National technical university of Ukraine
«IGOR SIKORSKY KYIV POLYTECHNIC INSTITUTE»

Faculty of Robotics and Instrument Engineering

SPECIAL MATHEMATICS SECTIONS

Syllabus

General information

Level of higher education	***First (Bachelor's)***
Knowledge branch	*G Engineering, Manufacturing and Construction*
Speciality	*G7 Automation, Computer-Integrated Technologies and Robotics*
Educational programme	*Computer-Integrated Technologies and Robotics*
Discipline status	*Mandatory*
Form of study	*Full-time*
Year of study, semester	*2nd year, spring semester*
Scope of discipline	*5 ECTS credits / 150 hours: lectures 30 hours, practical classes 60 hours, independent work 60 hours*
Semester control / control measures	*Exam / current control, modular control work (MCW), calculation and graphic work (CGW)*
Schedule	*In accordance with http://rozklad.kpi.ua*
Language of teaching	*Ukrainian / English*
Course coordinator / lecturers	Lecturers: *Candidate of Technical Sciences, Associate Professor, Nataliia Bezugla,* myhkam1@gmail.com *Candidate of Technical Sciences, Associate Professor, Pysarets Anna,* anna.v@ukr.net *Candidate of Technical Sciences, Associate Professor, Viacheslav Sokurenko,* sokurenko2@meta.ua
Course placement	https://do.ipo.kpi.ua/course/view.php?id=7770

Academic discipline program

1. Description of the academic discipline, its purpose, subject of study and learning outcomes

The course "Special Mathematics Sections" *is part of the professional training curriculum. It is designed to equip students with knowledge of various mathematical areas essential for the development of computer-integrated systems and technologies, as well as automated control systems. The material covered will enable future professionals to create and apply modern computer-integrated technologies and to automate a wide range of technological processes. The knowledge, skills, and competencies acquired during this course can be utilized by students in their subsequent study of specialized subjects and in the execution of their diploma projects.*

Subject matter *of the academic discipline: mathematical foundations of operational calculus, fundamentals of probability theory, and elements of mathematical statistics.*

Competencies *acquired by the student during the study of the discipline are*

- *Ability to apply knowledge in practical situation (GC01);*
- *Ability to communicate in the state language both orally and in writing (GC02);*
- *Skills in the use of information and communication technologies (GC04);*

- *Ability to apply knowledge of mathematics, to the extent of necessary for the use of mathematical methods for analysis and synthesis of automation systems (PC01).*

Programme learning outcomes are

- *Knowledge of linear and vector algebra, differential and integral calculus, functions of several variables, functional series, differential equations for one and many variables, operational calculus, theory of functions of a complex variable, theory of probabilities and mathematical statistics, theory of random processes to the extent necessary for the use of mathematical means and methods in the field of automation (PLO01).*

2. Prerequisites and postrequisites of the discipline (place in the structural and logical scheme of training in the corresponding educational program)

The course "Special Mathematics Sections" is based on knowledge students acquired in earlier years while studying higher mathematics, physics, and information technology. The knowledge, skills, and experience gained in this course can be applied by students in subsequent specialized subjects - such as computer modeling of processes and systems, automatic control theory, the design of automation systems, and digital signal and image processing - as well as during pre-graduation internships and the development of bachelor's capstone projects and master's theses.

3. The content of the discipline

The first session is designed to introduce students to the structure of the course, the schedule and format of lectures, the types of current and semester control, and the grading system (specifically, the rating-based system for evaluating student performance).
The lectures cover the fundamentals of operational (symbolic) calculus, the Laplace transform and its properties, as well as the core concepts, terminology, and principles of probability theory and mathematical statistics. Lectures are accompanied by presentations. In addition, the course includes video materials addressing fundamental topics covered in the lectures and practical sessions. The thematic content of the course is as follows:

Section 1. Operational Calculus.
Topic 1.1. Laplace Transform.
Topic 1.2. Basic Properties of the Laplace Transform.
Topic 1.3. Determining Original Functions from Their Transforms.
Topic 1.4. Applications of Operational Calculus.
Section 2. Fundamentals of Probability Theory.
Topic 2.1. Basic Concepts and Definitions in Probability Theory.
Topic 2.2. Probability Space. Addition and Multiplication Theorems for Event Probabilities.
Topic 2.3. Random Variable (RV). Theorems on Variance and Mathematical Expectation of Discrete RVs. Repeated Trials. Laws of Large Numbers.
Topic 2.4. Continuous Random Variables.
Topic 2.5. Functional Transformations of Random Variables.
Topic 2.6. Systems of Two Random Variables.
Section 3. Elements of Mathematical Statistics.
Topic 3.1. Fundamentals of Statistical Processing of Experimental Data.
Topic 3.2. Methods for Determining Point and Interval Estimates for an Observation Series. Methods for Estimating Parameters of the Data Distribution Law.

Topic 3.3. Methods for Determining the Data Distribution Law.
Topic 3.4. Correlation Analysis.
Topic 3.5. Regression Analysis.

4. Learning Materials and Resources

Basic literature

1. *Kuts Yu. V. Special Chapters of Mathematics: Lecture Course [Electronic resource] : study guide for bachelor degree applicants… / comp.: Yu. V. Kuts, Yu. Yu. Lysenko, V. M. Sokurenko ; Igor Sikorsky KPI. – Kyiv : Igor Sikorsky KPI, 2024. – 192 p.* https://ela.kpi.ua/handle/123456789/71127.
2. *Special Chapters of Mathematics. Workshop (Part I) [Electronic resource] : study guide… / Igor Sikorsky KPI; comp.: Yu. V. Kuts, N. V. Bezuhla. – Kyiv: Igor Sikorsky KPI, 2024. – 166 p.*
3. *Operational Calculus: workshop [Electronic resource]: study guide / V. P. Leheza, L. M. Oleshchenko; Igor Sikorsky KPI. – K.: Igor Sikorsky KPI, 2018. – 70 p.*
4. *Statistical Analysis of Measurement Data: study guide / Yeremenko V. S., Kuts Yu. V., Mokiichuk V. M., Samoilichenko O. V. – K.: NAU, 2015. – 321 p.*

Additional literature

1. *Zhyltsov O. B. Probability Theory and Mathematical Statistics in Examples and Problems / O. B. Zhyltsov; ed. by H. O. Mykhalin. – K.: B. Grinchenko Kyiv Univ., 2015. — 336 p.*
2. *Alekseieva I. V. Series. Theory of Functions of a Complex Variable. Operational Calculus. Workshop / I. V. Alekseieva, V. O. Haidai, O. O. Dykhovychnyi et al. – K., 2013. – 160 p.*
3. *Pavlenko A. V. Operational Calculus: Study Guide / A. V. Pavlenko, L. P. Kahadiy, V. L. Koporulin. – Dnipropetrovsk: NMetAU, 2012. – 42 p.*
4. *Shvets V. T. Higher Mathematics: Operational Calculus / V. T. Shvets. – Odesa: VMV Publishing House, 2015. – 138 p.*
5. *DSTU ISO 3534-1:2008 Statistics. Vocabulary and symbols. Part 1. General statistical terms and terms used in probability theory. – K.: Derzhspozhivstandart, 2008. – 42 p.*
6. *DSTU ISO 3534-2:2008 Statistics. Vocabulary and symbols. Part 2. Applied statistics. – K.: Derzhspozhivstandart of Ukraine, 2008. – 43 p.*
7. *Information Support for Monitoring Heat Power Engineering Objects / Babak V. P., Babak S. V., Berehun V. S. et al.; ed. by Corr. Member of NAS of Ukraine V. P. Babak. – K., 2015. – 512 p.*
8. *Theoretical Foundations of Information and Measuring Systems: Textbook / V. P. Babak, S. V. Babak, Yu. V. Yeremenko et al.; ed. by Corr. Member of NAS of Ukraine V. P. Babak. – K.: Univ. of New Technologies, 2017. – 496 p.*

Educational content

5. Methodology for studying the discipline (educational component)

Instruction is delivered through lectures, practical sessions, and independent student work. The approach incorporates active and collaborative learning strategies, supported by information and communication technologies; this fosters an inquiry-based learning process and encourages greater student autonomy (e.g., through the use of electronic presentations for lectures, as well as audio and video materials).

Lectures:

The primary objectives of the lectures are to master the theoretical material covering the fundamentals of operational (symbolic) calculus, probability theory and mathematical statistics, as well as the theory of stochastic processes.

A detailed description of each lecture is provided below.

Section 1.

Topic 1.1

Lecture 1. Laplace Transform.

Goals and objectives of the course. Operational calculus as a convenient mathematical tool for solving linear differential equations and systems of linear differential equations. Scope of application of operational calculus. Complex-valued functions. General overview of integral transforms. Original functions and their transforms (images). Deriving the transforms for specific functions: the Heaviside step function, power functions, and others.

Topic 1.2

Lecture 2. Fundamental properties of the Laplace transform.

Theorems on addition (linearity of the Laplace transform), scaling (similarity), shifting, and time-delay. Theorems regarding the differentiation of the original function and the differentiation of its transform. Theorems regarding the integration of the original function and the integration of its transform. The theorem on the multiplication of transforms (Borel's theorem) and its corollary (Duhamel's integral).

Topic 1.3

Lecture 3. Determining Original Functions from Their Transforms.

The inversion theorem. The Riemann-Mellin inversion formula. The first and second expansion theorems. The operational method for solving ordinary differential equations.

Topic 1.4

Lecture 4. Applications of Operational Calculus.

Solving ordinary differential equations. Solving systems of linear ordinary differential equations with constant coefficients. Application of operational calculus to solving problems in electrical engineering and automatic control theory.

Section 2

Topic 2.1

Lecture 5. Basic Concepts, Definitions, and Theorems of Probability Theory.

Basic concepts and definitions. Classical and statistical definitions of probability. Sets. Cardinality of sets. Set operations and their notation. Elements of combinatorics. "Geometric" probabilities.

Topic 2.2

Lecture 6. Probability Space. Addition and Multiplication Theorems for Event Probabilities.

Probabilistic model of stochastic experiments. Axioms of modern probability theory (Kolmogorov axioms). Conditional probability. Multiplication theorems for probabilities. Addition theorems for probabilities. Total probability formula. Concept of hypotheses. Bayes' formula.

Topic 2.3

Lecture 7. Random Variable (RV). Theorems on the Variance and Mathematical Expectation of Discrete RVs. Repeated Trials. Laws of Large Numbers.

Concept of a random variable (RV). Numerical characteristics of discrete RVs. Variance of the number of occurrences of events in independent trials. Identically distributed mutually independent RVs. Concept of higher-order moments of the distribution of an RV. Bernoulli scheme. Bernoulli distribution. Local Laplace theorem. Integral de Moivre–Laplace theorem. Poisson distribution. Laws of large numbers.

Topic 2.4

Lecture 8. Continuous Random Variables.

Probability distribution function of an RV. Probability density function. Probabilistic interpretation of the density function and its properties. Examples of distributions of continuous RVs (uniform, triangular (Simpson), Gaussian (Pearson), Student's t, exponential). Characteristics of continuous RVs (mathematical expectation, variance, mean deviation, normalized deviation, higher-order moments). Correlation coefficient. Law of large numbers. Chebyshev's inequality. Bernoulli's theorem.

Topic 2.5

Lecture 9. Functional Transformations of Random Variables.

Function of a single random argument and its distribution for discrete and continuous RVs. Mathematical expectation of a function of a single random argument for discrete and continuous RVs. Function of two random arguments. Distribution of the sum of independent random variables. Function of multiple random arguments. Method of linearization of functions of random variables.

Topic 2.6

Lecture 10. System of Two Random Variables. Random Processes.

General concept of a system of several RVs. Probability distribution law of a discrete bivariate RV. Joint cumulative distribution function of a bivariate RV and its properties. Joint probability density function of a continuous bivariate RV and its properties. Numerical characteristics of a system of two RVs (correlation moment and correlation coefficient). Conditional distribution laws of the components of systems of discrete and continuous RVs. Conditional numerical characteristics (conditional mathematical expectation and variance) and their properties. Concept and properties of random processes.

Section 3

Topic 3.1

Lecture 11. Fundamentals of Statistical Processing of Experimental Data.

Subject and objectives of mathematical statistics. Population and sample. Variational series, order statistics, and rank. Statistical distribution of a sample. Empirical distribution function and probability density function, and their graphical representation. Quality criteria for point estimators: unbiasedness, consistency, and efficiency. Point estimates of the characteristics of a set of observations.

Topic 3.2

Lecture 12. Methods for Determining Point and Interval Estimates of a Set of Observations. Estimation of the Parameters of a Data Distribution Law.

Methods for determining point estimates: maximum likelihood, method of moments, and quantiles. Interval estimates of a set of observations. Order statistics of a set of observations. Parameter estimation for a known probability distribution law (for the Gaussian distribution, uniform distribution, and triangular distribution). Estimation of the center of a distribution when the probability distribution law is unknown (Chebyshev's inequality).

Topic 3.3

Lecture 13. Methods for Determining the Distribution Law of Data.

General concepts of statistical hypotheses and their testing. Null and alternative hypotheses. Type I and Type II errors. Significance level and statistical power of a test. Preliminary estimation of the data distribution law using the $\beta_1\beta_2$ diagram. Analysis of variational series. Frequency polygon and histogram, and methods for constructing them. Method for constructing an estimate of the cumulative distribution function. Testing hypotheses about the goodness of fit of an estimated distribution law to a theoretical model (Pearson's chi-square test and Kolmogorov–Smirnov test).

Topic 3.4

Lecture 14. Correlation Analysis.

Objectives of correlation analysis. Classification of types of correlation. Pearson's pairwise correlation coefficient. Spearman's rank correlation coefficient. Kendall's rank correlation coefficient.

Topic 3.5

Lecture 15. Regression Analysis.

Objectives of regression analysis. Linear regression. Simplified methods for estimating linear regression coefficients (Bartlett–Kenney method and Kerrich method). Estimation of regression coefficients using the least-squares method. Testing the significance of linear regression coefficients. Testing the adequacy of the obtained regression model (F-test). Determination of confidence intervals for linear regression values. Nonlinear regression (power, exponential, fractional-linear, logarithmic, and hyperbolic functions).

Practical classes

The main objectives of the practical classes are to consolidate the theoretical provisions of the discipline and acquire skills and experience in their practical application in solving of different tasks.

Practical 1, 2. Complex numbers and operations with them.
Practical 3, 4. Determination of the image of given functions.
Practical 5. Restoration of the original from a given image.
Practical 6. Application of operational calculus to solving ordinary differential equations.
Practical 7. Solving systems of ordinary linear differential equations with constant coefficients.
Practical 8. Solving electrical engineering and control theory problems.
Practical 9, 10. Classical and geometric probability.
Practical 11, 12. Combinatorics formulas.
Practical 13. Execution of module test work (Part 1).
Practical 14. Dependent and independent random events. Theorems of multiplication and addition of probabilities.
Practical 15. Total probability. Bayes formula.
Practical 16. Determination of numerical characteristics of discrete random variables.
Practical 17. Trials according to the Bernoulli scheme.
Practical 18. Determination of numerical characteristics of continuous random variables.
Practical 19. Functional transformations of random variables.
Practical 20. Bivariate random variables.
Practical 21. Graphical representation of statistical data. Histogram analysis of experiment data.
Practical 22. Statistical estimates of population parameters.
Practical 23. Testing hypothesis about observation belonging to experimental data population.
Practical 24. Processing results of direct measurements with multiple observations.
Practical 25. Execution of module test work (Part 2).
Practical 26. Correlation analysis.
Practical 27. Defense of the calculation and graphic work (CGW).
Practical 28. Linear regression analysis.
Practical 29. Nonlinear regression analysis.
Practical 30. Summary class.

6. Student's independent work

In accordance with the working curriculum, 60 hours are allocated for students' independent work, including 30 hours for examination preparation, 8 hours for preparation for the modular control work (MCW), 10 hours for completing the calculation and graphic work (CGW), and 12 hours for preparation for classroom activities, studying lecture and practical class materials, and reviewing the academic literature in accordance with the course structure.

Students' independent work is aimed at mastering and deepening the knowledge acquired, preparing for classes and semester control. It involves consolidating the knowledge acquired during the course and developing the skills necessary for independent study of the course material.

Policy and control

7. Course Policy (Educational Component)

Main requirements for studying the course and successfully passing semester control:

- ***Attendance policy:***
  - *In the in-person learning mode, classes are held in the classroom according to the class schedule;*
  - *In the distance learning mode, classes are held as an online conference via the Zoom platform (or any other platform at the students' request); the link is provided to the group representatives at the beginning of the semester.*
- ***Rules of conduct during classes:***
  - *Activities not directly related to the course are prohibited;*
  - *Communication devices may be used only to search the Internet for information necessary to complete assignments;*
  - *Any disruption of classes is prohibited;*
  - *Current questions concerning the class topic should be posted in the conference chat to avoid interrupting the presentation of the material. These questions will be addressed during breaks between topics (subtopics).*
- ***Rules for awarding bonus points:***
  - *Detailed information on bonus points is provided in Section 8, "Types of Control and Rating System for Evaluating Learning Outcomes";*
  - *The maximum number of bonus points is determined in accordance with the Regulations on the System for Evaluating Learning Outcomes at Igor Sikorsky Kyiv Polytechnic Institute, the Regulations on Current, Calendar and Semester Control of Learning Outcomes at Igor Sikorsky Kyiv Polytechnic Institute, as well as other regulations and recommendations in force at Igor Sikorsky Kyiv Polytechnic Institute.*
- ***Deadlines and retake policy:***
  - *Retaking any assessment is permitted only in the presence of documented valid reasons for absence from class;*
  - *Retakes for the purpose of increasing scores are not provided.*
- ***Policy for rounding rating scores:***
  - *The rating score is rounded to the nearest whole number according to standard rounding rules.*
- ***Assessment policy:***
  - *Assessments are conducted in accordance with the Regulations on the System for Evaluating Learning Outcomes at Igor Sikorsky Kyiv Polytechnic Institute, the Regulations on Current,*

Calendar and Semester Control of Learning Outcomes at Igor Sikorsky Kyiv Polytechnic Institute, as well as other regulations and recommendations in force at Igor Sikorsky Kyiv Polytechnic Institute;

- *The minimum passing score for each assessment must be at least 60% of the maximum possible score established for that assessment;*
- *An unsatisfactory result is awarded 0 points.*

- ***Artificial intelligence use policy***
  - *When completing practical assignments, AI tools may be used only as an auxiliary resource for checking solutions or improving presentation.*
  - *All results obtained with the assistance of AI must be critically analyzed by the student, adapted, and properly identified in the submitted work.*
  - *Submitting AI-generated content as one's own without modification or without acknowledging its use is prohibited. Violation of this policy is considered academic misconduct under the internal regulations of Igor Sikorsky Kyiv Polytechnic Institute.*

Academic Integrity

The policy and principles of academic integrity are defined in Section 3 of the Code of Honor of Igor Sikorsky Kyiv Polytechnic Institute. More information: https://kpi.ua/code.

Standards of Ethical Conduct

The standards of ethical conduct for students and employees are defined in Section 2 of the Code of Honor of Igor Sikorsky Kyiv Polytechnic Institute. More information: https://kpi.ua/code.

Appeal of Assessment Results

In case of disagreement with the assessment results, students may complete and/or defend the relevant work in the presence of a committee formed from faculty (or department) instructors who teach the respective or related courses.

8. Types of Control and Rating System for Evaluating Learning Outcomes

Assessment of the student's learning outcomes is carried out using a 100-point grading system and consists of two components: the initial component (completion of the modular control work, calculation and graphic work, homework assignments, and participation in practical classes) and the examination component (assessment during the semester examination).

8.1. The initial component of the rating system is worth 60 points, while the examination component is worth 40 points.

The initial points are formed as the sum of the rating points earned by the student for completing:

- the modular control work (two parts);
- the calculation and graphic work;
- 15 individual practical assignments.

8.2. Criteria for Awarding Points

Modular Control Work (two parts):

The weighting of each of the two parts is 10 points. It is conducted as a written test.

Assessment criteria:

– 10–9 points – the answers are correct and complete, fully address the substance of the question, and demonstrate deep knowledge of the relevant section (at least 90% of the required information);
– 8.9–7.5 points – most of the task is completed; the answers are generally correct but incomplete (at least 75% of the required information), or the answer is complete with minor inaccuracies;
– 7.4–6 points – not all parts of the task are completed; the answers are insufficiently specific, do not address the substance of the question, or address it only partially (at least 60% of the required information), with minor errors;
– 0 points – unsatisfactory answer; the task has not been completed.

Calculation and Graphic Work:
Weighting – 10 points. Assessment criteria:
– 10–9 points – all requirements for the assignment are met – “excellent”;
– 8.9–7.5 points – the assignment is completed with minor deficiencies – “good”;
– 7.4–6 points – there are deficiencies in meeting the assignment requirements and certain errors – “satisfactory”;
– 0 points – the assignment does not meet the requirements; the task has not been completed.

Completion of Practical Assignments:
Weighting – 2 points. Assessment criteria:
– 2 points – complete answer; the task is completed creatively, all features of the work/task are taken into account, and deep knowledge of the course is demonstrated (at least 90% of the required information);
– 1.5–1.8 points – sufficiently complete answer (at least 75% of the required information), or a complete answer with minor inaccuracies;
– 1.2 points – incomplete answer (at least 60% of the required information) with minor errors;
– 0 points – the task has not been completed or contains major errors.
The total number of bonus points may not exceed (+5).

8.3. Conditions for a Positive Result of Calendar Control

To receive “attested” at the first calendar control (week 7), the student must have at least 14 points, including a passing score for the first part of the MCW:

$$[10\ (\text{MCW 1}) + 2\times 7\ (\text{πραχτιχαλ ασσιγνμεντσ})] \times 0.6 = (10 + 14) \times 0.6 = 14.4$$

The condition for a positive result of the second calendar control (week 13) is obtaining at least 27 points:

$$[2\times 13\ (\text{πραχτιχαλ ασσιγνμεντσ}) + 10\times 2\ (\text{ΜΧΩ})] \times 0.6 = (26 + 20) \times 0.6 = 27.6$$

Calculation of the rating scale (R):

The sum of the weighting points for assessments during the semester (RC) is:

$$R_C = 10 \times 2\ (\text{ΜΧΩ}) + 2 \times 15\ (\text{πραχτιχαλ ασσιγνμεντσ}) +$$
$$+ 10\ (\text{calculation and graphic work}) = 60\ \text{points.}$$

The rating scale for the course is

$$R = R_C + R_E,$$
$$R = 60 + 40 = 100\ \text{points.}$$

8.4. Conditions for Admission to Semester Control (Exam)

A prerequisite for admission to the examination is successful completion of all assessments and the calculation and graphic work, and a starting rating of at least 60*0.6=36 points.
In the case of distance learning and absence from more than 50% of classes, in order to be admitted to the examination, the student must complete, for each missed class, an essay on the relevant lecture topic or homework involving problem solving. Requirements for the essays are discussed separately.

8.5. Criteria for Assessing the Examination Paper

During the examination, students must provide written answers on the topics specified in the examination task. Each examination task contains two theoretical and two practical questions.
Each question is worth 10 points, according to the following criteria:

- 10–9 points – complete answer; the student demonstrates additional knowledge and general awareness (at least 90% of the required information);
- 8.9–7.5 points – sufficiently complete answer with minor inaccuracies; the student demonstrates knowledge of the question (at least 75% of the required information, or minor inaccuracies);
- 7.4–6 points – incomplete answer with significant inaccuracies; the student demonstrates only partial knowledge of the question (at least 60% of the required information and some errors);
- 0 points – unsatisfactory or absent answer; the level of knowledge demonstrated by the student is low.

After assessment of the completed examination paper, the student's starting points and examination points are added together, converted into the student's rating score, and then converted into grades according to the university scale in Table 1.

Provided that the student has met the conditions for admission to the examination and obtained a number of points not lower than the admission score, the department may, by its decision, recalculate the points into the final number of points according to the methodology approved by the university.

Table 1. Correspondence between rating points and grades according to the university scale:

Number of points/ Score	*Grade*
100-95	*Excellent*
94-85	*Very good*
84-75	*Good*
74-65	*Satisfactory*
64-60	*Sufficient*
Less than 60	*Unsatisfactory*
Admission conditions not met	*Not admitted*

9. Additional Information on the Discipline (educational component)

As part of the course, certificates of completion of distance or online courses on relevant topics may be recognized, subject to prior approval by the instructor. Recognition of the results of non-formal education is carried out in accordance with the regulations of Igor Sikorsky Kyiv Polytechnic Institute (KPI).

Syllabus:

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Approved by the Department of Computer-Integrated Technologies of Device Production (Protocol No. 20 dated June 24, 2026).

Approved by the Department of Automation and Non-Destructive Testing Systems (Protocol No. 22 dated June 18, 2026).

Approved by the Department of Computer-Integrated Optical and Navigation Systems (Protocol No. 17 dated June 24, 2026).

***Agreed** by the Methodological Commission of the Faculty of Robotics and Instrument Engineering (Protocol No. 6/26 dated June 26, 2026).*