smart city

1. Goal and objectives of the discipline:

The goal of this course is to provide students with the skills and knowledge of model-based workflows in the construction management using Building Information Modelling (BIM) technologies.

Discipline objectives:

- To establish an understanding of BIM basics and BIM tools.
- To provide the students with essentials of cloud-BIM for design/construction coordination.
- To present BIM tools and new workflows of construction planning & 4D scheduling.
- To familiarize students with model-based estimating.

2. The place of the discipline in the structure of the educational program:

The discipline " BIM-Technology in Construction Management" belongs to the variable part of block 1 of the curriculum.

Table 1 shows the previous and subsequent disciplines aimed at the formation of the discipline's competencies in accordance with the competence matrix of the OP VO.

Table No. 1

Previous and subsequent disciplines aimed at the formation of competencies

№	Code and name of competence	Preceding disciplines	Subsequent disciplines (groups of disciplines)
Universal competencies			
	УК-7		
General professional competencies			
	ОПК-4		
Professional competencies (type of professional activity of a civil engineer)			
	ПК-2		
	ПК-8		
	ПК-9		
	ПК-10		
	ПК-11		
Professional and specialized competencies of specialization			

3. 3. Requirements for the results of mastering the discipline:

The process of studying the discipline is aimed at the formation of the following competencies:

- УК-7- the ability to search for the necessary sources of information and data, perceive, analyze, remember and transmit information using digital means, as well as using algorithms when working with data obtained from various sources in order to effectively use the information received to solve problems; evaluate information, its reliability, build logical conclusions based on incoming information and data;
- ОПК-4- the ability to use and develop project and administrative documentation, as well as participate in the development of regulatory legal acts in the field of the construction industry and housing and communal services;
- ПК-2- development of project products based on the results of engineering and technical design for urban planning activities
- ПК-8- determination of the cost of construction and installation works performed by a construction organization;
- ПК-9- conducting planning and economic work in a construction organization;
- ПК-10- organization of the preparatory process for the development of documentation necessary for the execution of construction and installation works;

- ПК-11- preparation of the section of project documentation for metal structures of buildings and structures.

As a result of studying the discipline, the student must:

Know:

- the theoretical and practical knowledge;
- the state standards and be able to use them;
- the basic methods of estimation of building structures;
- the basics of organizing the work of a project team;
- the basics of making executive decisions and determining the order of work;
- the knowledge of specialized software.

Be able to:

- use the theoretical and practical knowledge;
- use the state standards;
- use methods of estimation of building structures;
- organize the work of a project team;
- make executive decisions and determine the order of work;
- use specialized software.

Own:

- application of theoretical knowledge in practice;
- application of the state standards;
- using the estimation methods of building structures;
- organizing the work of a project team;
- making executive decisions and determining the order of work;
- using of specialized software.

4. Scope of discipline and types of educational work

The total workload of the discipline is 4 credit units.

Type of educational work	Total hours	Modules			
		5			
Classroom classes (total)	54	54			
Including:	-	-	-	-	-
<i>Lectures</i>	18	18			
<i>Practical lessons (PL)</i>	36	36			
<i>Seminars (S)</i>	-	-			
<i>Laboratory work (LW)</i>	-	-			
Independent work (total)	90	90			
Total laboriousness	hour	144	144		
	credits	4	4		

5. Content of the discipline

5.1. Contents of discipline sections

№	Name of the discipline section	Content of the section (topics)
1.	BIM Technology	The concept of BIM. Project delivery methods and BIM implementation. Levels of Development (LOD). Applications in construction management.
2.	Cloud-BIM for design/construction coordination & clash detection	BIM for buildability scenario forecasting. Interference management. Clash detection.
3.	Construction Planning and 4D Simulation	Construction planning. Elements to model location for scheduling tasks. 4D simulations.

4.	Quantity Takeoff and Cost Estimating	Types of estimates. Conceptual estimate. Detailed estimate. Model-based calculation.
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5.2. Sections of disciplines and types of classes

No.	Discipline section No.	Lectures.	Practice	Lab. works	Seminars	Independent work of students	Total hour.
1.	BIM Technology	3	0	0	6	12	21
2.	Cloud-BIM for design/construction coordination & clash detection	6	0	0	12	26	44
3.	Construction Planning and 4D Simulation	3	0	0	6	26	35
4.	Quantity Takeoff and Cost Estimating	6	0	0	12	26	44

6. Laboratory workshop (if available)

№ п/п	№ discipline section	Name of laboratory work	laboriousness (hour)
1.	-	-	
2.	-	-	
...	-	-	

7. Practical exercises (seminars) (if available)

№ п/п	№ discipline section	Topics of practical classes (seminars)	laboriousness (hour)
1.	BIM Technology	Delivery methods for BIM, Levels of Development (LOD), Applications in construction management	21
2.	Cloud-BIM for design/construction coordination & clash detection	Interference management, clash detection	44
3.	Construction Planning and 4D Simulation	4D simulations	35
4.	Quantity Takeoff and Cost Estimating	Model-based estimating	44

8. Материально-техническое обеспечение дисциплины:

classroom with a list of material and technical support	Location
Lecture room № 418 Equipment and furniture: - a set of specialized furniture; - chalk board; - projection screen; - multimedia projector. - computers	Moscow, Ordzhonikidze str., 3
Classroom for seminars and practical classes № 373 Equipment and furniture: - a set of specialized furniture; - chalk board; - projection screen;	Moscow, Ordzhonikidze str., 3

<ul style="list-style-type: none"> - multimedia projector. - computers 	
<p>Classroom for independent and research work of students № 373</p> <p>Equipment and furniture:</p> <ul style="list-style-type: none"> - a set of specialized furniture; - chalk board; - projection screen; - multimedia projector. - computers 	<p>Moscow, Ordzhonikidze str., 3</p>

9. Information support of the discipline:

a) software

- Windows
- MS-office
- Autodesk Revit
- Autodesk Navisworks

б) databases, information and reference systems and search engines

- Yandex search engine <https://www.yandex.ru/>
- Google search engine <https://www.google.ru/>
- Site of the Ministry of Construction and Housing and Communal Services of the Russian Federation <http://www.minstroyrf.ru/>
- Electronic library system RUDN - EBS RUDN <http://lib.rudn.ru/MegaPro/Web>
- EBS "University Library Online" <http://www.biblioclub.ru>
- EBS "Student Consultant" www.studentlibrary.ru
- EBS "Doe" <http://e.lanbook.com/>

10. Educational and methodological support of the discipline:

a) main literature

- “BIM and Construction Management: Proven Tools, Methods, and Workflows”, Brad Hardin, Dave McCool, John Wiley & Sons, 2016.
- “BIM Handbook: A Guide to Building Information Modeling for Owners, Managers, Designers, Engineers and Contractors”, Chuck Eastman, Paul Teicholz, Rafael Sacks, Kathleen Liston, Wiley, 2016.
- “Building Information Modeling: Planning and Managing Construction Projects with 4D CAD and Simulations”, McGraw Hill Professional, Kymmell, Willem, 2018.

б) additional literature

- Talapov, VV BIM technology: the essence and features of the implementation of information modeling of buildings / VV Talapov. Moscow: DMK-Press, 2016. - 410 p.

11. Methodological guidelines for students on the development of the discipline (module):

Lectures are delivered in classrooms equipped with technical training facilities and video projectors. Lectures should be presented in the form of PowerPoint presentations.

Practical work is carried out in a classroom fully equipped with computers and required softwares.

The control measures consist of five control papers, an exam at the end of the module.

The course provides tasks. Tasks are performed by students independently with the possibility of receiving teacher's advice at the established hours, are issued in the form of an explanatory note on A4 sheets with the obligatory presence of a title page, on which, if necessary, the teacher points out mistakes, writes comments.

Methodological recommendations for the student are posted in the TUIS.

12. Fund of evaluation funds for conducting intermediate certification of students in the discipline (module)

Materials for assessing the level of mastering the educational material of the discipline "BIM-Technology in Construction Management" (evaluation materials), including a list of competencies indicating the stages of their formation, a description of indicators and criteria for evaluating competencies at various stages of their formation, a description of evaluation scales, standard control tasks or other materials necessary for evaluating knowledge, skills, skills and (or) experience of activity that characterize the stages of competence formation in the process of mastering the educational program, methodological materials, the defining procedures for assessing knowledge, skills, skills and (or) experience of activity that characterize the stages of competence formation are fully developed and are available to students on the discipline page in the TUIS RUDN.

The program is compiled in accordance with the requirements of the OS VO RUDN.

Developer:

Ass. Professor

Department of Civil engineering



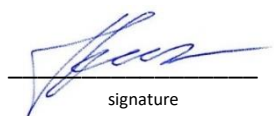
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