




**The Ministry of Science and High Education of the Russian Federation
Federal State Autonomous Educational Institution of Higher Education
FAR EASTERN FEDERAL UNIVERSITY (FEFU)**


Polytechnic Institute

«APPROVED»
Director of Educational Program



(signature) Alexander T. Bekker
«24» February 2021 г.

«APPROVED»
Head of Department of
Marine Arctic Technologies



(signature) Alexander T. Bekker
«24» February 2021 г.

WORK DISCIPLINE PROGRAM

Concrete Technology

Study profile – 08.04.01 Construction,

Educational Master program – Offshore and Coastal Engineering

Full-time program

Course **2** term **3**
Lectures **18** (hours)
Practical training **18** hours
Laboratory training **18** hours
In-class learning **54** (hours)
Private study **54** (hours)
Offset **3** term

The present educational and methodological package of the discipline is accomplished according to requirements of the Federal State Educational Standard for the major 08.05.01 Construction, approved by the order of the Ministry of Education and Science of the Russian Federation, May, 31, 2017; № 482.

The work discipline program was discussed at the session of the Department of *Marine Arctic Technologies*, protocol №6 of 24 February 2021 г.

Head of the Department Dr. of Eng. Sc., Professor Bekker A. T.

Designed by: Cand. of Eng. Sc. *Egor E. Pomnikov*

Vladivostok
2021

Title page reverse side of the WDP

1. The work program was revised and approved at a meeting of the Department of Marine Arctic Technologies (implementing the discipline and issuing structural unit), protocol dated « ____ »
_____ 202_ г. № _____

2. The work program was revised and approved at a meeting of the Department of Marine Arctic Technologies (implementing the discipline and issuing structural unit), protocol dated « ____ »
_____ 202_ г. № _____

3. The work program was revised and approved at a meeting of the Department of Marine Arctic Technologies (implementing the discipline and issuing structural unit), protocol dated « ____ »
_____ 202_ г. № _____

4. The work program was revised and approved at a meeting of the Department of Marine Arctic Technologies (implementing the discipline and issuing structural unit), protocol dated « ____ »
_____ 202_ г. № _____

5. The work program was revised and approved at a meeting of the Department of Marine Arctic Technologies (implementing the discipline and issuing structural unit), protocol dated « ____ »
_____ 202_ г. № _____

I. Purpose and objectives for discipline mastering:

Purpose: Purpose of developing the discipline "Concrete Technology" is the general formation of scientific and professional knowledge about concrete works methods and technologies, various concrete structures design and construction, concrete in material aspect and its proportion structure

Objectives:

- Studying of topical problems in the concrete science development and its actual development directions;
- Studying of topical problems of concrete production development;
- Studying of topical problems in economic aspect of the concrete compound selection;
- Formation and development of undergraduates' qualities and skills necessary for conducting research and innovation activities in modern conditions.

The results of training in the discipline are correlated with the indicators of competencies achievement established in the MPEP.

The combination of the planned learning outcomes in the discipline ensures the formation of all the competencies established by the MPEP in the graduate.

Professional competencies of graduates and indicators of their achievement:

Objectives type	Code and professional competency name (mastering result)	Code and achieved competency indicator name
	PC-2 Ability to develop the design decisions and organize design works in hydraulic construction sphere	PC-2.3 Drawing up a work plan and tasks for the design of hydraulic structures, their complexes
		PC-2.4 Selection and comparison of options for design technical solutions for hydraulic structures and their complexes
		PC-2.5 Selection and comparison of options for design organizational and technological solutions for hydraulic engineering construction

<p>PC-4 Ability to manage the production and technological activities of the organization in the hydraulic engineering field</p>	<p>PC-4.1 Control over the development of a project for the production of works for the construction or reconstruction of a hydraulic engineering construction facility</p>
	<p>PC-4.2 Control of compliance with the technology for the implementation of construction, installation and hydraulic engineering works at the hydraulic engineering construction site, development of measures to eliminate the causes of deviations in the results of work</p>
	<p>PC-4.3 Monitoring compliance with the requirements of labor protection, fire and environmental safety during construction, installation and hydraulic engineering works at the hydraulic engineering construction site</p>
	<p>PC-4.4 Development of work plans and schedules, plans and schedules for logistics for the construction (reconstruction) of hydraulic structures</p>
	<p>PC-4.5 Development of plans for the creation and development of the production base of hydraulic engineering</p>
	<p>PC-4.6 Preparation of information for drawing up contracts with subcontractors for the performance of certain types of work in the field of hydraulic engineering</p>
	<p>PC-4.7 Drawing up a plan of measures for construction control in the organization of hydraulic engineering construction</p>
	<p>PC-4.8 The choice of measures to combat corruption in an organization operating in the field of hydraulic engineering</p>

Indicator code and name of the competence achievement	Assessment indicator name (the result of training in the discipline)
	Know: the stages of drawing up a work plan and tasks for the design of hydraulic structures, their complexes

PC-2.3 Drawing up a work plan and tasks for the design of hydraulic structures, their complexes	Be able to: use the work plan and tasks for the design of hydraulic structures, their complexes Possess: the skills of drawing up a work plan and assignments for the design of hydraulic structures, their complexes
PC-2.4 Selection and comparison of options for design technical solutions for hydraulic structures and their complexes	Know: options for design technical solutions for hydraulic structures and their complexes Be able to: navigate in the choice of options for design technical solutions for hydraulic structures and their complexes Possess: methods of comparing options for design technical solutions of hydraulic structures and their complexes
PC-2.5 Selection and comparison of options for design organizational and technological solutions for hydraulic engineering construction	Know: options for design organizational and technological solutions for hydraulic engineering construction To be able to: navigate in the choice of options for design organizational and technological solutions for hydraulic engineering construction Possess: methods of comparing options for design organizational and technological solutions for hydraulic engineering Possess: the skills of optimizing design solutions in the field of hydraulic engineering based on a feasibility comparison of options Be able to: choose methods for performing surveys for hydraulic engineering construction Possess: the skills of selecting methods for performing surveys for hydraulic engineering construction

II. DISCIPLINE LABOR OUTPUT AND TYPES OF CLASSES IN THE DISCIPLINE

General discipline labor output is 3 credits (108 academic hours), (1 credit 36 академическим часам).

The types of training sessions and work of the student in the discipline are:

Designation	Studying classes and student works types
Lec	Lectures
Pr	Practical classes
LW	Laboratory works

IW	Student independent work in theoretical studying period
including control	Student independent and contact work with a teacher in intermediate attestation period

Discipline structure:

Education form – full-time program.

№	Section name disciplines	Term	The number of hours by type of training sessions and work of the student					Intermediate attestation forms
			Lec	LW	Pr	IW	Control	
1	General information – concrete definition, aggregates, bind elements (History and modernity)	3	2			2		PC-2, PC-4
2	Technical-economic variables of the concrete structures	3	4			2		PC-2, PC-4
3	Concrete works technology	3	2			2		PC-2, PC-4
4	Concrete unique structures	3	2			2		PC-2, PC-4
5	Theoretical basis of the concrete compound selection	3	4			2		PC-2, PC-4
6	Admixtures and properties regulation	3	2			2		PC-2, PC-4
7	Economical estimations in the concrete works technology selection	3	2			2		PC-2, PC-4
8	Sand as a building material. Sand testing methods	3			2	2		PC-2, PC-4
9	Crushed stone as a building material. Methods for testing crushed stone	3			2	2		PC-2, PC-4
10	Cement. Types of cement. Cement production. Determination of the amount of cement in the composition of concrete	3			2	2		PC-2, PC-4
11	Concrete. Types, characteristics of concrete. Concrete testing methods	3			4	2		PC-2, PC-4
12	Selection of concrete composition. The task of selecting the composition of concrete. Estimation	3			2	2		PC-2, PC-4
13	Adjustment of concrete composition based on test results	3			2	2		PC-2, PC-4

14	Concrete mixes. Production of concrete mixtures	3			2	2		PC-2, PC-4
15	Additives for concrete. Determining the type of additive for concrete	3			2	2		PC-2, PC-4
16	Sand Testing: Moisture Determination, Fine Modulus Determination, Bulk Density and Voidness Determination	3		4		4		PC-2, PC-4
17	Crushed stone tests: grain composition, crushability, bulk density and voidness, frost resistance	3		4		4		PC-2, PC-4
18	Cement testing, determination of water-cement ratio	3		2		4		PC-2, PC-4
19	Selection of the nominal composition of concrete based on the results of calculations. Premixes	3		2		4		PC-2, PC-4
20	Production of concrete samples for testing	3		4		4		PC-2, PC-4
21	Testing of concrete specimens	3		2		4		PC-2, PC-4
	Итого:		18	18	18	54		

III. STRUCTURE AND CONTENT OF THE THEORETICAL PART OF THE COURSE

Lectures (18 hours)

Class 1. General information – concrete definition, aggregates, bind elements (History and modernity)

1.1 What is the concrete as the material, structure compound. History aspect on the concrete compound and its variations. First aggregates and bind elements review;

1.2 Comparison of the historical and modern concrete compound;

1.3 Recent development in concrete production.

Class 2. Technical-economic variables of the concrete structures

2.1 Key major component of a total project cost. Varies costs for specific items of concrete compound;

2.2 Concrete grades, surface preparation cost and other parameters influencing on total value.

Class 3. Concrete works technology

3.1 Proper portioning, concrete curing and bringing of concrete items quality;

3.2 Concrete formation technologies review and cross comparison;

3.3 Development of the construction and demand for the construction products

Class 4. Concrete unique structures

4.1 Unique structure review;

4.2 Construction review in realized structures

Class 5. Theoretical basis of the concrete compound selection

5.1 Concrete composition selection in products and structures and other normalized quality indicators;

5.2 Requirements for materials of the concrete preparation;

Class 6. Admixtures and properties regulation

6.1 Concrete admixtures review;

6.2 Reasons and properties for applying different types of admixtures;

6.3 Admixtures classification

Class 7. Economical estimations in the concrete works technology selection

7.1 Review technology selection of concrete forming

7.2 Economic comparison in selection of concrete forming.

IV. STRUCTURE AND CONTENT OF THE PRACTICAL PART OF THE COURSE AND INDEPENDENT WORK

Practical work (18 hours)

Class 1. Sand as a building material. Sand testing methods;

- 1.1 Sand as a building material;
- 1.2 Sand testing methods

Class 2. Crushed stone as a building material. Methods for testing crushed stone;

- 2.1 Crushed stone as a building material;
- 2.2 Methods for testing crushed stone

Class 3. Cement. Types of cement. Cement production. Determination of the amount of cement in the composition of concrete;

- 3.1 General specifications. Cement types;
- 3.2 Cement production. Cement amount determination in the concrete composition

Class 4. Concrete. Types, characteristics of concrete. Concrete testing methods;

- 4.1 Types, characteristics of concrete;
- 4.2 Concrete testing methods

Class 5. Selection of concrete composition. The task of selecting the composition of concrete. Estimation;

- 5.1 The selecting task of the concrete composition;
- 5.2 Preliminary calculation

Class 6. Adjustment of concrete composition based on test results;

- 6.1 Adjustment of concrete composition based on test results

Class 7. Concrete mixes. Production of concrete mixtures;

7.1 Specifications. Production of concrete mixtures;

7.2 Test methods.

Class 8. Additives for concrete. Determining the type of additive for concrete

8.1 General specifications;

8.2 Types of additives, application.

V. STRUCTURE AND CONTENT OF THE LABORATORY PART OF THE COURSE AND INDEPENDENT WORK

Practical work (18 hours)

Class 1. Sand Testing: Moisture Determination, Fine Modulus Determination, Bulk Density and Voidness Determination

1.1 Moisture content determination, particle size modulus determination;

1.2 Bulk density determination and voidness

Class 2. Crushed stone tests: grain composition, crushability, bulk density and voidness, frost resistance

2.1 Grain composition, crushability, bulk density and voidness, frost resistance

Class 3. Cement testing, determination of water-cement ratio

3.1 Test methods, familiarity with the equipment;

3.2 Water-cement ratio determination

Class 4. Selection of the nominal composition of concrete based on the results of calculations. Premixes

4.1 The nominal composition selection of concrete based on the calculations results;

4.2 Premixes

Class 5. Production of concrete samples for testing

5.1 Resulting batch;

5.2 Concrete sampling

Class 6. Testing of concrete specimens

6.1 Testing of concrete samples;

6.2 Strength calculation;

6.3 Preparation of a test report

VI. EDUCATIONAL AND METHODOLOGICAL SUPPORT FOR STUDENTS' INDEPENDENT WORK

Schedule for the independent work implementation on the study

Theoretical part of the discipline

№ p/p	Date/Due dates	Independent work type	Approximate lead times	Control form
1	Class 1. General information – concrete definition, aggregates, bind elements (History and modernity)	Preparing to lesson	2	PC-2, PC-4
		Literature study	2	PC-2, PC-4
2	Class 2. Technical-economic variables of the concrete structures	Literature study	2	PC-2, PC-4
3	Class 3. Concrete works technology	Preparing for the lesson	2	PC-2, PC-4
		Literature study	2	PC-2, PC-4
4	Class 4. Concrete unique structures	Preparation for the test	2	PC-2, PC-4
5	Class 5. Theoretical basis of the concrete compound selection	Literature study	2	PC-2, PC-4
6	Class 6. Admixtures and properties regulation	Literature study	2	PC-2, PC-4
7	Class 7. Economical estimations in the concrete works technology selection	Literature study	2	PC-2, PC-4
8	January	Preparation to offset		Offset

	TOTAL		18	
--	-------	--	----	--

**Schedule for the implementation of independent work on the study
practical part of the discipline**

№ p/p	Date/Due dates	Independent work type	Approximate lead times	Control form
1	Class 1. Sand as a building material. Sand testing methods	Literature study	2	PC-2, PC-4
2	Class 2. Crushed stone as a building material. Methods for testing crushed stone	Literature study	2	PC-2, PC-4
3	Class 3. Cement. Types of cement. Cement production. Determination of the amount of cement in the composition of concrete	Literature study	2	PC-2, PC-4
4	Class 4. Concrete. Types, characteristics of concrete. Concrete testing methods	Literature study	2	PC-2, PC-4
5	Class 5. Selection of concrete composition. The task of selecting the composition of concrete. Estimation	Literature study	4	PC-2, PC-4
6	Class 6. Adjustment of concrete composition based on test results	Literature study	2	PC-2, PC-4
7	Class 7. Concrete mixes. Production of concrete mixtures	Literature study	2	PC-2, PC-4
8	Class 8. Additives for concrete. Determining the type of additive for concrete	Literature study	2	PC-2, PC-4
	TOTAL		18	

**Schedule for the implementation of independent work on the study
laboratory part of the discipline**

№ p/p	Date/Due dates	Independent work type	Approximate lead times	Control form
1		Preparing to lesson	2	PC-2, PC-4

	Class 1. Sand Testing: Moisture Determination, Fine Modulus Determination, Bulk Density and Voidness Determination	Literature study	2	PC-2, PC-4
2	Class 2. Crushed stone tests: grain composition, crushability, bulk density and voidness, frost resistance	Literature study	4	PC-2, PC-4
3	Class 3. Cement testing, determination of water-cement ratio	Literature study	2	PC-2, PC-4
4	Class 4. Selection of the nominal composition of concrete based on the results of calculations. Premixes	Literature study	2	PC-2, PC-4
5	Class 5. Production of concrete samples for testing	Literature study	4	PC-2, PC-4
6	Class 6. Testing of concrete specimens	Literature study	2	PC-2, PC-4
	TOTAL		18	

Recommendations for students on individual forms independent work

1. Work with theoretical material.

Purpose: to gain good knowledge of the discipline and learn to work independently.

Tasks:

- Acquisition of skills of independent work with lecture material;
- Acquisition of skills of independent work with basic and additional literature, use of Internet resources;
- The ability to analyze practical problems set and solve similar problems.

Work with theoretical material should be carried out based on the practical course of the discipline.

Working with literature involves independent work with textbooks, books, teaching aids, teaching aids for course work and final qualifying work, with legal sources. The list of references: basic, additional, normative and Internet resources is given in section V "Educational and methodological support of the discipline" of this work program.

The ability to work independently with literature is one of the most important conditions for mastering the discipline. The search, study and elaboration of literary

sources forms a scientific way of cognition in students, develops the skills to learn, allows them to continue to improve their qualifications and acquire the necessary competencies for further growth in the profession in the future in practical work after graduation from the university.

Independent work with literary sources requires perseverance, patience and concentration from the student. In order to better understanding the essence of the issue, it is advisable to the outline material was studied, make the necessary notes, and mark questions for consultation with the teacher.

ACHIEVEMENT CONTROL OF COURSE OBJECTIVES

№ p/p	Controlled sections / topics of the discipline	Code and name of achievement indicator	Learning Outcomes	Evaluation tools	
				current control	Intermedia te certificatio n
1	General information – concrete definition, aggregates, bind elements (History and modernity)	PC-2, PC-4	Know: The history and modern aspect of concrete definition, its compound and elements; Main elements of technical-economic property of the concrete structures. Concrete cost consisting; The design of concrete forming technologies and its advantages and disadvantages; Unique structure construction forms Construction in realized structures; Theoretical basis of the concrete compound selection;	PC-2, PC-4	Зачет Вопросы 1-11, 19-20, 36-40
				PC-2, PC-4	Зачет Вопросы 2-28, 36-40
2	Technical-economic variables of the concrete structures				
3	Concrete works technology		Concrete composition selection in products and structures and other normalized quality indicators;	PC-2, PC-4	Зачет Вопросы 2-13, 29-40
4	Concrete unique structures	PC-2, PC-4	Requirements for materials of the concrete preparation;	PC-2, PC-4	
5	Theoretical basis of the concrete compound selection	PC-2, PC-4	Admixtures and properties regulation; Concrete admixtures types; Reasons and properties for applying different types of admixtures;		
6	Admixtures and properties regulation	PC-2, PC-4	Admixtures classification; Economical estimations in the concrete works technology selection	PC-2, PC-4	
7	Economical estimations in the	PC-2, PC-4	Technology selection of concrete forming;	PC-2, PC-4	

concrete works technology selection		Economic comparison in selection of concrete forming		
---	--	---	--	--

VII. REFERENCES, INFORMATION, AND METHODOLOGICAL SUPPORT OF THE DISCIPLINE

Main literature

1. Alimov L. A. 2010 Technology of the construction materials and structures Concrete science (M.: "ACADEMIA") p. 432;
2. Bedov A. I., Gabitov A. I., Gaisin A. M., Salov A. S., Chernova A. R. 2018 CAD in interdisciplinary integration as a tool to increase specialist training quality in "Construction" education VI International Scientific Conference "Integration, Partnership and Innovation in Construction Science and Education" (IPICSE-2018) (Moscow, Russia) p. 1-7;
3. Belov V. V. 2014 Technologies and properties of modern cement sand concretes p. 281;
4. Berg O.Ya. 2012 High performance concrete (M.: Book upon demand) p. 208;
5. Dvorkin L. I. 2019 Calculated prediction of properties and engineering of the concrete compositions (Vologda: "Infra-engineering") p. 385;
6. Frei Hansjorg 2007 Builder's guide Construction machinery, structures and technologies Vol 1 (2) Edited by: Nestle Hans (M.: "Technosphere") p. 519;
7. Gabitov A. I., Gaisin A. M., Salov A. S. 2018 CAD simulation for stress and strain behavior of wall constructions made of hollow ceramic blocks IOP Conference Series: Materials Science and Engineering Vol 463 Issue 231 December 2018 No 022041 International Multi-Conference on Industrial Engineering and Modern Technologies 2018 (Vladivostok, Russian Federation) Code144116;
8. Nesvetaev G. V. 2011 Concretes: educational and reference book (Rostov-on-Don: "Fenix") p. 381;

9. Rybjev I.A. 2012 Construction materials science (M.: "Yuright) p 701[16]
Dvorkin L. I. 2012 Special concretes (Vologda: "Infra-engineering") p. 368;
10. Shmit'ko Ye. I. 2010 Processes and equipment for technology of construction materials and items (Saint-Petersburg: "Prospekt Nauki Publ.) p. 736;
11. Yevstifeev V. G. 2011 Reinforced concrete and masonry structures: in 2Vol1 Reinforced concrete structures (M.: "ACADEMIA") p. 432

List of resources of the information and telecommunications network

"Internet"

1. NEB Scientific Electronic Library
<http://elibrary.ru/querybox.asp?scope=newquery;>
2. Electronic library system of the publishing house "Lan"
[http://e.lanbook.com/;](http://e.lanbook.com/)
3. ELS "Student Consultant" [http://www.studentlibrary.ru/;](http://www.studentlibrary.ru/)
4. EBS znanium.com Research Center "INFRA-M" [http://znanium.com/;](http://znanium.com/)
5. FEFU Scientific Library online public catalog;
<http://lib.dvfu.ru:8080/search/query?theme=FEFU;>
6. Information system SINGLE WINDOW for access to educational resources
<http://window.edu.ru/resource>

VIII. METHODOLOGICAL INSTRUCTIONS FOR MASTERING THE DISCIPLINE

In the studying the material process of the training course "Concrete Technology", various forms of work assumed lectures, practical work, and independent work.

Lectures are held both in the form of a presentation and in the traditional way. As a rule, lectures are interactive. They cover issues relevant to the topics of the theoretical course (section I).

The purpose of practical classes is to give knowledge and practical skills to students in the field of calculating the concrete technical-economic variables, proper concrete selection assessment, to deepen the previously laid scientific and methodological foundations for independent work of students.

Recommendations on the use of the educational and methodological complex of the discipline.

Recommended to use the following educational and methodological materials when students studying the discipline: a summary of lectures and practical exercises on the discipline; textbooks and teaching aids; state standards; periodicals on the subjects of the studied discipline, methodological recommendations for the implementation of practical and term papers. The given literature list of the working program of the academic discipline is recommended in (see section 5).

To prepare a report for defense, it is necessary to analyze the results, compare them with known theoretical provisions or reference data, summarize the research results in the conclusions to the work, and prepare answers to the questions given in the guidelines for the implementation of practical work. The report ends with conclusions based on the results of the work.

A fully prepared and properly executed report of practical work is submitted for verification and protection to the teacher conducting practical classes in this discipline.

Recommendations for working with literature

Work with literature should begin with familiarization with the list of recommended educational literature on the discipline (see section 5 of the work program), which lists the main, additional and normative literature, other publications; Internet resources necessary for work in the classroom.

Having chosen the necessary source, you should find the section of interest in it by the table of contents or alphabetical index, comparing it with the corresponding section of your own abstract.

In case of difficulties, one should turn to other sources, where the presentation may be more accessible. For completeness of information, it is necessary to strive to study all the recommended printed and electronic sources of information to the extent necessary for understanding the topic.

It should be noted that working with literature is not only useful as a means of a deeper study of any discipline, but is also an integral part of the professional activity of a future specialist.

Recommendations for preparing for the test

Preparation for the test is the final stage of studying the discipline. Preparation should begin from the first lecture and from the first practical session, since knowledge, skills and abilities are formed during the entire period preceding the examination session.

Before passing the test, the student must defend reports on all practical work provided for by the curriculum, pass tests (if necessary). Specify the time and place of the test.

When preparing for the test, the student is recommended to prepare a list of examination questions and a set of sources for preparing answers to examination questions no later than a week before the test: lecture notes, recommended teaching aids and teaching materials. If there are Internet sources, provide Internet access and prepare a list of necessary sites.

Preparation for the test must be carried out for at least three to four full days without significant breaks and distraction to extraneous topics.

When passing the test, it must be taken into account that when assessing the knowledge of students, the teacher is guided, first, by the following criteria:

- correct answers to questions;
- completeness and conciseness of the answer;
- ability to interpret and apply normative acts;
- the ability to correctly qualify the facts and circumstances, to share the ranks and consequences of the process;
- the ability to draw adequate conclusions and conclusions;

- navigate in the regulatory and technical literature;
- logic and argumentation of presentation;
- response culture.

Requirements for admission to the test

In order to be admitted to the test, a master student must:

- defend the practical work on the calculation of the structure;
- defend the abstract;
- prepare for the delivery of the test.

IX. LOGISTICS AND TECHNICAL SUPPORT OF THE DISCIPLINE

Lectures and practical classes are held in the following classrooms, equipped with the necessary equipment for the educational process.

In order to provide special conditions for the education of people with disabilities and people with disabilities in FEFU, all buildings are equipped with ramps, elevators, lifts, specialized places equipped with toilets, information and navigation support signs.

Logistics and software discipline

Name of special rooms and rooms for independent work	Equipment special premises and premises for independent work	List of licensed software. Details of the supporting document
Primorsky Territory, Vladivostok, Frunzensky District, Russian Island, st. Ajax p., d. 10, bldg. L, Floor 3, room L353	Training class for 18 seats. Educational furniture for 18 workplaces, Teacher's place (table, chair), teacher's computer - personal computer CS GRATTAGE M COM J8044 with monitor Acer V226HQLB; TV LG M-4716 CG - 1 pc.; 9 personal computers CS GRATTAGE M COM J8044	<ul style="list-style-type: none"> • Microsoft Office Professional Plus 2016 - an office suite that includes software for working with various types of documents (texts, spreadsheets, databases, etc.); • АBBYY FineReader 11 - программа для оптического распознавания символов; - Adobe Acrobat XI Pro - a software package for creating and

	with Acer V226HQLB monitors for students;	viewing electronic publications in PDF format; AutoCAD - three-dimensional computer-aided design and drawing system;
Primorsky Territory, Vladivostok, Frunzensky district, Russian Island, st. Ajax, p. d. 10, cor. A (Lit. P), Floor 10, room A1002	<p>Reading room of natural and technical sciences: Monoblock Lenovo C360G-i34164G500UDK - 58 pcs. Integrated touch display Polymedia FlipBox Xerox WorkCentre 5330 (WC5330C) 4 Tray Copier-Printer-Color Scanner to E-mail Xerox WorkCentre 7530 Full Color Copier-Printer-Scanner (WC7530CPS) Workplaces for people with disabilities are equipped with Braille displays and printers; equipped with: portable devices for reading flat-print texts, scanning and reading machines, a video enlarger with the ability to regulate color spectra; magnifying electronic loupes and ultrasonic markers</p>	<ul style="list-style-type: none"> • Microsoft Office Professional Plus 2016 - an office suite that includes software for working with various types of documents (texts, spreadsheets, databases, etc.); • ABBYY FineReader 11 - a program for optical character recognition; • Adobe Acrobat XI Pro - a software package for creating and viewing electronic publications in PDF format;
Primorsky Territory, Vladivostok, Frunzensky district, Russian Island, st. Ajax, p. d. 10, cor. A (Lit. P), Floor 10, room A1042	<p>Reading room of periodicals: Monoblock Lenovo C360G-i34164G500UDK - 5 pcs. Xerox WorkCentre 5330 (WC5330C) 4 Tray Copier-Printer-Color Scanner to E-mail</p>	<ul style="list-style-type: none"> • Microsoft Office Professional Plus 2016 - an office suite that includes software for working with various types of documents (texts, spreadsheets, databases, etc.); • ABBYY FineReader 11 - a program for optical character recognition; • Adobe Acrobat XI Pro - a software package for creating and viewing electronic publications in PDF format;
Primorsky Territory, Vladivostok, Frunzensky district, st. Aleutskaya, d. 65b, Floor 2, building 203	<p>Universal Reading Room: Multifunction Printer (MFP) Monoblock Lenovo C360G-i34164G500UDK Personal systems for reading rooms of the terminal - 12 pcs. Working place for media room HP dc7700 – 2 pcs. Personal systems for the media room included - 7 pcs.</p>	<ul style="list-style-type: none"> • Microsoft Office Professional Plus 2016 - an office suite that includes software for working with various types of documents (texts, spreadsheets, databases, etc.); • ABBYY FineReader 11 - a program for optical character recognition; • Adobe Acrobat XI Pro - a software package for

		creating and viewing electronic publications in PDF format;
Primorsky Territory, Vladivostok, Frunzensky district, st. Aleutskaya, 65b, Floor 3, building 303	Reading room of rare editions: Personal systems for terminal reading rooms - 6pcs. Projector Screen	<ul style="list-style-type: none"> • Microsoft Office Professional Plus 2016 - an office suite that includes software for working with various types of documents (texts, spreadsheets, databases, etc.); • ABBYY FineReader 11 - a program for optical character recognition; • Adobe Acrobat XI Pro - a software package for creating and viewing electronic publications in PDF format;
Primorsky Territory, Vladivostok, Frunzensky district, st. Aleutskaya, d. 65b, Floor 3, building 411	Hall of access to electronic resources: Personal systems for reading rooms of the terminal - 15 pcs.	<ul style="list-style-type: none"> • Microsoft Office Professional Plus 2016 - an office suite that includes software for working with various types of documents (texts, spreadsheets, databases, etc.); • ABBYY FineReader 11 - a program for optical character recognition; • Adobe Acrobat XI Pro - a software package for creating and viewing electronic publications in PDF format;

X. VALUATION FUNDS

(assessment funds include: a list of assessment forms used at various stages of the formation of competencies in the course of mastering the discipline of the module, an assessment scale for each form, with a description of indicators for achieving the mastery of the discipline in accordance with the declared competencies, examples of tasks for current and intermediate control, conclusion of the employer on the FOS)

The content of the guidelines, determining the procedures for evaluating the results of mastering the discipline "Concrete Technology"

Current certification of students. The current attestation of students in the discipline "Problems of Science and Production" is carried out in accordance with the local regulations of the FEFU and is mandatory.

The current certification in the discipline "Problems of Science and Production" is carried out in the form of the defense of practical work, the defense of computational and graphic work, presentation) to assess the actual results of students' learning and is carried out by the leading teacher.

The objects of assessment are:

- academic discipline (activity in the classroom, the timeliness of the implementation of various types of tasks, attendance at all types of classes in the discipline being certified);
- the degree of assimilation of theoretical knowledge;
- the level of mastery of practical skills and abilities in all types of educational work;
- results of independent work.

Evaluation of the development of the academic discipline "Problems of Science and Production" is a complex event, which is necessarily taken into account and recorded by the leading teacher. Such indicators of this assessment as attendance of all types of classes and testing are recorded in the class attendance log.

The degree of assimilation of theoretical knowledge is assessed by such control measures as testing.

Intermediate certification of students. Intermediate certification of students in the discipline "Problems of Science and Production" is carried out in accordance with the local regulations of the Far Eastern Federal University and is mandatory.

In accordance with the working curriculum in the direction of training 08.04.01. Construction, master's program "Offshore and Coastal Engineering" type of intermediate certification of students in the process of studying the discipline "Problems of science and production" is a test (3 semester). The test is conducted in the form of an oral survey in the form of answers to questions.

List of typical questions for the test:

1. List the main concrete marks;
2. List the main admixtures classification;
3. Which general properties could be modified by the admixtures in fresh concrete?;
4. Which general properties could be modified by the admixtures in hardened concrete?;
5. When concrete admixtures used?;
6. List the admixtures classification;
7. List the air entraining admixtures;
8. Which disadvantages has the accelerating concrete admixtures?;
9. Which advantages has the retarding concrete admixtures?;
10. Why are super plasticizers admixtures using?;
11. Which advantages has the super plasticizers concrete admixtures?;
12. Why are mineral admixtures using?;
13. List the effects from using the Pozzolanic filler of silica fume;
14. How to select the concrete admixture properly?
15. What is the concrete? Give the definition;
16. What from was made the Mayan concrete?;
17. Disclose the concrete history;
18. Which types of concrete existing in modern times?
19. What is the reason for excessive laboriousness and materials consumption?;
20. What is greatly influence on the total project cost?;
21. What is influence on the concrete construction cost?;
22. Which variables are mostly impact on the concrete items cost?;
23. List the concrete forming technologies;
24. How much time is need to achieve by concrete its strength?;
25. List new concrete technology;
26. What is BIM technology? List the advantages and disadvantages;

27. What is high-performance concrete?;
28. What is self-healing concrete?;
29. List the advantages and disadvantages of the self-healing concrete;
30. List the unique concrete structure

Criteria for evaluating the presentation of the report:

Mark	50-60 points (unsatisfactory)	61-75 points (satisfactorily)	76-85 points (Good)	86-100 points (Great)
Criteria	Content of criteria			
Disclosure Problems	The issue has not been resolved. Conclusions missing	The problem is not fully disclosed. Conclusions not drawn and/or conclusions not substantiated	Problem solved. The analysis of the problem was carried out without the involvement of additional literature. Not all conclusions are drawn and/or substantiated	The issue has been fully resolved. The analysis of the problem was carried out with the involvement of additional literature. Conclusions justified
Performance	The information presented is not logically related. Professional terms not used	The information provided is not systematized and/or not consistent. 1-2 professional terms used	The information presented is not systematized and inconsistent. More than 2 professional terms used	The information presented is systematized, consistent and logically connected. More than 5 professional terms used
Formalization	Power Point technologies are not used. More than 2 errors in the information provided	Partially used Power Point technologies. 3-4 errors in the information provided	Power Point technologies are used. No more than 2 errors in the information provided	Technologies are widely used (Power Point, etc.). There are no errors in the information provided
Answers on questions	No answers to questions	Only answers to basic questions	Answers to questions are complete and / or partially complete	Answers to questions are complete, with examples and / or explanations

Criteria for grading a student for performing computational and graphic works on the discipline "Concrete Technology"

Points	Grade (standard)	Requirements for the formed competencies
--------	---------------------	--

(rating score)		
100-86 points	<i>"read" / "Great"</i>	An “excellent” mark is given to a student if he has deeply and firmly mastered the program material, sets it out exhaustively, consistently, clearly and logically, is able to closely link theory with practice, freely copes with tasks, questions and other types of application of knowledge, and does not find it difficult to answers when modifying tasks, uses material from monographic literature in the answer, correctly substantiates the decision made, possesses versatile skills and techniques for performing practical tasks.
85-76 points	<i>"read" / "Good"</i>	A “good” grade is given to a student if he knows the material well, presents it competently and to the point, avoiding significant inaccuracies in answering the question, correctly applies theoretical provisions in solving practical issues and tasks, and possesses the necessary skills and techniques for their implementation.
75-61 points	<i>"read" / "satisfactorily"</i>	The grade "satisfactory" is given to the student if he has knowledge only of the basic material, but has not mastered its details, allows inaccuracies, insufficiently correct wording, violations of the logical sequence in the presentation of the program material, has difficulty in performing practical work.
60-50 points	<i>«"not counted" / "Unsatisfactory"</i>	The “unsatisfactory” mark is given to a student who does not know a significant part of the program material, makes significant mistakes, performs practical work uncertainly, with great difficulty. As a rule, the mark "unsatisfactory" is given to students who cannot continue their studies without additional classes in the relevant discipline.

Criteria for grading a student in the test in the discipline

"Concrete Technology"

Points (rating score)	Grade (standard)	Requirements for the formed competencies
100-86 points	<i>"read" / "Great"</i>	An “excellent” mark is given to a student if he has deeply and firmly mastered the program material, sets it out exhaustively, consistently, clearly and logically, is able to closely link theory with practice, freely copes with tasks, questions and other types of application of knowledge, and does not find it difficult to answers when modifying tasks, uses material from monographic literature in the answer, correctly substantiates the decision made, possesses versatile skills and techniques for performing practical tasks.
85-76 points	<i>"read" / "Good"</i>	A “good” grade is given to a student if he knows the material well, presents it competently and to the point, avoiding significant inaccuracies in answering the question, correctly applies theoretical provisions in

		solving practical issues and tasks, and possesses the necessary skills and techniques for their implementation.
75-61 points	<i>"read" / "satisfactorily"</i>	The grade "satisfactory" is given to the student if he has knowledge only of the basic material, but has not mastered its details, allows inaccuracies, insufficiently correct wording, violations of the logical sequence in the presentation of the program material, has difficulty in performing practical work.
60-50 points	<i>"not counted" / "unsatisfactory"</i>	The “unsatisfactory” mark is given to a student who does not know a significant part of the program material, makes significant mistakes, performs practical work uncertainly, with great difficulty. As a rule, the mark "unsatisfactory" is given to students who cannot continue their studies without additional classes in the relevant discipline.

Competence level measurement scale

Final score	1-60	61-75	76-85	86-100
Grade (five-point scale)	2 unsatisfactory	3 satisfactorily	4 good	5 great
Competence level	absent	threshold (base)	advanced	high (creative)