Federal State Autonomous Educational Institution of Higher Education
"Peoples' Friendship University of Russia"

Academy of Engineering

Recommended by ISSC

THE WORKING PROGRAM OF THE DISCIPLINE

Name of the discipline

Life Cycle Economics of Buildings

It is recommended for the direction of preparation

08.04.01 Civil Engineering

Direction of the program (profile)

Civil Engineering and Built Environment

1. Goal and objectives of the discipline:

The goal of this course is to provide students with the skills and knowledge needed to effectively use the principles of engineering economy in construction.

Discipline objectives:

- To establish an understanding of engineering economy principles.
- To provide the students with essentials of life cycle economics of building.
- To familiarize students with the analysis methods.
- To present some applications.

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

The discipline " Life Cycle Economics of Buildings " 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-2		
General professional competencies			
	ОПК-7		
Professional competencies (type of professional activity of a civil engineer)			
	ПК-3		
	ПК-4		
	ПК-8		
	ПК-9		
Vocational Competencies of Specialization Structural mechanics			

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-2- Ability to manage a project at all stages of its life cycle;
– ОПК-7- Ability to manage an organization operating in the construction industry and the field of housing and communal services, organize and optimize its production activities;
– ПК-3 Maintenance of technical maintenance of civil buildings
– ПК-4- Management of the complex of works for the operation and repair of civil buildings;
– ПК-8- Determination of the cost of construction and installation work performed by a construction organization;
– ПК-9- conducting planning and economic work in a construction organization.

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 making executive decisions and determining the order of work;

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 5 credit units.

Type of educational work	Total hours	Semester			
		6			
Classroom classes (total)	32	32			
Including:	-	-	-	-	-
Lectures	16	16			
Practical lessons (PL)	-	-			
Seminars (S)	-	-			
Laboratory work (LW)	16	16			
Independent work (total)	58	58			
Total laboriousness hour	108	108			
credits	3	3			

5. Content of the discipline

5.1. Contents of discipline sections

№	Name of the discipline section	Content of the section (topics)
1.	Introduction	Engineering economy. Decision making process. Costs. Concepts of engineering economics analysis.
2.	Time value of money	Time value of money. Cash flow/time diagram. Single payment. Uniform series payments. Uniform infinite series. Arithmetic gradient uniform series payments.
3.	Economic Evaluation	Economics evaluation. Planning horizon. Life cycle costing. Present worth analysis. Equivalent uniform annual worth analysis. Rate of return method. Benefit/cost ratio method. Payback period.
4.	Applications	Depreciation. Estimating equipment costs (rentals). Sensitivity analysis. Breakeven analysis.

5.2. Sections of disciplines and types of classes

No.	Discipline section No.	Lectures.	Practice	Lab. works	Seminars	Inde-pendent work of students	Total hour.
1.	Introduction	2	2	0	0	8	12
2.	Time value of money	6	6	0	0	20	32
3.	Economic Evaluation	6	6	0	0	20	32
4.	Applications	2	2	0	0	10	14

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.	Introduction	Engineering economy. Decision making process. Costs. Concepts of engineering economics analysis.	2
2.	Time value of money	Time value of money. Cash flow/time diagram. Single payment. Uniform series payments. Uniform infinite series. Arithmetic gradient uniform series payments.	6
3.	Economic Evaluation	Economics evaluation. Planning horizon. Life cycle costing. Present worth analysis. Equivalent uniform annual worth analysis. Rate of return method. Benefit/cost ratio method. Payback period.	6
4.	Applications	Depreciation. Estimating equipment costs (rentals). Sensitivity analysis. Breakeven analysis.	2

8. Material and technical support of the discipline:

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; - multimedia projector. - computers	Moscow, Ordzhonikidze str., 3
Classroom for independent and research work of students № 373 Equipment and furniture: - a set of specialized furniture; - chalk board; - projection screen; - multimedia projector. - computers	Moscow, Ordzhonikidze str., 3

9. Information support of the discipline:

а) software.

- Windows
- MS-office.

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:

а) main literature

- “BASICS OF ENGINEERING ECONOMY” Published by McGraw-Hill, a business unit of The McGraw-Hill Companies, Inc., 1221. Avenue of the Americas, New York, NY 10020
- Newnan, D.G., Eschenbach, T.G., Lavelle, J.P., and Lewis, N.A. (2020). Engineering Economic Analysis, 14th Ed. Oxford University Press.

б) additional literature

- Economic and Financial Analysis for Engineering and Project Management. ISBN 9780367399382. Published October 7, 2019 by CRC Press. 221 Pages

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.
Preparation for a practical lesson should begin with familiarization with the lecture material, with studying the plan of practical classes. Having determined the problem, you should refer to the recommended literature.
During the training process, the student must not only master the curriculum, but also acquire the skills of independent work. Independent work of students plays an important role in fostering a conscious attitude of students themselves to mastering theoretical and practical knowledge, instilling in them the habits of directed intellectual work. Independent work is carried out in order to deepen knowledge of the discipline.
Control measures consist of five control papers. Exam at the end of the module.
The main guidelines for preparing for the intermediate certification in the discipline are a summary of lectures and a list of recommended literature. When preparing for the session, the student should organize the educational work in such a way that all practical works are submitted and protected before the first day of the session.
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 " Life Cycle Economics of Buildings " (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 — signature — Elsheikh A.M (surname, initials)

Director
Department of Civil engineering — signature — Rynkovskaya M.I. (surname, initials)