



MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE RUSSIAN FEDERATION  
Federal State Autonomous Educational Institution of Higher Education  
**Far Eastern Federal University**  
(FEFU)  
INSTITUTE OF LIFE SCIENCES AND BIOMEDICINE (SCHOOL)

VALUATION FUND  
in the discipline "Systems analysis and management in healthcare"

Vladivostok  
2023

List of Forms of Assessment Used at Various Stages of Competence  
Formation in the Course of Mastering a Discipline (Module)  
«Systems analysis and management in healthcare»

| Item No | Supervised modules/sections/topics of the discipline           | Codes and Stages of Competency Formation                      |       | Valuation Tools – Name                                    |                          |
|---------|--|---|-------|---|--------------------------|
|         |  |   |       | Current control   | Intermediate Attestation |
| 1       | Subject and Methods of Systems Theory. Types and properties    | PP-5.1;<br>PC-5.2;<br>PC-5.3;<br>PP-6.1;<br>PC-6.2;<br>PP-6.3 | Knows | Interview<br>UO-1, abstract PR-4                          | Credit Questions 1-3     |
|         |  |   | Can   | Tests PR-1, essay PR-3, case problems PR-11, presentation |                          |
|         |  |   | Owns  | Small Group Work, UO-3                                    |                          |
| 2       | The Concept of Structure in Systems Theory                     | PP-5.1;<br>PC-5.2;<br>PC-5.3;<br>PP-6.1;<br>PC-6.2;<br>PP-6.3 | Knows | Interview<br>UO-1, abstract PR-4                          | Credit Questions 4-6     |
|         |  |   | Can   | Tests PR-1, essay PR-3, case problems PR-11, presentation |                          |
|         |  |   | Owns  | Small Group Work, UO-3                                    |                          |
| 3       | Basic Methods of Systems Theory                                | PP-5.1;<br>PC-5.2;<br>PC-5.3;<br>PP-6.1;<br>PC-6.2;<br>PP-6.3 | Knows | Interview<br>UO-1, abstract PR-4                          | Credit Questions 7-9     |
|         |  |   | Can   | Tests PR-1, essay PR-3, case problems PR-11, presentation |                          |
|         |  |   | Owns  | Small Group Work, UO-3                                    |                          |
| 4       | Cybernetic systems. The Concept of Structure in Systems Theory | PP-5.1;<br>PC-5.2;<br>PC-5.3;<br>PP-6.1;<br>PC-6.2;<br>PP-6.3 | Knows | Interview<br>UO-1, abstract PR-4                          | Credit Questions 10-12   |
|         |  |   | Can   | Tests PR-1, essay PR-3, case problems PR-11, presentation |                          |
|         |  |   | Owns  | Small Group Work, UO-3                                    |                          |
| 5       | Freedom and Expediency of Systems                              | PP-5.1;<br>PC-5.2;<br>PC-5.3;<br>PP-6.1;<br>PC-6.2;<br>PP-6.3 | Knows | Interview<br>UO-1, abstract PR-4                          | Credit Questions 13-15   |
|         |  |   | Can   | Tests PR-1, essay PR-3, case problems PR-11, presentation |                          |
|         |  |   | Owns  | Small Group Work, UO-3                                    |                          |
| 6       | Synthetic Method in Systems Theory. Tasks of System Analysis   | PP-5.1;<br>PC-5.2;<br>PC-5.3;<br>PP-6.1;<br>PC-6.2;<br>PP-6.3 | Knows | Interview<br>UO-1, abstract PR-4                          | Credit Questions 16-18   |
|         |  |   | Can   | Tests PR-1, essay PR-3, case problems PR-11, presentation |                          |
|         |  |   | Owns  | Small Group Work, UO-3                                    |                          |
| 7       | Methods of Systems Research                                    | PP-5.1;<br>PC-5.2;<br>PC-5.3;<br>PP-6.1;<br>PC-6.2;           | Knows | Interview<br>UO-1, abstract PR-4                          | Credit Questions 19-21   |
|         |  |   | Can   | Tests PR-1, essay PR-3, case problems PR-11, presentation |                          |

|    |  |   |       |   |                           |
|----|--|---|-------|---|---------------------------|
|    |  | PP-6.3  | Owns  | Small Group Work, UO-3  |                           |
| 8  | Methods of System Analysis in Relation to Solving the Problems of Organizing Medical Care for the Population | PP-5.1;<br>PC-5.2;<br>PC-5.3;<br>PP-6.1;<br>PC-6.2;<br>PP-6.3 | Knows | Interview<br>UO-1, abstract PR-4                                | Credit<br>Questions 22-24 |
|    |  |   | Can   | Tests PR-1, essay PR-3,<br>case problems PR-11,<br>presentation |                           |
|    |  |   | Owns  | Small Group Work, UO-3  |                           |
| 9  | Stages of systems research.<br>Characteristics and classification of scientific research                     | PP-5.1;<br>PC-5.2;<br>PC-5.3;<br>PP-6.1;<br>PC-6.2;<br>PP-6.3 | Knows | Interview<br>UO-1, abstract PR-4                                | Credit<br>Questions 25-27 |
|    |  |   | Can   | Tests PR-1, essay PR-3,<br>case problems PR-11,<br>presentation |                           |
|    |  |   | Owns  | Small Group Work, UO-3  |                           |
| 10 | System Regularities as a Basis for Constructing Mechanisms for Managing Complex Socio-Medical Systems        | PP-5.1;<br>PC-5.2;<br>PC-5.3;<br>PP-6.1;<br>PC-6.2;<br>PP-6.3 | Knows | Interview<br>UO-1, abstract PR-4                                | Credit<br>Questions 28-30 |
|    |  |   | Can   | Tests PR-1, essay PR-3,<br>case problems PR-11,<br>presentation |                           |
|    |  |   | Owns  | Small Group Work, UO-3  |                           |
| 11 | Particular Methods of System Analysis in Relation to Solving Problems in the Field of Medical Services       | PP-5.1;<br>PC-5.2;<br>PC-5.3;<br>PP-6.1;<br>PC-6.2;<br>PP-6.3 | Knows | Interview<br>UO-1, abstract PR-4                                | Credit<br>Questions 31-33 |
|    |  |   | Can   | Tests PR-1, essay PR-3,<br>case problems PR-11,<br>presentation |                           |
|    |  |   | Owns  | Small Group Work, UO-3  |                           |
| 12 | Quantitative Methods for Describing Systems in Healthcare  | PP-5.1;<br>PC-5.2;<br>PC-5.3;<br>PP-6.1;<br>PC-6.2;<br>PP-6.3 | Knows | Interview<br>UO-1, abstract PR-4                                | Credit<br>Questions 34-36 |
|    |  |   | Can   | Tests PR-1, essay PR-3,<br>case problems PR-11,<br>presentation |                           |
|    |  |   | Owns  | Small Group Work, UO-3  |                           |
| 13 | Qualitative Methods of System Analysis   | PP-5.1;<br>PC-5.2;<br>PC-5.3;<br>PP-6.1;<br>PC-6.2;<br>PP-6.3 | Knows | Interview<br>UO-1, abstract PR-4                                | Credit<br>Questions 37-39 |
|    |  |   | Can   | Tests PR-1, essay PR-3,<br>case problems PR-11,<br>presentation |                           |
|    |  |   | Owns  | Small Group Work, UO-3  |                           |
| 14 | Methods of Formalized Representation of Systems  | PP-5.1;<br>PC-5.2;<br>PC-5.3;<br>PP-6.1;<br>PC-6.2;<br>PP-6.3 | Knows | Interview<br>UO-1, abstract PR-4                                | Credit<br>Questions 40-42 |
|    |  |   | Can   | Tests PR-1, essay PR-3,<br>case problems PR-11,<br>presentation |                           |
|    |  |   | Owns  | Small Group Work, UO-3  |                           |
| 15 | System Modeling  | PP-5.1;<br>PC-5.2;<br>PC-5.3;<br>PP-6.1;<br>PC-6.2;<br>PP-6.3 | Knows | Interview<br>UO-1, abstract PR-4                                | Credit<br>Questions 43-45 |
|    |  |   | Can   | Tests PR-1, essay PR-3,<br>case problems PR-11,<br>presentation |                           |
|    |  |   | Owns  | Small Group Work, UO-3  |                           |

|    |  |   |       |   |                           |
|----|--|---|-------|---|---------------------------|
| 16 | Biotechnical Systems   | PP-5.1;<br>PC-5.2;<br>PC-5.3;<br>PP-6.1;<br>PC-6.2;<br>PP-6.3 | Knows | Interview<br>UO-1, abstract PR-4                                | Credit<br>Questions 46-48 |
|    |  |   | Can   | Tests PR-1, essay PR-3,<br>case problems PR-11,<br>presentation |                           |
|    |  |   | Owns  | Small Group Work, UO-3  |                           |
| 17 | Simulation   | PP-5.1;<br>PC-5.2;<br>PC-5.3;<br>PP-6.1;<br>PC-6.2;<br>PP-6.3 | Knows | Interview<br>UO-1, abstract PR-4                                | Credit<br>Questions 49-50 |
|    |  |   | Can   | Tests PR-1, essay PR-3,<br>case problems PR-11,<br>presentation |                           |
|    |  |   | Owns  | Small Group Work, UO-3  |                           |
| 18 | Decision-making models for managing complex systems. Automated control systems for medical and biological purposes | PP-5.1;<br>PC-5.2;<br>PC-5.3;<br>PP-6.1;<br>PC-6.2;<br>PP-6.3 | Knows | Interview<br>UO-1, abstract PR-4                                | Credit<br>Questions 51-52 |
|    |  |   | Can   | Tests PR-1, essay PR-3,<br>case problems PR-11,<br>presentation |                           |
|    |  |   | Owns  | Small Group Work, UO-3  |                           |

\*Recommended forms of evaluation tools:

1) interview (MA-1), colloquium (MA-2); Report, Communication (MA-3); Round Table, Discussion, Polemics, Dispute, Debate (SW-4); etc.

2) tests (PR-1); tests (PR-2), essays (PR-3), essays (PR-4), term papers (PR-5), scientific and educational reports on practices (PR-6); laboratory work (PR-7); portfolio (PR-8); project (WP-9); business and/or role-playing game (PR-10); case problem (PR-11); workbook (PR-12), etc.

3) simulator (TS-1), etc.

Scale for assessing the level of achievement of learning outcomes for current and intermediate certification *in the discipline*  
«Systems analysis and management in healthcare»

| <i>Points (rating score)</i> | Levels of achievement Training       |                                 | <i>Requirements for the formed competencies</i>  |
|------------------------------|--------------------------------------|---------------------------------|--|
|                              | Current & Intermediate certification | <i>Intermediate Attestation</i> |  |
| 100 – 86                     | Increased                            | "Passed" / "Excellent"          | Freely and confidently finds reliable sources of information, operates with the information provided, has excellent skills in analyzing and synthesizing information, knows all the basic methods of solving problems provided for in the curriculum, knows typical mistakes and possible difficulties in solving a particular problem and is able to choose and effectively apply an adequate method for solving a particular problem.<br>trouble |
| 85 – 76                      | Base                                 | "Passed" / "Good"               | In most cases, he is able to identify reliable sources of information, process, analyze and synthesize the proposed information, choose a method for solving a problem and solve it. Makes single serious mistakes in problem solving, experiences difficulties in rare or difficult cases of problem solving, does not know typical mistakes and possible difficulties in solving this or that trouble  |
| 75 – 61                      | Threshold                            | "Passed" / "Satisfying"         | Makes mistakes in determining the reliability of sources of information, is able to correctly decide only Typical most often Occur trouble<br>in<br>(process information, choose a method to solve a problem, and solve it)  |
| 60 – 0                       | Level Not Reached                    | "Failed" / "Unsatisfactory"     | Does not know a significant part of the program material, makes significant mistakes, performs practical work unconfidently, with great difficulty.  |

## **Current attestation in the discipline "Systems analysis and management in healthcare"**

Current certification of students in the discipline "Systems analysis and management in healthcare" is carried out in accordance with local regulations of FEFU and is mandatory.

Current attestation in the discipline is carried out in the form of control measures, in the form of an interview, to assess the actual results of students' learning and is carried out by the leading teacher.

For each object, a description of the assessment procedures is given in relation to the assessment tools used.

### **Assessment Tools for Ongoing Monitoring**

#### ***1. Questions for Interview:***

- 1) What is system analysis and what methods and tools are used in this field?
- 2) What challenges may arise in the implementation of systems analysis and management in healthcare, and how can they be overcome?
- 3) What are the benefits of using systems analysis and management in healthcare for patients, healthcare organizations, and the healthcare system as a whole?

#### ***Requirements for the presentation and evaluation of materials (results):***

##### **Assessment of Students' Oral Responses**

Oral questioning is one of the main ways of recording knowledge.

A student's detailed answer should be a coherent, logically consistent message on a certain topic, showing his ability to apply definitions and rules in specific cases. When evaluating a student's answer, the following criteria should be followed:

- 1) completeness and correctness of the answer;
- 2) the degree of awareness and understanding of what has been learned;
- 3) the language of the response

A grade of "5" is given if the student:

- 1) fully expounds the studied material, gives correct definitions of concepts;
- 2) shows an understanding of the material, can substantiate his/her judgments, apply knowledge in practice, give the necessary examples not only on the material, but also independently compiled;
- 3) presents the material consistently and correctly.

A grade of "4" is given if the student gives an answer that meets the same

requirements as for a grade of "5", but makes 1-2 mistakes, which he corrects himself, and 1-2 shortcomings in the sequence and language of the presentation.

A grade of "3" is given if the student demonstrates knowledge and understanding of the main points of the topic, but:

1) presents the material incompletely and allows inaccuracies in the definition of concepts or formulation;

2) is not able to substantiate his/her judgments and give examples in sufficient depth and evidence;

3) presents the material inconsistently and makes mistakes in what is presented.

A grade of "2" is given if the student reveals ignorance of most of the relevant section of the material being studied, makes mistakes that distort their meaning, and presents the material in a disorderly and uncertain manner. A grade of "2" marks such shortcomings in the student's preparation that are a serious obstacle to the successful mastery of the subsequent material.

A grade ("5", "4", "3") can be given not only for a one-time answer (when a certain time is allotted to check the student's preparation), but also for a time-dispersed one, i.e. for the sum of the answers given by the student during the lesson (the lesson score is displayed), provided that during the lesson not only the student's answers were heard, but also his ability to apply knowledge in practice was checked.

## ***2. Sample Essay Topics***

Topic 1. Analysis and management of the process of medical care delivery in the context of the COVID-19 pandemic.

Topic 2. Analysis and optimization of medical personnel management in the hospital system.

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Topic 3. Method of Expert Analysis in System Analysis.

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## ***3. Sample Essay Topics***

Topic 1. Application of system analysis to optimize the medical malpractice management process.

Topic 2. Analysis of the effectiveness of the healthcare quality management system.

Topic 3. Optimization of the medical resources management system in the context of limited budget funds.

*Criteria for evaluating the abstract:* bMalicious understanding of the abstract as an integral author's text determines the criteria for its evaluation: novelty of the text; the reasonableness of the choice of source; the degree of disclosure of the essence of the issue; compliance with the design requirements.

**Grade 5** is given if all the requirements for writing and defending an abstract are met: the problem is identified and its relevance is justified, a brief analysis of various points of view on the problem under consideration is made and one's own position is logically stated, conclusions are formulated, the topic is fully disclosed, the volume is maintained, the requirements for external design are met, correct answers to additional questions are given.

**Grade 4** – the main requirements for the abstract and its defense have been met, but at the same time there are shortcomings. In particular, there are inaccuracies in the presentation of the material; there is no logical consistency in judgments; the volume of the abstract is not maintained; there are omissions in the design; Incomplete answers were given to additional questions during the defense.

**Grade 3** – there are significant deviations from the requirements for abstracting. In particular: the topic is covered only partially; factual errors were made in the content of the abstract or when answering additional questions; There is no conclusion during the defense.

**Grade 2** – the topic of the abstract is not disclosed, a significant misunderstanding of the problem is revealed.



#### *4. Case Study*

##### **Optimisation of the process of making an appointment with a doctor in a polyclinic**

Task: In the polyclinic, there is a problem with long queues and difficulties in making an appointment with a doctor. Patients complain of long waiting times and inconveniences when making an appointment. As a systems analyst, you've been tasked with streamlining the appointment scheduling process and improving patient satisfaction.

Questions:

1. What system analysis techniques will you use to analyze the current appointment scheduling process?
2. What factors can affect the effectiveness of the process of making an appointment at the clinic?
3. What recommendations and improvements will you suggest to streamline the appointment scheduling process and improve patient satisfaction?

**I. Intermediate attestation in the discipline "Systems analysis and management in healthcare"**

Intermediate attestation of students. Intermediate certification of students in the discipline "Systems analysis and management in healthcare" is carried out in accordance with the local regulations of FEFU and is mandatory.

**Assessment Tools for Intermediate Control (Exam/Test)**

**1. Bank of test tasks**

1. Which system analysis method is used to divide a complex system into simpler subsystems?

- (a) Black-box method
- (b) Decomposition method
- (c) Method of analogy
- (d) Modelling method

2. What system analysis method is used to analyze the statistical relationships between the components of the system?

- (a) Black-box method
- (b) Decomposition method
- (c) Method of analogy
- (d) Method of statistical analysis of relationships

3. What method of system analysis is used to build models based on the knowledge of experts?

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- (a) Black-box method
- (b) Decomposition method
- (c) Method of analogy
- (d) The method of expertise

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4. What method of system analysis is used for the evolutionary development of the system based on changes in external conditions?

- (a) Black-box method
- (b) Decomposition method
- (c) Method of analogy
- (d) Method of evolutionary development

## Indicative List of Evaluation Tools (AP)

| №                       | Code | Name of the appraisal means                          | Brief description of the evaluation tool   | Presentation valuation in the fund   |
|-------------------------|------|--|--|--|
| <b>Oral Questioning</b> |      |  |  |  |
| 1                       | UO-1 | Interview  | A means of control, organized as a special conversation between the teacher and the student on topics related to the discipline being studied, and Calculated on ascertainment Volume Knowledge a student on a certain section, topic, problem, etc.                                   | Questions on topics/sections of the discipline                                       |
| 2                       | UO-2 | Colloquium   | A means of monitoring the assimilation of the educational material of a topic, section or sections of the discipline, organized as a training session in the form of an interview between the teacher and the students   | Questions on topics/sections of the discipline                                       |
| 3                       | UO-3 | Report, Communication                                | The product of the student's independent work, which is a public speech to present the results of the solution of a certain educational, practical, educational research or scientific topic   | Topics of reports, messages  |
| 4                       | UO-4 | Round table, discussion, polemics, Disputes, debates | Assessment tools that allow students to be involved in the process of discussing a controversial issue, problem and assess their ability to argue their own point of view  | List of discussion topics for round tables, discussions, polemics, disputes, debates |
| <b>Written works</b>    |      |  |  |  |
| 1                       | PP-1 | Test   | A system of standardized tasks that allows you to automate the procedure for measuring the level of knowledge and skills Student   | Test Task Fund   |
| 2                       | PP-2 | Quiz   | A tool for testing the ability to apply the acquired knowledge to solve problems of a certain type on a topic or section   | A set of control tasks<br>By variants  |
| 3                       | PR-3 | Essay  | A tool that allows you to assess the student's ability to express the essence of the problem in writing, independently analyze this problem using concepts and analytical tools of the relevant discipline, to draw conclusions summarizing the author's position on the problem posed | Essay Topics   |

|   |      |          |   |         |                 |
|---|------|----------|---|---------|-----------------|
| 4 | PP-4 | Abstract | A product of the student's independent work, representing<br>is a written summary of the results of the theoretical Analysis<br>Scientific (Training- | Certain | Abstract Topics |
|---|------|----------|---|---------|-----------------|

|    |       |                                   |   |  |
|----|-------|-----------------------------------|---|--|
|    |       |                                   | research) topic, where the author reveals the essence of the problems, gives different points of view, as well as his own views on it   |  |
| 5  | PP-5  | Term paper, term project          | The product of the student's independent work, which is a brief summary in writing of the results of the theoretical analysis of a certain scientific (educational and research) topic, where the author reveals the essence of the problem under study, gives various points of view, as well as his own Views on it   | Coursework/Project Topics, Term Paper Outlines<br>works/projects, methodological recommendations for writing CR and CP |
| 6  | PR-6  | Laboratory work                   | A tool for consolidation and practical mastery of the material for a specific section   | A set of tasks for Laboratory Work   |
| 7  | PP-7  | Abstract                          | A product of the student's independent work, reflecting the The main ideas of the lecture, message, etc.  | Sections of the discipline   |
| 8  | PP-8  | Portfolio                         | A targeted selection of a student's work, revealing his/her individual educational achievements in one or more several academic disciplines   | Portfolio Structure  |
| 9  | PP-9  | Project                           | The final product obtained as a result of the planning and implementation of a set of educational and research tasks. It allows you to assess the ability of students to independently construct their knowledge in the process of solving practical tasks and problems, to navigate in the information space and the level of formation of analytical, research skills, practical and creative thinking skills. Can be executed individually or by a group of students | Topics of group and/or individual projects   |
| 10 | PP-10 | Business and/or role-playing game | Joint activity of a group of students under the guidance of a teacher in order to solve educational and professionally oriented tasks by means of game modeling of a real problem situation. Allows you to assess the ability to analyze and solve typical professional tasks   | Theme (problem), concept, roles, and expected outcome for each game  |
| 11 | PP-11 | Case Study                        | A problem-based task in which the learner is asked to to comprehend the real professionally-oriented situation necessary to solve this problem  | Tasks for solving a case problem   |
| 12 | PP-12 | Workbook                          | Didactic complex designed for independent of the student's work and allows to assess the level of assimilation of the educational material  | Sample Workbook  |

|                 |       |                                   |  |   |
|-----------------|-------|-----------------------------------|--|---|
| 13              | PP-13 | Multi-level tasks and assignments | <p>A distinction is made between tasks and tasks:</p> <p>a) reproductive level, which makes it possible to assess and diagnose knowledge of factual material (basic concepts, algorithms, facts) and the ability to correctly use special terms and concepts, recognition of objects of study within a certain section of the discipline;</p> <p>6) reconstructive level, allowing to assess and diagnose the ability to synthesize, analyze, generalize factual and theoretical material with the formulation of specific conclusions, the establishment of cause-and-effect relationships;</p> <p>c) creative level, which allows you to assess and diagnose skills, integrate knowledge from various fields, and argue your own point of view</p> | A set of multi-level tasks and tasks                    |
| 14              | PP-14 | Cash-Graphic work                 | A tool for testing the ability to apply the acquired knowledge according to a predetermined methodology to solve problems or tasks on the module or discipline in general  | A set of tasks for performing the Graphic Work          |
| 15              | PR-15 | Creative Brief                    | A partially regulated task that has a non-standard solution and allows you to diagnose skills, integrate knowledge from various fields, and argue your own point View. It can be performed individually or by a group of students  | Topics for group and/or individual creative assignments |
| Technical Means |       |                                   |  |   |
| 1               | TC-1  | Simulator                         | A technical tool that can be used to control the professional skills and abilities acquired by the student to manage a specific material object  | A set of tasks for working on the simulator             |