

**Federal State Autonomous Educational Institution of Higher Education
PEOPLES' FRIENDSHIP UNIVERSITY OF RUSSIA
NAMED AFTER PATRICE LUMUMBA
RUDN University**

Engineering Academy

(educational division (faculty/institute/academy) as programme developer)

Department of Construction Technology and Structural Materials

(department realizing the PhD program)

COURSE SYLLABUS

Building designs, buildings and constructions

(course title)

Scientific specialty:

2.1.1. Building designs, buildings and constructions

(scientific speciality code and title)

The course instruction is implemented within the PhD programmes:

Building designs, buildings and constructions

(PhD program title)

1. DISCIPLINE (MODULE) GOAL

The objective of mastering the discipline «Building designs, buildings and constructions» is to gain knowledge, skills, and experience in the field of calculation of structures and structures that characterize the stages of competence formation and ensure the achievement of the planned results of the development of the educational program and also preparation for the candidate's examinations and obtaining knowledge, skills and experience in the field of construction.

2. REQUIREMENTS FOR LEARNING OUTCOMES

Mastering the discipline is aimed at preparing for passing candidate exams, as well as mastering the following competencies:

Knowledge of the methodology of theoretical and experimental research in the field of construction;

Possession of a culture of scientific research in the field of construction, including the use of the latest information and communication technologies;

Possession of methods for developing scientific and methodological foundations for research, improvement, theoretical, experimental and feasibility studies for the use of various technical solutions and technologies in construction;

Possession of innovative science-based methods for designing structures and devices for obtaining water from natural sources, its preparation for various needs, transportation to places of consumption, subsequent processing with rational use in technological cycles, taking into account the requirements of ensuring environmental safety, increasing the efficiency and reliability of the functioning of water systems economy of settlements, industrial enterprises and territorial-industrial complexes.

3. WORKLOAD OF THE DISCIPLINE AND TYPES OF ACTIVITIES

The overall workload of the discipline «Building designs, buildings and constructions» is 3 credit units (108 academic hours).

Types of activities	Total ac. hrs.	Semesters
		3
<i>Classroom activities (total), including:</i>	60	60
В ТОМ ЧИСЛЕ:		
Lectures (LC)	30	30
Laboratory activities (LA)	–	–
Practical lessons/Seminars (PC)	30	30
<i>Independent work</i>	48	48
<i>Intermediate certification (test with assessment/exam)</i>	–	–
Overall workload	ac. hrs.	108
	credits	3

4. DISCIPLINE CONTENTS

Name of the discipline section	Contents of the section (topic)	Type of study work
Section 1. Calculation of the transverse frame of an agricultural building	Theme 1.1. Determination of loads and impacts acting on the transverse frame of an agricultural building	LC, PC
	Theme 1.2. General calculation of a transverse frame based on a flat FE model. Analysis of calculation results	
	Theme 1.3. General calculation of the transverse frame based on the spatial FE model. Analysis of calculation results	

	Theme 1.4. Selection of sections and checking the strength of the main wooden elements that make up the frame (posts, crossbars, braces)	
Section 2. Calculation of glued metal-wood trusses and beams on plate dowels	Theme 2.1. General FE calculation of a glued metal-wood truss. Analysis of calculation results	
	Theme 2.2. Selection of sections and checking the strength of elements of a glued metal-wood truss	
	Theme 2.3. Study of the stress-strain state (SSS) of the support unit of a glued metal-wood truss based on flat (two-dimensional) and spatial (volumetric) FE models	
Section 3. Calculation of the transverse frame of a steel frame of a multi-story building	Theme 3.1. Determination of loads and influences acting on the transverse frame of a steel frame of a multi-story building	
	Theme 3.2. General calculation of the transverse frame of a steel frame of a multi-story building based on a flat FE model. Analysis of calculation results	
	Theme 3.3. General calculation of the transverse frame of a steel frame of a multi-story building based on a spatial FE model. Analysis of calculation results	
	Theme 3.4. Selection of sections and checking the strength of the main load-bearing elements of the steel frame of a multi-story building	
Section 4. Calculation of a metal truss	Theme 4.1. General FE calculation of a metal roof truss. Analysis of calculation results	
	Theme 4.2. Selection of sections and checking the strength of metal roof truss elements	
	Theme 4.3. Study of the stress-strain state (SSS) of the nodes of a metal truss based on flat (two-dimensional) and spatial (volumetric) FE models	
	Theme 4.4. Design and drawing of a metal roof truss	

5. EQUIPMENT REQUIREMENTS AND TECHNOLOGY SUPPORT

Room Type	Room Equipment	Specialized educational / laboratory equipment, software and materials for mastering the discipline
Class for Seminars, Lectures	Room for seminar-type classes, equipped with a set of specialized furniture, board (screen) and technical / multimedia gadgets	Not necessary
Self-Work Class	Room for self-working (can be used for lecture and seminars activities), equipped with a set of specialized furniture, board (screen) and technical / multimedia gadgets and computers with an access to EIPES	Not necessary
Computer class	Computer class for conducting classes, group and individual consultations, ongoing	RUDN University software: Plaxis 2D Suit

	monitoring and intermediate certification, equipped with personal computers (9 pcs.), a whiteboard (screen) and technical means for multimedia presentations.	(Network license). Plaxis Professional (version 8) + Plaxis Dynamics Modul + PlaxFlow (version 1) - Education Registration number 90-07-019-00261-3 MS-office corporate, Registration code: 86626883 Parent program: 86493330 Status: Active
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6. METHODOLOGICAL SUPPORT AND LEARNING MATERIALS

Main readings:

1. Yudina, A.F. Metal and reinforced concrete structures. Montage: textbook for universities / A. F. Yudina. — 2nd ed., rev. and additional - Moscow: Yurayt Publishing House, 2019. - 302 p. — (Series: Specialist). — ISBN 978-5-534-06927-3. — Text: electronic // EBS Law [website]. — URL: <https://biblio-online.ru/bcode/434494> (access date: 04/01/2019).
2. Krivoshapko, S. N. Architectural and construction structures: a textbook for academic undergraduates / S. N. Krivoshapko, V. V. Galishnikova. - Moscow: Yurayt Publishing House, 2019. - 460 p. — (Series: Bachelor. Academic course). — ISBN 978-5-534-03143-0. — Access mode: HYPERLINK <https://biblio-online.ru/bcode/432798>
3. Tukhfatullin, B. A. Numerical methods for calculating building structures. Finite element method: textbook. manual for academic undergraduates / B. A. Tukhfatullin. — 2nd ed., rev. and additional - Moscow: Yurayt Publishing House, 2019. - 157 p. — (Series: Bachelor. Academic course). — ISBN 978-5-534-08899-1. — Access mode: HYPERLINK <https://biblio-online.ru/bcode/442338>

Additional readings:

1. Krivoshapko, S. N. Constructions of buildings and structures: a textbook for secondary vocational education / S. N. Krivoshapko, V. V. Galishnikova. - Moscow: Yurayt Publishing House, 2019. - 476 p. — (Series: Professional education). — ISBN 978-5-534-02348-0. — Access mode: HYPERLINK <https://biblio-online.ru/bcode/433396>
2. Dedyukh, R.I. Materials science and technologies of structural materials. Fusion welding technology: textbook. manual for applied bachelor's degree / R. I. Dedyukh. - Moscow: Yurayt Publishing House, 2019. - 169 p. — (Series: Universities of Russia). — ISBN 978-5-534-01539-3. — Text: electronic // EBS Law [website]. — URL: <https://biblio-online.ru/bcode/433979> (access date: 04/01/2019).
3. Yudina, A. F. Building structures. Montage: textbook for open source education / A. F. Yudina. — 2nd ed., rev. and additional - Moscow: Yurayt Publishing House, 2019. - 302 p. — (Series: Professional education). — ISBN 978-5-534-07027-9. — Access mode: HYPERLINK <https://biblio-online.ru/bcode/442133>
4. Shambina S.L. Structural mechanics [Text/electronic resource]: Lecture notes. / S.L. Shambina. - Electronic text data. - M.: Publishing house RUDN, 2015. - 48 p. : ill. - ISBN 978-5-209-06779-5: 42.15. Access mode: http://lib.rudn.ru/MegaPro/UserEntry?Action=Rudn_FindDoc&id=447028&idb=0

Internet sources:

ELS RUDN University and third party EBS, to which university students have access based signed contracts:

- RUDN Electronic Library System, <http://lib.rudn.ru/MegaPro/Web> ;
 - ELS University Library Online, <http://www.biblioclub.ru> ;
 - EBS Urayt, <http://www.biblio-online.ru> ;
 - ELS Student Consultant, <http://www.studentlibrary.ru> ;
 - EBS Lan, <http://e.lanbook.com> ;
 - EBS Trinity Bridge <http://www.trmost.ru>
- Databases and search engines:
- Electronic fund of legal and normative-technical documentation, <http://docs.cntd.ru> ;
 - Yandex search system [https:// www .yandex.ru](https://www.yandex.ru) ;
 - Google search system <https://www.google.com> ;
 - Reference database Scopus , <http://www.elsevierscience.ru/products/scopus>

Educational and methodological materials for students' self-work studying the discipline / module:

A course of lectures on the discipline «Building designs, buildings and constructions».

7. ASSESSMENT TOOLKIT AND GRADING SYSTEM FOR EVALUATION OF PHD STUDENTS' COMPETENCES LEVEL AS COURSE RESULTS

Assessment toolkit and a grading system to evaluate the level of competences (competences in part) formation as the course results are specified in the Appendix to the course syllabus.

DEVELOPERS:

Professor

A.P. Svintsov

HEAD OF THE DEPARTMENT

Director of the department

S.B. Yazyev