AL-FARABI KAZAKH NATIONAL UNIVERSITY
Faculty of Mechanics and Mathematics
Department of Mathematics

APPROVED
Head of the Department of Mathematics

_____ S.E. Kassenov

«____» _____ 2025 y.

Program of final attestation on discipline
ODU2207 «Ordinary Differential Equations»

Speciality «6B07111 –Space Engineering and Technologies»

Course – 2__
Semester –3__
Number of Credits – 5

Almaty – 2025 y.

Program
Final control for the course "ODU 2207 Ordinary Differential Equations" for the 2025/2026 academic year

Faculty Mechanics and Mathematics
Department Mathematics
Code and name of the educational program: " Speciality 6B07111 –Space Engineering and Technologies"

Name of discipline:Ordinary Differential Equations
Course
Teacher: Atakhan Nilupar
Protocol and date of consideration
and approval by the department Mathematics
The form of final control in an academic discipline is oral traditional (topics include IWS, seminars)
Platform: no
Oral exam – the student takes an exam in the building in front of the examination committee according to the exam schedule by answering the questions on the ticket. The exam is monitored by a video camera.

TRADITIONAL ORAL EXAMINATION – ANSWERS TO QUESTIONS.
Conducted offline. The exam format is synchronous.

The process of passing an oral examination by a student involves the creation of an examination paper for the student, which must be answered before the examination committee.

EXAMINATION REGULATIONS
IMPORTANT – the exam is conducted according to a schedule that must be known to students and teachers in advance. This is the responsibility of the departments and faculty.

STUDENT
1. It is necessary to come to the building in advance and find an audience to take the exam.
2. Provide identification and sign the appearance form.
3. Enter according to your queue.
4. Take a ticket and prepare to answer the questions on the ticket.
5. The duration of preparation is determined by the commission (recommended 10 minutes preparation and 5 minutes response).
6. After preparation, the student defends his answers before the commission.

List of topics for the oral final exam in the discipline
1. Variable separable differential equation, Complete differential equations.
2. The first type of integrating multiplier: $\mu = \mu(x)$
3. First order linear differential equations.
4. Riccati's equation
5. Equations with differentiable variables
6. Clero's equation
7. Construction of general solutions of homogeneous differential equations of the second order with constant coefficients.
8. Differential equations that can be easily reduced
9. Inhomogeneous equations of the second order with constant coefficients

10. Method of variation of free constants (Lagrange method)
11. Homogeneous differential equations of the first order.
12. Darbu equation
13. Bernoulli's equation.
14. Equations leading to a homogeneous equation.
15. Solution of two unknowns of a system of normally given differential equations using the Euler method.
16. Solution of two unknowns of a system of normally given differential equations using the D'Alembert method.
17. Solution of a system of differential equations with two unknowns in the normal form using the method of derivation of one unknown.
18. Euler's method for a system of three unknowns of differential equations given normally.
19. Equations for linear equations.
20. Riccati equations solved in quadrature.
21. The method of solving homogeneous differential equations of the first order.
22. General solution of linear differential equations of the first order.
23. The structure of the general solution of inhomogeneous equations of the second order with constant coefficients.
24. Second-order homogeneous equations with constant coefficients.
25. How to differentiate variables.
26. Lagrange's equation.
27. Second-order homogeneous differential equations with constant coefficients.
28. Conditions of complete differential equations.
29. Types of first-order simple differential equations.
30. The second type of integrating multiplier: $\mu = \mu(y)$

Literature

1. Suleimenov Zh.S. Course of differential equations: Textbook.-Almaty "Kazakh University" - 2009. 440б.
2. Kadykenov B. M. Problems and exercises of differential equations. Almaty, 2002.
3. Filippov A. F. Collection of tasks on differential equations. M., "Science", 2008.
4. Trenogin VA Ordinary differential equations M .: Fizmatlit, 2009.-312 p.

Evaluation Criteria (Rating Scale):

«Great» –	A	4,0	95-100
	A-	3,67	90-94
«Fine» –	B+	3,33	85-89
	B	3,0	80-84
	B-	2,67	75-79
	C+	2,33	70-74
«Satisfactorily» –	C	2,0	65-69
	C-	1,67	60-64
	D+	1,33	55-59
	D-	1,0	50-54

«Unsatisfactory» –	FX	0,5	25-49
	F	0	0-24

GRADING POLICY
BAK/MAG/DOC STANDARD EXAM: ORAL

№	Criterion/score	Descriptors				
		Great 90–100% (27-30 score)	Fine 70–89% (21-26 score)	Satisfactorily 50–69% (15-20 score)	Unsatisfactory 25–49% (8-14	0–24% (0-7
1 question 30 points	Knowledge and understanding theories and course concepts	"**Great**" grade is given for an answer that contains an exhaustive explanation of the question, a detailed argumentation for each conclusion and statement, is constructed logically and consistently, and is supported by examples from the developed classroom topics.	"**Fine**"grade is given for an answer that contains a complete but not exhaustive coverage of the issue, an abbreviated argumentation of the main provisions, and allowsfor a violation of the logic and sequence of presentationof the material. The answer containsinaccurate use of terms	"**Satisfactory**" grade is given for an answer that contains incomplete coverage of the questions proposed in the ticket, superficially argues the main points, in the presentation allows for violations of the logic and sequence of presentation of the material, and does not illustrate theoretical points with examples from the developed class notes	Incorrect coverage of the posed questions, erroneous argumentation, factual and verbal errors, assumption of an incorrect conclusion.	Ignorance of basic concepts, theories...; Violation of the Rules for final control.
2 question 30 points	Application of favorites methods and technologies to specific practical tasks	Complete completion of the educational assignment, a detailed, reasoned answer to the question posed, followed by solving practical problems of the course;	Partial completion of the educational assignment, incomplete, sometimes reasoned answer to the question posed with an incomplete solution to the practical problems of the course; illiterate	The material is presented in fragments, in violation of logical sequence, factual and semantic inaccuracies are made, and theoretical knowledge of the course is used superficially.	An irrational method of solving a task or an insufficiently thought-out answer plan; inability to solve problems, perform tasks in general;	Inability to apply knowledge and algorithms to solve tasks; inability to draw conclusions and generalizations. Violation of the Rules for final

№	Criterion/score	Descriptors				
		Great	Fine	Satisfactorily	Unsatisfactory	
		90–100% ((36-40	70–89% (35-28	50–69% ((27-20	25–49% (19-20	0–24% (0-9
3 question 40 points	**Evaluatingandanalyzingtheapplicabilityofthechosenmethodologytotheproposedpracticaltask, justifyingtheobtained result**	Consistent, logical and correct justification of scientific principles and the applied methodology and technology, literacy, compliance with the norms of scientific language, 1-2 inaccuracies in the presentation of the material are allowed that do not affect the generally correct conclusions (+ visualization of the results of the justification through graphical data).	3-4 inaccuracies in the use of conceptual material, minor errors in generalizations and conclusions are allowed, which do not affect the good overall level of task completion.	Conclusions on the applicability of substantiated scientific provisions are vague and unconvincing; there are stylistic and grammatical errors, as well as inaccuracies in processing the results of a practical solution	The task was completed with gross errors, the answers to the questions were incomplete, the conceptual material and argumentation were poorly used.	The task has not been completed, there are no answers to the questions posed, materials and analysis tools have not been used. Violation of the Rules for final control.

Exam papers consist of 3 questions. For correctly completed tasks, the maximum is 100 points, of which 30 points for the first question, 30 **score** for the second question, and 40 **score** for the third question.