**AL-FARABI KAZAKH NATIONAL UNIVERSITY**

**Faculty of Mechanics and Mathematics**

**Department of Mechanics**

**Final Control Program**

**Course: "****Scientific Research Methods"**

**Educational Program: "8D05403 - Mechanics", “8D05401 - Mathematics”, “8D07111 – Space Engineering and Technologies”, “8D07110 – Robotic Systems”, “8D05404 – Fundamental and Applied Mathematics”**

**Course: 1st year PhD candidate**

**Semester: 1**

**Credits: 2**

 **Location: Almaty, 2024**

Final control program developed by PhD, Associate Professor, Acting Professor of the Department of Mechanics, Yerzhan Belyayev.

The exam program was reviewed and approved at the Department of Mechanics meeting on September 13, 2024, Protocol No. 2.

Approved by

Head of the Department of Mechanics \_\_\_\_\_\_\_\_\_\_\_\_\_ Dinara Turalina.

**Purpose of the Exam in the form of a "PROJECT"**

One of the main goals of higher education systems is to develop students' competencies. Project-based learning is an effective method to achieve this.

The Project is independent scientific-practical research by the student aimed at consolidating and systematizing knowledge gained during the course as a whole and on a specific topic. It develops skills and teaches students to apply their knowledge in practice to solve specific scientific and practical problems in mechanics and formulate and argue their position on these issues.

The final project will serve as the basis for writing a scientific article for submission to a domestic journal included in the list of the Committee for Control in the Sphere of Education and Science of the Republic of Kazakhstan (CCSES).

The Project is carried out over the academic semester. It assesses students' abilities to independently apply their knowledge in solving practical tasks, navigate the informational space, and evaluate their level of analytical, research skills, and creative thinking.

**Project Stages**

|  |  |  |
| --- | --- | --- |
| 1 | Conduct a literature review on the research topic to understand the problem. | Weeks 1-2 |
| 2 | Justify the relevance of the problem. | Week 3 |
| 3 | Define the purpose and objectives of the research problem. | Week 4-5 |
| 4 | Formulate the problem statement.  | Week 6 |
| 6 | Choose a research method (laboratory experiment or numerical experiment) and justify the choice.  | Weeks 7-8 |
| 7 | Explain the research methodology. | Week 9 |
| 8 | Conduct the research and analyze the results (tables, graphs, analysis). | Weeks 10-13 |
| 9 | Make justified conclusions. | Week 14 |
| 10 | Prepare and format the project report. This report will serve as the basis for a scientific article in the CCSES journal.  | Week 15 |

**Project Report Content**

|  |  |  |  |
| --- | --- | --- | --- |
| No. |  | Content | pages |
| 1 | **Introduction** |  |
|  | 1.1 | Literature Review  |  |
|  | 1.2 | Problem Relevance |  |
| 2 | **Problem Statement** |  |
|  | 2.1 | Problem Statement |  |
| 3 | **Research Methodology**  |  |
|  | 3.1 | Research method |  |
|  | 3.2 | Justification of the research method  |  |
|  | 3.3 | Research Methodology  |  |
|  | 3.4 | Research results  |  |
| 4 | **Conclusion** |  |
| 5 | **References** |  |

|  |
| --- |
| **Project Topics**  |
| 1. Writing a literature review for the research paper in the field of PhD applicants.
2. Writing a research proposal for the grant funding call in Kazakhstan.
3. Writing a short tutorial book in the PhD applicant’s research field.
4. Writing a review paper based on the PhD applicant's research topic.
5. Writing a book chapter in the PhD applicant’s research field.
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**Final Control Program for the course**

**“Scientific Research Methods”**

**Academic Year: 2024-2025**

Faculty of Mechanics and Mathematics

Department of Mechanics

Course: Scientific Research Methods

Specialty: "8D05403 - Mechanics", “8D05401 - Mathematics”, “8D07111 – Space Engineering and Technologies”, “8D07110 – Robotic Systems”, “8D05404 – Fundamental and Applied Mathematics”

Year: 1st year PhD candidate

Number of students: 8

Instructor: Yerzhan Belyayev

Exam platform: Moodle Distance Learning System

Exam format: COMBINED #1: written project followed by an oral defense.

EXAM PROCEDURE

The exam consists of two parts: a written component (project implementation, implementation report) and an oral component (project defense).

The written part of the project is to be completed within the timeframe specified by the instructor in the Moodle LMS. The deadline is 24 hours before the start of the oral exam.

The oral part of the exam will be conducted at the time indicated in the exam schedule.

Number of files to be attached: 1

Exam duration: 2 hours.

Grading criteria: **70%** of the grade is allocated to the written part (assessment of the report) and **30%** to the oral defense.

The maximum overall score for the submission is 100 points.

Following the exam, the student must submit a completed project in the form of a report in (\*.docx) format via Moodle LMS.

An originality check will be conducted on the submitted exam work.

The uploaded file size should not exceed 30 MB.

The final grade will be assigned by the committee based on the assessment results.

The time allowed for entering the exam grade into the assessment register for a project-based exam is 24 hours.

**Recommended Literature**

**Literature:** main, additional.

1. Gerald Graff and Cathy Birkenstein "They Say/I Say: The Moves That Matter in Academic Writing" Publisher: W. W. Norton & Company 2018, ISBN: 978-0393631678

2. Joseph M. Williams and Joseph Bizup "Style: Lessons in Clarity and Grace" Publisher: Pearson 2016, ISBN: 978-0134080413

3. William Strunk Jr. and E. B. White "The Elements of Style", Publisher: Pearson 2020, ISBN: 978-0134092669

4. Lisa Ganobcsik-Williams "Teaching Academic Writing in European Higher Education" Language and Education 33 (1), 2019, P.59-72, DOI: 10.1080/09500782.2018.1529139

5. Joan Bolker "Writing Your Dissertation in Fifteen Minutes a Day: A Guide to Starting, Revising, and Finishing Your Doctoral Thesis", Publisher: Holt Paperbacks 1998, ISBN: 978-0805048919

**Research infrastructure**

1. Mechanics and Energy Lab, Department of Mechanics

2. Kazakh-French Geo-Energy Center

**Professional scientific databases**

1. Writing research proposals.
2. Writing research papers.
3. Peer-reviewing experience.

**Internet resources**

1. <https://adilet.zan.kz/rus/docs/V2100022325>
2. <https://adilet.zan.kz/rus/docs/V1100006929>
3. <https://adilet.zan.kz/rus/docs/V1100006951>
4. <https://www.gov.kz/memleket/entities/science/press/news/details/634085?lang=ru>
5. <https://www.ncste.kz/>

**Software**

1. Mendeley

2. VOSviewer

**ASSESSMENT CRITERIA**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Grade | GPA Equivalent | Percentage | Traditional Grade | Criteria |
| А | 4,0 | 95-100 | Excellent  | Complete understanding and justification of the problem's relevance. Full command and comprehension of the physical and mathematical problem statements, research methodology, accuracy of research, comprehensive analysis of results, justified conclusions, and report formatting meeting all requirements. |
| А- | 3,67 | 90-94 |
| В+ | 3,33 | 85-89 | Good  | Significant understanding and justification of the problem's relevance. Strong command of the physical and mathematical problem statements, methodology, and research, with a limited analysis of results and conclusions. Report formatting meets requirements.  |
| В | 3,0 | 80-84 |
| В- | 2,67 | 75-79 |
| С+ | 2,33 | 70-74 | Satisfactory  | Limited understanding and justification of the problem's relevance. Weak comprehension of the physical and mathematical problem statements, incorrect research methodology, incomplete analysis, unsubstantiated conclusions, and lack of logical flow. Report formatting does not meet requirements.  |
| С | 2,0 | 65-69 |
| С- | 1,67 | 60-64 |
| D+ | 1,33 | 55-59 |
| D- | 1,0 | 50-54 |
| FX | 0,5 | 25-49 | Unsatisfactory | Complete lack of problem understanding and research accuracy. Report formatting does not meet requirements.  |
| F | 0 | 0-24 | Unsatisfactory | Violation of final control regulations.  |
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**Lecturer Yerzhan Belyayev**