



Technology of production of materials and products for construction purposes

Work program educational component (Syllabus)

Educational component details

Level of higher
education

First (bachelor's)

Discipline	13
Specialty	133 Industrial mechanical engineering
Educational program	Engineering of equipment for the production of polymer and building materials and products
Status educational component	Selective
Form of study	full-time (day)
Year of training, semester	3rd year, fall semester
Amount educational component	4 (120)
Semester control/control measures	Test
Class schedule	4 hours per week (2 hours of lectures, 2 hours of practical classes)
Language of instruction	Ukrainian
Information about course leader/teachers	Lecturer, practical: Doctor of Philosophy, Associate Professor, Shvachko Denys Grigorovich, http://intellect.cpsm.kpi.ua/profile/hdg3
Course placement	Sikorsky Platform

Educational component program

1. **Description** educational component, its purpose, subject of study and learning outcomes

A feature of modern construction is an extremely wide range of new materials, products and technologies, which are changing due to the intensive development of construction science and technology. Manufacturers of construction products have switched to the production of system materials and products that allow the implementation of the principle of modular construction. Its characteristic features: the presence of a wide range of materials and products that are chemically compatible and adhesively related, mutually coordinated in size, etc. and allow all construction and installation (repair) work to be performed on a turnkey basis. Thanks to the union of science and construction engineering, technologies are being created for obtaining new, highly efficient, environmentally friendly materials of functional purpose. The production of these materials is based on waste-free and energy-saving technologies. Using the technology of composite materials, the production of composites is rapidly growing, the specific strength of which exceeds the similar characteristic of steel by 15 times. Today, "dry construction" systems are very popular in Ukraine, which successfully replace traditional plaster and brickwork.

The subject of the educational component is the features of the production of materials and products for construction purposes.

Given the rapid development of science and technology, experts suggest that the main building materials in the future will also be metal, concrete and reinforced concrete, ceramics, glass, wood, polymers. New building materials will be created on the same raw material basis, but with the use of more progressive technological methods and waste-free technologies. The flow of new materials with high performance characteristics, durability and reliability will increase. General principles that should be used when choosing materials:

- new and existing materials must be mutually compatible;
- the properties of new materials must be better than existing ones;
- preference should be given to those materials and technologies that can be used in the autumn-winter period. The main criterion when choosing a material will be environmental friendliness.

Goeeducational component«Technology of production of materials and products for construction purposes»

The purpose of studying this educational component is to form in bachelors a complex of knowledge regarding the technology of production of materials and products for construction purposes.

In accordance with the goal, the training of bachelors in this specialty requires strengthening the competencies formed in students:

Integral competence:

- The ability of a person to solve complex specialized tasks and practical problems in a certain field of professional activity or in the process of learning, which involves the application of certain theories and methods of relevant sciences and is characterized by the complexity and uncertainty of conditions.

ZK2 Ability to apply knowledge in practical situations. ZK4 Ability to search, process and analyze information from various sources. ZK10 Skills in using information and communication technologies. ZK12 Ability to exercise one's rights and obligations as a member of society, to realize the values of a civil (free democratic) society and the need for its sustainable development, the rule of law, the rights and freedoms of man and citizen in Ukraine. FK2 Ability to apply fundamental scientific facts, concepts, theories, principles to solve professional tasks and practical problems of the engineering industry. FK6 Ability to assess the technical and economic efficiency of typical systems and their components based on the application of analytical methods, analysis of analogues and the use of available data. FK11 Ability to analyze, select, assign processes and equipment for the production of polymer and building materials and products. FK12 Ability to perform engineering calculations on a PC using a high-level algorithmic language (Fortran, etc.)

1.2. According to the requirements of the programeducational component "Technology of production of materials and products for construction purposes", after mastering it, students must demonstrate the following program learning outcomes:

knowledge:

- PH1 Knowledge and understanding of the principles of technological, fundamental and engineering sciences that underlie the branch of mechanical engineering of the relevant industry.
- PH2 Knowledge and understanding of mechanics and mechanical engineering and the prospects for their development.
- PH8 Understand appropriate methods and have the skills to design typical assemblies and mechanisms in accordance with the task.

skills:

- PH12 Apply technical control tools to evaluate the parameters of objects and processes in industrial mechanical engineering.
- PH19 Know and understand the features of the technology of processing polymer materials into products and parts.

Also, studying the educational component will contribute to the formation of additional provisions in students, namely:

- know the properties of building materials and structures that are used both for new construction and in the process of repair and reconstruction of facilities;
- understand the mechanism of wear, corrosion, and destruction of structures from the action of various factors and, on this basis, effectively use materials and technologies for their protection;

– be able to design repairs and reinforcement of buildings (structures) using modern materials and technologies, combining this with knowledge of organization and management in construction.

- compare different types of materials and construction products regarding their suitability for manufacturing products with a given functional purpose;
- develop technological processes for the production of materials and products for construction purposes.

2. Prerequisites and postrequisites of the educational component (place in the structural and logical scheme of training according to the relevant educational program)

Studied educational component "Technology of production of materials and products for construction purposes" has a professional and practical focus and is the first in the cycle of the educational component for training specialists in the field of building materials based on inorganic binders. It is based on such educational components as "Physics", "Chemistry", "Organic Chemistry", "Technology of Structural Materials", etc. This educational component is a prerequisite for studying such educational components as "Rheology" and "Technological equipment for the production and processing of materials and products".

3. Content of the educational component

Topic 1. General information about building materials and products. Classification of building materials and products.

Topic 2. Technologies for the production of mineral binders. Production of gypsum binders. Production of building lime. Production of cement.

Topic 3. Fundamentals of ceramic product technology. Raw materials for the production of ceramic products. Production of ceramic bricks by the semi-dry method. Production of ceramic bricks and stones by the method of plastic molding. Production of ceramic tiles. Production of special-purpose products.

Topic 4. Production of products from mineral melts. Raw materials for the production of products from mineral melts. Production of glass and products from it. Production of materials and products from slag melts. Production of materials and products from stone casting.

Topic 5. Production of structures and products based on mineral binders. Raw materials for the production of products based on mineral binders. Production of reinforced concrete products and structures. Production of products from cellular concrete. Production of asbestos-cement products and structures. Production of silicate bricks. Production of products based on gypsum binders. Production of fibrolite boards.

4. Educational materials and resources

Basic literature

1. Technology of production of materials and products for construction purposes. Textbook [Electronic resource]: a textbook for bachelor's degree applicants in the educational program "Engineering and computer-integrated technologies for designing innovative industry equipment" specialty 133 "Industrial mechanical engineering" / Igor Sikorsky Kyiv Polytechnic Institute; compilers: V. Yu. Shcherbina, D. G. Shvachko, L. N. Gur'eva. - Electronic text data (1 file: 16.56 MB).

- Kyiv: Igor Sikorsky Kyiv Polytechnic Institute, 2024. - 188 p. - Title from the screen. **URI**<https://ela.kpi.ua/handle/123456789/66516>

2. *Fundamentals of production of wall and finishing materials: textbook* / R. F. Runova, L. O. Sheinich, O. G. Gelevera, V. I. Gots. Kyiv: KNUBA, 2001. 354 p.
3. *System for ensuring the reliability and safety of construction objects. Loads and actions. Design standards: DBN V. 1.2-2:2006*. - [Introduced from 01.01.2007]. - Kyiv: Ministry of Construction of Ukraine, 2006. - 78p. (State Construction Standards of Ukraine).
4. *Constructions of buildings and structures. Concrete and reinforced concrete structures. Basic provisions: DBN V. 2.6-98:2009*. - [Replacing SNiP 2.03.01-84*]; effective from 2011.06.01. - Kyiv: MinregionstroyUkraine, 2009. - 75 p. - (State building standards of Ukraine.).
5. *Building materials. Concretes. Methods for determining prismatic strength, elastic modulus and Poisson's ratio: DSTU b V. 2.7-217:2009*. - [Reserved for the first time (with the cancellation of GOST24452-80); effective from 2010-09-01]. - Kyiv: Minregionalbud of Ukraine, 2010. - 16 p. - (National standard of Ukraine).

Additional literature

6. *Building materials. Concretes. Determination of strength by mechanical methods of non-destructive testing: DSTU b V. 2.7-220:2009*. - [Introduced for the first time (with the cancellation of GOST 22690-88); effective from 2010-09-01]. - Kyiv: Minregionalbud of Ukraine, 2010. - 20 p. - (National standard of Ukraine).
7. *Building materials. Concretes - methods for determining strength by samples taken from structures: D STU b V. 2.7-223:2009*. - [Introduced for the first time (with the cancellation of GOST 22690-88); effective from 2010-09-01]. - Kyiv: Minregionalbud of Ukraine, 2010. - 12 p. - (National standard of Ukraine).
8. *Building materials. Concrete strength control rules: D STU b V. 2.7-224:2009*. - [Introduced for the first time (with the cancellation of GOST 18105-86); effective from 2010-09-01]. - Kyiv: Minregionalbud of Ukraine, 2010. - 23 p. - (National standard of Ukraine).
9. *Building materials. Concretes. Ultrasonic method for determining strength: DSTU b V. 2.7- 226:2009*. - [Introduced for the first time (with the cancellation of GOST 17624-87); effective from 2010-09-01]. - Kyiv: Minregionstroy of Ukraine, 2010. - 27 p. - (National standard of Ukraine).
10. *DSTU-N B V.1.2-18. 2016. "Guidelines for the inspection of buildings and structures to determine and assess their technical condition", Kyiv DP UkrNDNC 2017, p.43.*

Information resources on the Internet

1. <https://studfile.net/preview/5532354/page:4/>
2. <http://ep3.nuwm.edu.ua/4741/1/V55.pdf>
3. <http://bibliograph.com.ua/spravochnik-33/36.htm>
4. <https://studfile.net/preview/5241906/page:14/>
5. https://studopedia.su/9_43580_materlali-l-virobi-z-mIneralnih-rozplavlv.html
6. <http://um.co.ua/8/8-8/8-80177.html>
7. <https://studfile.net/preview/5241906/page:27/>
8. <http://bibliograph.com.ua/spravochnik-76/>
9. The working program of the credit module (syllabus) is in the "Campus" system, on the "Sikorsky" platform and on the website of the department (faculty);
10. Tutorials:<https://ela.kpi.ua/items/b2b108f6-cc47-40d4-9cf4-f40af6b650fe>

Educational content

5. Methodology for mastering the educational component

Lecture classes

Lectures are aimed at:

- providing modern, holistic, interdependent knowledge from the educational component «Technology of production of materials and products for construction purposes», the level of which is determined by the target setting for each specific topic;
- ensuring creative work of bachelors together with the teacher during the lecture;
- fostering professional and business qualities in bachelors and developing independent creative thinking in them;
- developing the necessary interest in bachelors and providing direction for independent work;
- determination of the current level of development of science in the field of modern methods and processes, forecasting the development of the industry for the coming years;
- reflection of the methodological processing of the material (highlighting the main provisions, conclusions, recommendations, clear and adequate wording);
- use of visual materials for demonstration, combining them, if possible, with the demonstration of results and samples;
- teaching research materials in clear and high-quality language, observing structural and logical connections, explaining all newly introduced terms and concepts;
- accessibility for perception by a given audience.

No. of the company	Title of the lecture topic	Hours
1.	Topic 1. General information about building materials and products. Classification of building materials and products. References: [1] pp. 3-10; [3] pp. 32-69. Tasks on the CTS. Where are materials and products used by classification	4
2.	Topic 2. Technologies for the production of mineral binders. Production of gypsum binders. Production of building lime. Production of cement. References: [1] pp. 10-30; [3] pp. 32-69. Tasks for the SRS. What products are made from lime and cement?	6

3.	Topic 3. <i>Fundamentals of ceramic product technology. Raw materials for the production of ceramic products. Production of ceramic bricks by the semi-dry method. Production of ceramic bricks and stones by the method of plastic molding. Production of ceramic tiles. Production of special-purpose products.</i> <i>References: [1] pp. 30-60; [5] pp. 32-69.</i> <i>Tasks on the CPC. What are the parameters for ceramic bricks, Where are ceramic products used?</i>	8
4.	Topic 4. <i>Production of products from mineral melts. Raw materials for the production of products from mineral melts. Production of glass and products from it. Production of materials and products from slag melts. Production of materials and products from stone casting.</i> <i>References: [1] pp. 60-80; [1] pp. 32-69.</i> <i>Tasks for the SRS. What are the criteria for mineral melts?</i>	6
5.	Topic 5. <i>Production of structures and products based on mineral binders. Raw materials for the production of products based on mineral binders. Production of reinforced concrete products and structures. Production of products from cellular concrete. Production of asbestos-cement products and structures. Production of silicate bricks. Production of products based on gypsum binders.</i> <i>References: [7] pp. 80-130; [8] pp. 32-69.</i> <i>Tasks on the CRC. Where reinforced concrete structures are used</i>	8
6.	Modular test work	2
7.	Test	2
Total		36

Practical (seminar) classes

The main tasks of the seminar series are: students consolidate the theoretical provisions of the academic discipline and acquire the skills and abilities to apply them practically. Seminar classes include testing knowledge, skills and abilities, setting a general problem (task) by the teacher and discussing it with the participation of students. At each seminar class, the teacher organizes a discussion on previously defined problems. Based on individual tasks (abstracts), students prepare theses for presentations on these problems.

Main tasks of the training cycle:

- to help bachelors systematize, consolidate and deepen theoretical knowledge in the field of building materials production technology;
- to teach bachelors in the methods of solving practical problems, to promote the acquisition of skills and abilities to communicate the results of their own research to colleagues and the scientific community;
- to teach them to work with scientific and reference literature and diagrams;
- to form skills to learn independently, that is, to master the methods, means and techniques of self-study, self-development and self-control.

No. of the company	Title of the practical topic	Hours
1.	Topic 1. Production of gypsum binders. Production of building lime. Production of cement.	4

	<i>References: [1] pp. 8-24; [3] pp. 32-69.</i> <i>Tasks for the CTC. Lime and cement production schemes</i>	
2.	<i>Topics 2. Production of ceramic bricks and stones by plastic molding. Production of ceramic tiles. Production of special-purpose products.</i> <i>References: [2] pp. 24-54; [3] pp. 32-69.</i> <i>Tasks for the CTC. Brick production schemes</i>	4
3.	<i>Topic 3. Determination of technological parameters of forming</i> <i>References: [3] pp. 58-84; [5] pp. 32-69.</i> <i>Tasks on the CPC. What are the parameters for ceramic bricks, Where are ceramic products used?</i>	4
4.	<i>Topics 4. Production of reinforced concrete products and structures. Production of products from cellular concrete. Production of asbestos-cement products and structures.</i> <i>References: [6] pp. 88-104; [1] pp. 32-69.</i> <i>Tasks for the CRC. Schemes of reinforced concrete products</i>	4
5.	<i>Topics 5. Production of silicate bricks. Production of products based on gypsum binders. Production of fibrolite boards.</i> <i>References: [7] pp. 50-84; [8] pp. 32-69.</i> <i>Tasks for the CRC. Schemes for the production of silicate bricks</i>	4
6.	<i>Topics 6. Production of gypsum binders. Production of building lime. Production of cement.</i> <i>References: [7] pp. 60-84; [8] pp. 32-69.</i> <i>Tasks for the CTC. Gypsum production schemes</i>	4
7.	<i>Topics 7. Production of ceramic bricks and stones by plastic molding. Production of ceramic tiles. Production of special-purpose products.</i> <i>References: [6] pp. 75-84; [8] pp. 32-69.</i> <i>Tasks for the CTC. Ceramic tile production schemes</i>	4
8.	<i>Topic 8. Determination of technological parameters of forming</i> <i>References: [7] pp. 38-84; [8] pp. 32-69.</i> <i>Tasks for the CRC. What are the types of brick formation?</i>	4
9.	<i>Topics 9. Production of reinforced concrete products and structures. Production of products from cellular concrete. Production of asbestos-cement products and structures.</i> <i>References: [8] pp. 38-84; [8] pp. 32-69.</i> <i>Tasks for the CTC. Schemes for the production of asbestos-cement products</i>	4
Total		36

Tests

While studying the educational component, students complete a modular test according to the material in the last lecture session.

Tasks on modular test work answers the questions for the credit, which were considered at the time of the test work.

6. Independent work of a higher education student

Independent work takes up to 40% of the time of studying the educational component, including preparation for the exam. The main task of independent work of bachelors is to master scientific knowledge in areas that are not included in the list of lecture questions through personal search for information, the formation of active interest in a creative approach to educational work. In the process of independent work within the educational component, the bachelor must learn to deeply analyze modern approaches to the development and implementation of the latest technologies and innovations in the direction of their own research.

No. of the company	Title of the topic to be studied independently	Number of hours of CTC
1.	<i>Topic 1. Classification of building materials and products. Classification, specific scope of application of certain types of building materials and products. References: [1] pp. 8-84; [1] pp. 32-69.</i>	8
2.	<i>Topic 2. Production of gypsum binders. Production of building lime. Production of cement. Raw materials for the production of gypsum, building lime, cement. Main technological schemes of production. References: [1] pp. 18-84; [3] pp. 32-69.</i>	8
3.	<i>Topic 3. Raw materials for the production of ceramic products. Production of ceramic bricks by the semi-dry method. Production of ceramic bricks and stones by the method of plastic molding. Production of ceramic tiles. Production of special-purpose products. Main technological equipment for the production of building ceramic products. Features of the technology for the production of special-purpose products. References: [1] pp. 38-84; [5] pp. 32-69.</i>	9
4.	<i>Topic 4. Raw materials for the manufacture of products from mineral melts. Production of glass and products from it. Production of materials and products from slag melts. Production of materials and products from stone casting. Methods of glass production. Basic technological schemes for the production of materials and products from stone casting. References: [1] pp. 58-84; [1] pp. 32-69.</i>	9
5.	<i>Topic 5. Raw materials for the manufacture of products based on mineral binders. Manufacture of reinforced concrete products and structures. Manufacture of products from cellular concrete. Manufacture of asbestos-cement products and structures. Manufacture of silicate bricks. Manufacture of products based on gypsum binders. Manufacture of fibrolite boards. Technology of production of cellular concrete. Types of asbestos-cement products and methods of their manufacture. Technological parameters of forming silicate bricks. References: [1] pp. 38-84; [2] pp. 32-69.</i>	9
6.	<i>Preparation for the ICR</i>	4

No. of the company	Title of the topic to be studied independently	Number of hours of CTC
7.	Preparation for the test	6
Total		48

Policy and control

7. Educational component policy

Rules for class attendance and behavior in class

Attendance is a mandatory component of assessment. Students are required to actively participate in the learning process, not be late for classes or miss them without a valid reason, not interfere with the teacher conducting classes, and not be distracted by activities unrelated to the learning process.

Rules for assigning incentive and penalty points

- Incentive points can be awarded by the teacher exclusively for performing creative works in the discipline or for additional completion of online specialized courses with obtaining the appropriate certificate:
 - <https://www.port.ac.uk/study/courses/beng-hons-innovation-engineering>;
 - Other courses may be credited upon agreement with the instructor.
- There are no penalty points within the educational component.

Deadline and Rescheduling Policy

In the event of arrears for the educational component or any force majeure circumstances, students must contact the teacher via available (provided by the teacher) communication channels to resolve problematic issues and agree on an algorithm of actions for work-out.

Academic Integrity Policy

Plagiarism and other forms of dishonest work are unacceptable. Plagiarism includes the lack of references when using printed and electronic materials, quotes, opinions of other authors. Hints and copying when writing tests, conducting classes are unacceptable; taking credit for another student; copying materials protected by the copyright system without the permission of the author of the work.

The policy and principles of academic integrity are defined in Section 3 of the Code of Honor of the National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute". More details: <https://kpi.ua/code>

Academic Conduct and Ethics Policy

Students should be tolerant, respect the opinions of others, formulate objections in a correct form, and provide constructive feedback in class.

The norms of ethical behavior of students and employees are defined in Section 2 of the Code of Honor of the National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute". More details: <https://kpi.ua/code>

8. Types of control and rating system for assessing learning outcomes (RSO)

Distribution of study time by types of classes and tasks in the educational component:

Semester	Study time		Distribution of teaching hours				Control measures		
	Loans	academic year	Lectures	Practical (seminar)	Lab work	CRC	MKR	abstract	Semester control
5	4	120	36	36	-	48	1	-	test

A student's rating in a discipline consists of the points he receives for:

A student's rating for the educational component consists of the points he receives for his work in practical classes and modular test work.

The semester test is a credit.

Rating (weighting) points system and evaluation criteria

1. Practical classes

It is planned to complete 9 tasks in practical (seminar) classes.

Weighted score – 10. The maximum number of points for all practical work is:

10 points x 9 points/year = 90 points

Criteria for evaluating the performance of a practical task

<i>Completeness and signs of task completion</i>	<i>Points</i>
<i>The task was completed in full without errors.</i>	<i>10</i>
<i>Minor flaws</i>	<i>8-9</i>
<i>Late completion of the task</i>	<i>6-7</i>
<i>Untimely completion of the task and there are shortcomings</i>	<i>4-5</i>
<i>Poor quality, untimely completion of the task</i>	<i>1-3</i>
<i>Failure to complete the task</i>	<i>0</i>

2. Completion of modular test work.

Weighted score –10. The modular test has two tasks, each task is evaluated at 5 points. The maximum number of points on the modular test is:

10 points x 1 MCR = 10 points

Criteria for assessing student knowledge

<i>Mark</i>	<i>Completeness of the answer</i>
<i>10</i>	<i>Timely and complete completion of the task without any shortcomings, correct design</i>
<i>9- 7</i>	<i>Minor deficiencies that do not affect the task</i>
<i>6- 4</i>	<i>Untimely completion of the task and incorrect registration</i>
<i>3-0</i>	<i>Failure to complete the task</i>

Students who have a rating of less than 60 points at the end of the semester, as well as those who want to improve their grade, take a final exam. A "hard" system is used, where the student loses their starting rating, and the grade for the educational component is given based on the student's performance in the final exam.

At the test, students complete a written test. Each task contains two theoretical questions. The list of questions is given in the methodological recommendations for mastering the educational component. Each theoretical question is evaluated at 50 points.

Evaluation system for theoretical questions RT1, RT2 ::

"excellent", complete answer (at least 95% of the required information) – 50–48 points;

"good", sufficiently complete answer (at least 75% of the required information or minor inaccuracies) – 47–38 points;

"satisfactory", incomplete answer (at least 60% of the required information and some errors) – 37-30 points;

"unsatisfactory", unsatisfactory answer – 0 points.

The maximum rating for the test is

RE=RT1+ RT2 = 50+50 = 100 points.

Admission requirements for semester control: enrollment of all practical work.

The sum of the starting points and/or points for the credit test is converted into the credit score according to the table:

To obtain a credit score, the sum of all rating points R obtained during the semester is converted according to the table:

Number of points	Rating
95...100	perfectly
85...94	very good
75...84	good
65...74	satisfactorily
60...64	enough
RD < 60	unsatisfactorily
Admission conditions not met	not allowed

9. Additional information on the educational component

Approximate list of questions that are submitted for MKR and semester control

1. Gypsum, its characteristics and use in the construction industry.
2. Provide general information about mineral binders and their types.
3. Provide general information about raw materials for gypsum production.
4. Analyze the features of gypsum production technology.
5. Describe building lime and its characteristics.
6. Provide general information about raw materials for the production of building lime.
7. Analyze the features of the technological process for the production of quicklime.
8. Name the main types of cements and their characteristics.
9. Provide general information about raw materials for the production of cements.
10. Name the main methods of cement production and their characteristics.
11. Features of the production of Portland cement by the wet method.
12. Analyze the features of dry-process Portland cement production.
13. Name the main characteristics of ceramic bricks and stones.
14. Name the main raw materials for the production of ceramic bricks and stones.
15. Analyze the concept of plasticity of clays.
16. Analyze the technological scheme of the plastic method of preparing raw ceramic mass.
17. Technological scheme for preparing ceramic mass for semi-dry molding of ceramic bricks.
18. Features of drying and firing of raw ceramic bricks.
19. Characteristics and types of ceramic tiles.
20. Raw materials for the production of ceramic tiles.
21. Technological scheme for preparing raw materials for the production of ceramic tiles by the liquor method.
22. Ceramic tiles, their characteristics and manufacturing features.
23. Road bricks, characteristics, manufacturing.
24. Drainage ceramic pipes, their characteristics and manufacturing features.
25. Sanitary ware, its characteristics and manufacturing features.
26. Types and characteristics of glass building products.
27. Raw materials for glass production.
28. Preparation of raw materials for the production of building glass.
29. Describe the process of forming a glass mass from a raw material batch.
30. Describe the methods of producing sheet glass.
31. Characteristics of materials obtained by the stone casting method.

32. *Technological stages of manufacturing cast stone products.*
33. *Fibrous materials obtained from mineral melts and their manufacture.*
34. *Characteristics and nomenclature of reinforced concrete products.*
35. *Gypsum, its characteristics and use in the construction industry.*
36. *What are the main classes of building materials do you know? Give examples.*
37. *What is the principle of modular construction and what are its advantages?*
38. *What are the requirements for modern building materials?*
39. *Describe the cement production process and its main stages.*
40. *Name the main types of gypsum binders and their applications.*
41. *What types of building lime are there and how is it made?*
42. *What raw materials are used to make ceramic bricks?*
43. *What is the difference between semi-dry and plastic methods of forming ceramic products?*
44. *What stages does the ceramic tile production technology include?*
45. *How is building glass made? What are its types?*
46. *used in construction?*
47. *What are the features of cast stone products? What are the stages of manufacturing reinforced concrete structures?*
48. *How are aerated concrete products made and where are they used?*
49. *What are fiberboard panels and in what structures are they used?*
50. *What environmental requirements are imposed on modern production of building materials?*

Work program educational component (syllabus):

Compiled Doctor of Philosophy, Associate Professor Shvachko D.G.

Approved by the department ____KhPSM____ (protocol No.17 from 04.06.2025)

Agreed Methodological Commission of the Faculty of Chemical Engineering (Minutes No. 11 dated 06/27/2025)