

MINISTRY OF EDUCATION AND SCIENCE  
REPUBLIC OF KAZAKHSTAN



SATBAYEV  
UNIVERSITY

«APPROVED»

Kozykova N.V.

Full name

signature of the head of the department

« 07 » 08 2020 г.

## SILLABUS

### Binder technology

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For specialty  
**5B073000 «Production of building materials, products and structures»**  
3 credits

**Semester: 5, 2020- 2021 academic year.**

Almaty, 2020

**Institute of Architecture and Construction**  
**Department of Construction and Building Materials**

**1. Teacher information:**

Kenzhebek Akmalaiuly, professor  
(Teacher's name, position)

Training format - 100% online.  
(leave as needed)

Login: Microsoft Teams  
office: 104

(office) Office hours: 09:00 - 17:00  
whatsup +7(701)759-8154 FB, VK, Telegram, Instagram

e-mail: k.akmalaiuly@satbayev.university

**Course requirements:**

- Presence of desktop or laptop computer, simultaneous use of other gadgets is recommended, but not required.
- Speed of at least 0.5 Mbps. availability of an Internet channel.
- Having a personal account and corporate mail with a picture of the teacher on the Microsoft 365 platform.
- Attendance is required in accordance with the schedule.

**2. Course description:**

2.1 Course for students of BBB specialty 5B073000 – “Manufacture of building materials, products and structures”

During the course the student is able to get a general idea of the principle of preparation of binders, to study the internal structure of materials, its construction technical properties, effective in construction, ie the use of functional properties to be able to learn and be able to work professionally. The main task of teaching the discipline is to use the experience of training specialists working in the field of construction materials.

2.2 The final stage of the course is an exam.

Upon completion of the course, the student must be able to analyze the topics covered and demonstrate design skills, as well as be able to calculate costs.

2.3 Student: Technological principles of obtaining binders, their application; nomenclature of binders and their properties; conditions for long-term environmental friendliness, economy and authenticity; should know the development trends of the production of binders.

2.4 Upon completion of the course, the student must know how to use binders and the basics of the choice of materials and products in the control of design decisions and proposals in the field of construction.

**3. Calendar-thematic plan:**

<b>Week</b>	<b>Theme of the lecture</b>	<b>The theme of practical work</b>	<b>Reference on Literature</b>	<b>Task</b>	<b>Deadline</b>
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Week	Theme of the lecture	The theme of practical work	Reference on Literature	Task	Deadline
1	Basic concepts about mineral binders. Classification and nomenclature	Acquaintance with the principles of calculation of obtaining semi-aqueous gypsum	Highlights 4 Additional 1	What are astringents	24.08-30.08.2020
2	Air-cured binders. Gypsum binders	Acquaintance with the principles of calculating the composition of the mortar.	Highlights 1 Additional 1	Construction gypsum binders	31.08-06.09.2020
3	Air-hardened construction lime. General information	Determination of general physical properties of a binder	Highlights 2 Additional 3	Types of building lime	07.09-13.09.2020
4	Quicklime. Hydrated lime and lime paste	Determination of the functional properties of binders.	Highlights 4 Additional 3	Types of lime hardening	14.09-20.09.2020
5	Air lime hardening. Properties of aerated lime and its applications	Magnesium binders.	Highlights 1 Additional 2	Caustic magnesite and dolomite	21.09-27.09.2020
6	Magnesia binders	Acquaintance with the principles of obtaining pozzolanic Portland cement	Highlights 3 Additional 3	Hydraulic binders	28.09-04.10.2020
7	Hydraulic binders. Hydraulic lime and roman cement	Influence of the technological factor on the properties of gypsum binder	Highlights 2 Additional 2	Receiving Portland cement by wet process	05.10-11.10.2020
8	<b>1st Intermediate (Midterm) Attestation</b>			Multivariate test	12.10-18.10.2020
9	Portland cement. Composition and classification	Determination of the strength of lime mortar	Highlights 2 Additional 2	Receiving Portland cement by dry method	19.10-25.10.2020
10	Portland cement technology	Study of the properties of cement.	Highlights 4 Additional 4	Varieties of Portland cement	26.10-01.11.2020
11	Hardening of Portland cement and its properties	Calculation of the composition of hydrophobic and pozzolanic cement	Highlights 4 Additional 4	Varieties of pozzolanic Portland cement	02.11-08.11.2020
12	Physical and mechanical properties of	Alumina cement composition	Highlights 2 Additional	Features of alumina cement	09.11-15.11.2020

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Week	Theme of the lecture	The theme of practical work	Reference on Literature	Task	Deadline
	cements		3		
13	Varieties of Portland cement	Study of the influence of additives on the properties of Portland cement mөлшерin esepтеu	Highlights 4 Additional 4	Bitumen grades	16.11-22.11.2020
14	Organic binders	Study of the properties of bitumen	Highlights 4 Additional 4	Polymerization process	23.11-29.11.2020
15	<b>2nd Final (Endterm) Attestation</b>			Multivariate test	30.11-06.12.2020
	<b>Final exam</b>			Tickets	According to schedule

*\*In the calendar – themed calendar, changes are possible taking into account holidays*

#### 4. List of references:

Basic	Auxiliary
1. Akmalayev KA Inorganic binders. - KazNTU Almaty, 2013.- 110 p.	1. Building materials science.-Rostov n / a: Phoenix, 2007;
2. Akmalayev KA, Saduakayov MS Natural and artificial stone materials.-KazNTU Almaty, 2009.- 191 p.	2. Popov L.N., Popov N.L. Laboratory work on the discipline "Building materials and products." - M .: INFRA-M, 2005.
3. Gypsum materials and products (production and use). Directory. Ed. A.V. Ferronskoy .- M .: ASV Publishing House, 2004 .- 488 p.	Akmalayev KA Gypsum-cement pozzolanic binder. KazNTU Almaty, 2014.- 138 p.
4. Belov V.V., Petropavlovskaya V.B., Shlapakov Yu.A. Laboratory determination of the properties of building materials.- Moscow: ASV, 2004.- 176 p.	4. Akmalayev KA Basics of concrete science. KazNTU Almaty, 2014.- 320 p.

#### 5. Scope of competence

Learning descriptors	Scope of competence				
	Scientific and theoretical world ТАНЫМДЫҚ	Socio-personal and civic	General engineering, professional	Intercultural and communicative	Specialized
Knowledge and	30	10	30	10	30

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understanding					
Apply knowledge and understanding	20	10	30	10	30
Comment and action analysis	15	15	30	10	30
Communicative and creative abilities	10	20	30	10	30
Self-education and digital skills	20	10	30	10	30

### 6. Schedule of required works

#	Type of control	Of the week max. points	Week															Max score results
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
1	Activity in the discussion of lectures	10	24.08	31.08	07.09	14.09	21.09	28.09	05.10	12.10	19.10	26.10	02.11	09.11	16.11	23.11	30.11	10
2	Completion of tasks (TSIS)	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
4	Perform practical tasks	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
6	1st intermediate control (Midterm)	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	30
8	Student's independent work (ISW)	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
9	2nd final control (Endterm)	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	30
	Final exam *	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	40
	That's all	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	<b>100</b>

\* The final exam consists of four tasks of different levels, ie three simple tasks of 25 points and one complex task of 15 points.

### 7. The criteria for the evaluation of works:

Evaluation by alphabetic system	Digital equivalent of evaluation	Criterion
<b>A</b>	<b>95 – 100</b>	Correctness and completeness of answers, accuracy and accuracy of presentation of all issued tasks.
<b>A -</b>	<b>90 – 94</b>	correctness and completeness of answers, accuracy and accuracy of presentation with some comments

<b>Evaluation by alphabetic system</b>	<b>Digital equivalent of evaluation</b>	<b>Criterion</b>
<b>B +</b>	<b>85 – 89</b>	incomplete presentation of answers, accuracy of presentation with some comments
<b>B</b>	<b>80 – 84</b>	Incomplete statement of answers with comments, accuracy of presentation with some comments.
<b>B -</b>	<b>75 – 79</b>	the statement of answers is not complete, not accurate presentation, some comments on the content, not all issues are set out in full
<b>C +</b>	<b>70 – 74</b>	a weak statement of the answers, not the accuracy of the presentation, some remarks, not all questions are set out in full
<b>C</b>	<b>65 – 69</b>	a weak statement of the answers, not the accuracy of the presentation, comments on the accuracy of the presentation
<b>C -</b>	<b>60 – 64</b>	a weak statement of the answers, not the accuracy of the presentation, comments on the accuracy of the presentation, some questions are not disclosed
<b>D +</b>	<b>55 – 59</b>	The answers do not correspond to the questions raised, there are remarks in the presentation,
<b>D</b>	<b>50 – 54</b>	The answers do not correspond to the questions raised, there are remarks in the presentation,
<b>F</b>	<b>0 – 49</b>	The answers do not correspond to the questions

#### **Evaluation criteria**

In addition to the test, each work is evaluated on 4 criteria:

- accuracy and precision (A) - 30% (how carefully and accurately the work is calculated)
- Creativity and creativity (T) - 30% (how and in what form the work is presented)
- completeness and maturity (H) - 40% (how deep, logical and structured the work is)
- specificity (O) - a special factor of 1.0; 0.5 or 0 is used.

<b>Criteria</b>	<b>Very good (0.9-1.0)</b>	<b>Good (0.7-0.9)</b>	<b>Satisfactory (0.4-0.7)</b>	<b>Unsatisfactory (0-0.4)</b>
Neatness and accuracy	30	20	10	<10
Creativity and creativity	30	20	10	<10
Completeness and maturity	40	30	20	10
Features	1,0		0,5	0

The total score is calculated by the formula:

$$\text{Price} = (A + T + 3) \times O$$

#### **Maximum assessment of knowledge by type of task**

Tests and activities	10
Student's independent work (ISW)	10
Practical work and bonus	10
Laboratory work	10

1st intermediate control (Midterm)	10
Course project	
2nd final control (Endterm)	10
Final exam	<b>40</b>
That's all	<b>100</b>

### **8. Late submission policy:**

The student must be prepared for lectures and practical classes. All types of work (practical and original) require full performance and timely protection. The student should not be late or absent from class, be responsible and careful. It is planned to reduce the maximum score by 10% for work not submitted on time. If, for some reason, you have to skip the midterm exam, you can give the teacher a chance to do so in advance. Missing the exam without a valid reason deprives you of the right to retake it. If you miss the exam for valid reasons, you will be given a special permission to retake the exam, and the date, time and place of the exam will be set.

### **9. Attendance policy:**

The student must be punctual and punctual, responsible and careful. The student must be ready for lectures and practical classes. Timely submission of calculations for practical work, full performance of all types of work (practical and independent).

### **10. Academic discipline and ethics policy:**

Respect other people's opinions, be patient. Express your opinion in the right way. Plagiarism and other forms of dishonest work are not allowed. It is not allowed to take exams, copy, manipulate other students. A student who falsifies any course information will receive an "F" grade.

Activity in lectures and practical classes depends on your final score. Many theoretical questions are included in the lecture materials and are read only in lectures. Therefore, skipping a lesson can affect your progress and your final grade. Missing or delaying twice before the end of a lesson for any reason is considered a missed lesson. However, just attending classes does not mean an increase in points. You need to be active in class. The mandatory requirement of the course is to be ready for each lesson. These sections of the textbook and additional materials should be reviewed not only in preparation for practical exercises, but also before attending the relevant lecture. Such training will make it easier for you to accept new material and will help you to actively acquire knowledge within the university. Corruption in any form is not allowed in the teaching of the discipline. The organizer of such events (teachers, students or third parties on their behalf) is fully liable for violation of the laws of the Republic of Kazakhstan.

**Help:** You can contact the teacher during working hours or around the clock by e-mail for advice on completing, submitting and defending independent work, as well as additional information about the material covered and all questions about the course.

### **During distance learning:**

Mandatory distance learning in accordance with the schedule determines the readiness for this lesson. In case of absenteeism, the student must notify the teacher around the clock and explain the plan of self-study.

- Mandatory reading of the materials presented before distance learning
- timely submission of tasks. There are fines of -10% for late submission
- 20% of absenteeism is equal to the grade "F (Fail)"
- Plagiarism and fraud are not allowed during the task
- Although the use of electronic gadgets in the classroom is allowed, their use during the exam is not allowed.
- Corruption in any form is not allowed in the teaching of the discipline. The organizer of such events (teachers, students or third parties on their behalf) is fully liable for violation of the laws of the Republic of Kazakhstan.

2020 August 07 №1 (name of the department) was approved by the minutes of the department meeting.

Compiler:             Professor             Akmalaevich K.  
                                       (position)             (surname, name)

