MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE REPUBLIC OF KAZAKHSTAN

SATBAYEV UNIVERSITY

(Kazakh National Research Technical University named after K.I. Satbayev)

Module reference book or collection of module descriptions in the specialty

7M07153 "Materials Science and Engineering"

Almaty 2025

A module reference book or a collection of module descriptions, which is also available to students for review, should contain the following information about individual modules:

Module designation	**Module of basic training**
Semester(s) in which the module is taught	**Autumn, spring (1, 2)**
The person responsible for the module	Department of Social Disciplines Department of Foreign Languages
Language	Kazakh / Russian / English
Attitude to the curriculum	Cycle of Basic Disciplines (BD), University Component (UC)
Teaching methods	Lecture, laboratory classes, practical classes, independent work of students
Workload (including contact hours, self-study hours)	Total workload: 12 ECTS (360 hours) Approximate distribution: Contact hours (practical classes) – 120 hours Independent study – 240 hours
Credits	12 ECTS
Necessary and recommended prerequisites for joining the module	Bachelor's degree in engineering, materials science, or related technical field.
Module objectives / expected learning outcomes	The aim of the module is to develop methodological, pedagogical, managerial, and professional communication competencies necessary for research and academic activities at the master's level. Upon completion of the module, master's students are able to analyze the philosophical foundations of scientific knowledge, apply methodological principles in research, demonstrate pedagogical competence in higher education settings, apply psychological principles in academic and professional environments, and communicate effectively in a foreign language within the context of scientific and technical discourse. The module supports the development of critical thinking, academic integrity, and professional responsibility.
Description	This module provides interdisciplinary foundational training for master's students. It includes the study of the history and philosophy of science, focusing on the development of scientific paradigms and research methodology; higher school pedagogy, aimed at forming teaching competencies; psychology of management, covering leadership and organizational behavior; and professional foreign language training, focused on academic and technical communication. The module prepares students for scientific research, academic teaching, and professional interaction in international contexts.
Exams and assessment formats	Assessment includes continuous and final evaluation. Continuous assessment consists of written assignments, analytical essays, presentations, and intermediate tests. The final assessment is conducted in the form of a written or oral examination in each discipline. Evaluation is carried out

	according to established academic criteria and university regulations.
Requirements for studies and exams	Successful completion of the module requires active participation in coursework and completion of all intermediate assessments. Continuous assessment accounts for 60% of the final grade, and the final examination accounts for 40%. Master's students must obtain at least 60 out of 100 total points in each discipline to successfully complete the module.
Reading list	1. Kuhn, T. *The Structure of Scientific Revolutions.* University of Chicago Press. 2. Popper, K. *The Logic of Scientific Discovery.* Routledge. 3. Biggs, J., Tang, C. *Teaching for Quality Learning at University.* McGraw-Hill. 4. Northouse, P. *Leadership: Theory and Practice.* Sage Publications. 5. Swales, J., Feak, C. *Academic Writing for Graduate Students.* University of Michigan Press.

Module designation	**Module of applied problems of materials science**
Semester(s) in which the module is taught	**Autumn, spring (1, 2)**
The person responsible for the module	Kudaibergenov K.K., Kerimkulova A.Y., Mamaeva A.A.
Language	Kazakh / Russian / English
Attitude to the curriculum	Cycle of Basic Disciplines (BD), Component of Choice (CCH)
Teaching methods	Lecture, practical classes, independent work of students
Workload (including contact hours, self-study hours)	Total workload: 40 ECTS (1200 hours) Approximate distribution: Contact hours (practical classes) – 360 hours Independent study – 840 hours
Credits	40 ECTS
Necessary and recommended prerequisites for joining the module	Bachelor's degree in Materials Science, Engineering Physics, Metallurgy, or related technical field Fundamental knowledge of materials science, physics, and chemistry
Module objectives / expected learning outcomes	The aim of the module is to develop advanced professional and research-oriented competencies in applied materials science and modern materials technologies. Upon completion of the module, master's students are able to analyze technological processes ensuring material quality, apply modern methods of materials characterization, evaluate structure–property relationships in advanced and nanostructured materials, assess sustainability and environmental aspects of materials production, apply intellectual property regulations in research

	activities, and critically evaluate current scientific problems in materials science and related technologies. Students are also able to integrate scientific knowledge into practical engineering and research tasks.
Description	This module focuses on contemporary applied problems in materials science and engineering. It covers technological quality assurance, modern research methods, advanced and nanostructured materials, nano-coating technologies, carbon nanomaterials, intellectual property management, and sustainable development strategies. The module integrates theoretical foundations with research-oriented practice and emphasizes critical analysis of current scientific challenges. Students develop competencies necessary for innovative materials development, industrial implementation, and research activities at the graduate level.
Exams and assessment formats	Assessment includes continuous and final evaluation. Continuous assessment consists of analytical assignments, laboratory reports, research-oriented projects, presentations, and intermediate examinations. The final assessment is conducted in the form of a written or oral examination in each discipline. Evaluation is carried out according to established academic criteria and university regulations.
Requirements for studies and exams	Successful completion of the module requires participation in lectures and laboratory sessions, submission of analytical and research assignments, and completion of all intermediate assessments. Continuous assessment accounts for 60% of the final grade, and the final examination accounts for 40%. Master's students must obtain at least 60 out of 100 total points in each discipline to successfully complete the module.
Reading list	1. Callister, W.D., Rethwisch, D.G. Materials Science and Engineering: An Introduction. Wiley. 2. Ashby, M. Materials Selection in Mechanical Design. Butterworth-Heinemann. 3. Cao, G., Wang, Y. Nanostructures and Nanomaterials. World Scientific. 4. ASM International. ASM Handbook (selected volumes) 5. WIPO. Intellectual Property Handbook. World Intellectual Property Organization.

Module designation	**Practice-oriented module**
Semester(s) in which the module is taught	**Spring (1)**
The person responsible for the module	Kudaibergenov K.K.
Language	Kazakh / Russian / English
Attitude to the curriculum	Basic and Profile Disciplines Cycles (BD / PD), University Component (UC)

Teaching methods	Lecture, practical classes, independent work of students
Workload (including contact hours, self-study hours)	Total workload: 8 ECTS
Credits	8 ECTS
Necessary and recommended prerequisites for joining the module	Completion of core theoretical modules Knowledge of research methodology Approval of practice plan by academic supervisor
Module objectives / expected learning outcomes	The aim of the module is to develop professional, pedagogical, and research competencies required for academic and industrial practice at the master's level. Upon completion of the module, master's students are able to design and conduct educational activities in higher education settings, apply modern teaching methods, organize and perform experimental research in materials science, analyze and interpret research results, prepare scientific reports, and demonstrate professional communication skills in academic and industrial environments. The module supports the integration of theoretical knowledge with practical and research experience.
Description	The Practice-Oriented Module includes pedagogical and research practice. Pedagogical practice is aimed at developing teaching competencies in higher education institutions, including preparation and delivery of lectures, practical classes, and assessment activities. Research practice provides hands-on experience in laboratory and industrial environments. Master's students participate in experimental studies, materials characterization, data analysis, and preparation of scientific documentation. The module ensures the development of applied research skills and professional readiness for academic and industrial careers.
Exams and assessment formats	Assessment is based on supervisor evaluation, practice reports, presentation and defense of practice results, and compliance with the approved practice program. Evaluation is conducted in accordance with university regulations.
Requirements for studies and exams	Successful completion of the module requires full completion of the practice program, submission of written reports, and successful defense of practice results before a departmental commission. The final grade is assigned based on supervisor evaluation, report quality, and defense performance.
Reading list	1. Biggs, J., Tang, C. Teaching for Quality Learning at University. McGraw-Hill. 2. Creswell, J. Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. Sage Publications. 3. ASM Handbook (selected volumes related to laboratory and industrial practice). 4. University guidelines for pedagogical and research practice.

Module designation	**Module of applied problems of materials science**
Semester(s) in which the module is taught	**Autumn (3)**
The person responsible for the module	Beisebayeva A.S., Smagulov D.U.
Language	Kazakh / Russian / English
Attitude to the curriculum	Cycle of Basic Disciplines (BD), Component of Choice (CCH)
Teaching methods	Lecture, practical classes, independent work of students
Workload (including contact hours, self-study hours)	Total workload: 40 ECTS (450 hours) Approximate distribution: Contact hours (practical classes) – 135 hours Independent study – 315 hours
Credits	40 ECTS
Necessary and recommended prerequisites for joining the module	Bachelor's degree in Materials Science, Metallurgy, Engineering Physics, or related technical field Fundamental knowledge of materials science, physics, chemistry, and research methodology
Module objectives / expected learning outcomes	The aim of the module is to develop advanced professional and research competencies in applied materials science and modern materials technologies. Upon completion of the module, master's students are able to: • critically analyze technological processes ensuring material quality; • apply modern methods of materials characterization and testing; • evaluate structure–property relationships in advanced and nanostructured materials; • assess technological reliability and performance of engineering materials; • apply principles of intellectual property protection in scientific research; • integrate sustainability strategies into materials development; • critically evaluate contemporary scientific problems in materials science; • formulate research tasks based on industrial and scientific challenges. The module prepares students for innovative research and high-level professional activity in materials science.
Description	This module focuses on contemporary applied problems in materials science and engineering. It includes technological quality assurance of materials, intellectual property in research, modern challenges in materials and process sciences, advanced materials technologies, nano-coating technologies, structure and properties of carbon nanomaterials, research methods, and sustainable development strategies. The module integrates scientific theory with practical and research-based approaches, emphasizing analytical thinking, problem-solving, and

	innovation in materials development. Students develop competencies necessary for industrial implementation, research activity, and technology transfer.
Exams and assessment formats	Assessment includes continuous and final evaluation. Continuous assessment consists of analytical essays, laboratory reports, research-oriented projects, case studies, presentations, and intermediate examinations. The final assessment is conducted in the form of written or oral examinations for each discipline. Evaluation is carried out in accordance with established academic standards and university regulations.
Requirements for studies and exams	Successful completion of the module requires active participation in lectures and laboratory sessions, completion of analytical and research assignments, and successful completion of all intermediate assessments. Continuous assessment accounts for 60% of the final grade, and the final examination accounts for 40%. Master's students must obtain at least 60 out of 100 total points in each discipline to successfully complete the module.
Reading list	1. Ashby, M. Materials Selection in Mechanical Design. Butterworth-Heinemann. 2. Callister, W.D., Rethwisch, D.G. Materials Science and Engineering: An Introduction. Wiley. 3. Cao, G., Wang, Y. Nanostructures and Nanomaterials. World Scientific. 4. ASM International. ASM Handbook (selected volumes). 5. WIPO. Intellectual Property Handbook. World Intellectual Property Organization. 6. Recent peer-reviewed journal articles in Acta Materialia, Materials Science and Engineering A/B, Journal of Materials Research.

Module designation	**Advanced Materials Science Module**
Semester(s) in which the module is taught	**Autumn (3)**
The person responsible for the module	Aimaganbetov K.P., Ybyrayimkul D.T., Kudaibergenov K.K.
Language	Kazakh / Russian / English
Attitude to the curriculum	Cycle of Profile Disciplines (PD), University Component (UC)
Teaching methods	Lecture, practical classes, independent work of students
Workload (including contact hours, self-study hours)	Total workload: 15 ECTS (450 hours) Approximate distribution: Contact hours (practical classes) – 135 hours Independent study – 315 hours
Credits	15 ECTS

Necessary and recommended prerequisites for joining the module	Bachelor's degree in Materials Science or related engineering field Completion of Module of Applied Problems of Materials Science Knowledge of phase transformations, structure–property relationships, and materials characterization methods
Module objectives / expected learning outcomes	The aim of the module is to develop advanced scientific and engineering competencies in the design and application of high-performance materials. Upon completion of the module, master's students are able to: • analyze structure–property relationships in composite and functional materials; • design materials with targeted mechanical, thermal, electrical, or functional properties; • evaluate advanced processing technologies including additive manufacturing (3D technologies); • apply modern theoretical and experimental approaches to materials development; • critically assess scientific literature and propose innovative material solutions; • integrate interdisciplinary knowledge in solving complex materials engineering problems. The module prepares students for research activity, innovation-driven engineering, and industrial implementation of advanced materials.
Description	This module focuses on advanced materials science concepts and modern high-performance materials. It includes the study of composite materials with tailored properties, functional materials with specific physical or chemical characteristics, and materials used in additive manufacturing technologies. Students analyze microstructure formation, performance optimization, multifunctionality, and technological implementation of advanced materials. Emphasis is placed on research-based learning, materials design strategies, and integration of computational and experimental approaches. The module supports innovation, technological competitiveness, and preparation for scientific research at the master's level.
Exams and assessment formats	Assessment includes continuous and final evaluation. Continuous assessment consists of research-oriented projects, analytical essays, laboratory reports, case studies, and presentations. The final assessment is conducted in the form of a written or oral examination. Evaluation is carried out according to university regulations and academic standards.
Requirements for studies and exams	Successful completion of the module requires active participation in lectures and seminars, completion of analytical and laboratory assignments, and successful passing of intermediate assessments. Continuous assessment accounts for 60% of the final grade, and the final examination accounts for

	40%. Master's students must obtain at least 60 out of 100 total points in each discipline to successfully complete the module.
Reading list	1. Hull, D., Clyne, T. An Introduction to Composite Materials. Cambridge University Press. 2. Gibson, I., Rosen, D., Stucker, B. Additive Manufacturing Technologies. Springer. 3. Ashby, M., Shercliff, H., Cebon, D. Materials: Engineering, Science, Processing and Design. Butterworth-Heinemann. 4. Schwartz, M. (ed.) Encyclopedia of Materials, Parts and Finishes. CRC Press. 5. Recent peer-reviewed publications in Advanced Materials, Acta Materialia, Materials Today.

Module designation	**Nanotechnology module**
Semester(s) in which the module is taught	**Autumn (1, 3)**
The person responsible for the module	Kudaibergenov K.K., Kerimkulova A.Y., Kakimov U.K.
Language	Kazakh / Russian / English
Attitude to the curriculum	Cycle of Profile Disciplines (PD), Component of Choice (CCH)
Teaching methods	Lecture, practical classes, research seminars, independent work of students
Workload (including contact hours, self-study hours)	Total workload: 30 ECTS (900 hours) Approximate distribution: Contact hours (practical classes) – 270 hours Independent study – 630 hours
Credits	30 ECTS
Necessary and recommended prerequisites for joining the module	Module of Applied Problems of Materials Science Advanced Materials Science Module Knowledge of solid-state physics, materials characterization, and research methodology
Module objectives / expected learning outcomes	The aim of the module is to develop advanced scientific competencies in nanotechnology and nanoscale materials engineering. Upon completion of the module, master's students are able to: • analyze size-dependent physical and chemical properties of nanomaterials; • design and synthesize functional nanomaterials and nanostructures; • apply advanced characterization techniques including electron and probe microscopy; • evaluate surface engineering technologies and nanostructured coatings;

	• assess industrial applications of nanomaterials and nanotechnologies; • integrate theoretical, experimental, and technological approaches in nanoscale materials research; • critically analyze current scientific trends in nanotechnology. The module prepares students for independent research, innovation, and high-technology industrial implementation.
Description	This module focuses on advanced nanotechnology concepts and nanoscale materials engineering. It covers functional materials, synthesis of nanostructures, advanced materials processing technologies, surface engineering, and modern microscopy techniques. Special attention is given to electron microscopy, probe microscopy, surface modification technologies, and industrial implementation of nanomaterials. The module integrates theoretical principles with experimental and research-oriented activities, emphasizing innovation and technological applications in energy, electronics, coatings, and high-performance materials.
Exams and assessment formats	Assessment includes continuous and final evaluation. Continuous assessment consists of laboratory reports, research-oriented projects, scientific presentations, analytical reviews of scientific articles, and intermediate examinations. The final assessment is conducted in the form of written or oral examinations in each discipline. Evaluation is carried out according to university regulations and academic standards.
Requirements for studies and exams	Successful completion of the module requires participation in lectures and laboratory sessions, completion of research assignments, and successful passing of intermediate assessments. Continuous assessment accounts for 60% of the final grade, and the final examination accounts for 40%. Master's students must obtain at least 60 out of 100 total points in each discipline to successfully complete the module.
Reading list	1. Cao, G., Wang, Y. *Nanostructures and Nanomaterials: Synthesis, Properties and Applications.* World Scientific. 2. Bhushan, B. *Springer Handbook of Nanotechnology.* Springer. 3. Williams, D.B., Carter, C.B. *Transmission Electron Microscopy.* Springer. 4. Goldstein, J. et al. *Scanning Electron Microscopy and X-ray Microanalysis.* Springer. 5. Recent publications in *Advanced Functional Materials*, *Nano Letters*, *Acta Materialia*, *Materials Today*.

Module designation	**R&D module**
Semester(s) in which the module is taught	**Autumn (3)**

The person responsible for the module	Kudaibergenov K.K., Smagulov D.U.,
Language	Kazakh / Russian / English
Attitude to the curriculum	Cycle of Profile Disciplines (PD), Component of Choice (CCH)
Teaching methods	Lecture, practical classes, research seminars, independent work of students
Workload (including contact hours, self-study hours)	Total workload: 10 ECTS (300 hours) Approximate distribution: Contact hours (practical classes) – 90 hours Independent study – 210 hours
Credits	10 ECTS
Necessary and recommended prerequisites for joining the module	Completion of Applied Problems and Advanced Materials modules Knowledge of materials science, research methodology, and engineering analysis Basic understanding of innovation processes and technology transfer
Module objectives / expected learning outcomes	The aim of the module is to develop research, innovation, and technology transfer competencies required for advanced professional and scientific activity in materials science. Upon completion of the module, master's students are able to: • apply systematic approaches to materials and technology selection; • justify material choice based on functional, economic, and sustainability criteria; • analyze innovation processes in materials science; • evaluate commercialization potential of research results; • develop project proposals for new materials and technologies; • integrate scientific knowledge with industrial and technological applications. The module supports preparation for independent research, innovation management, and industrial implementation.
Description	The R&D Module focuses on innovation-driven materials engineering and research-based development. It covers methodology for selecting materials and technologies, life-cycle considerations, sustainability aspects, and innovation strategies in materials science. Students analyze case studies of technological development, evaluate research commercialization pathways, and develop project-oriented solutions for advanced materials. The module emphasizes interdisciplinary integration, critical analysis, and strategic decision-making in scientific and industrial contexts.
Exams and assessment formats	Assessment includes continuous and final evaluation. Continuous assessment consists of project reports, case studies, analytical essays, innovation proposals, and presentations. The final assessment is conducted in the form of a written or oral

	examination or defense of a project-based assignment. Evaluation is carried out according to university regulations and academic standards.
Requirements for studies and exams	Successful completion of the module requires active participation in seminars and project activities, submission of analytical and project assignments, and successful completion of intermediate assessments. Continuous assessment accounts for 60% of the final grade, and the final examination accounts for 40%. Master's students must obtain at least 60 out of 100 total points in each discipline to successfully complete the module.
Reading list	1. Ashby, M. *Materials Selection in Mechanical Design.* Butterworth-Heinemann. 2. Dieter, G., Schmidt, L. *Engineering Design.* McGraw-Hill. 3. Schilling, M. *Strategic Management of Technological Innovation.* McGraw-Hill. 4. OECD. *Innovation Strategy Reports.* 5. Recent publications in *Acta Materialia*, *Advanced Materials*, *Materials & Design*.

Module designation	**Practice-oriented module**
Semester(s) in which the module is taught	**Spring (4)**
The person responsible for the module	Kudaibergenov K.K.
Language	Kazakh / Russian / English
Attitude to the curriculum	Basic and Profile Disciplines Cycles (BD / PD), University Component (UC)
Teaching methods	Lecture, practical classes, independent work of students
Workload (including contact hours, self-study hours)	Total workload: 8 ECTS
Credits	8 ECTS
Necessary and recommended prerequisites for joining the module	Completion of core theoretical modules Knowledge of research methodology Approval of practice plan by academic supervisor
Module objectives / expected learning outcomes	The aim of the module is to develop professional, pedagogical, and research competencies required for academic and industrial practice at the master's level. Upon completion of the module, master's students are able to design and conduct educational activities in higher education settings, apply modern teaching methods, organize and perform experimental research in materials science, analyze and interpret research results, prepare scientific reports, and demonstrate professional communication skills in academic and industrial environments. The module supports the integration of theoretical knowledge with practical and research experience.

Description	The Practice-Oriented Module includes pedagogical and research practice. Pedagogical practice is aimed at developing teaching competencies in higher education institutions, including preparation and delivery of lectures, practical classes, and assessment activities. Research practice provides hands-on experience in laboratory and industrial environments. Master's students participate in experimental studies, materials characterization, data analysis, and preparation of scientific documentation. The module ensures the development of applied research skills and professional readiness for academic and industrial careers.
Exams and assessment formats	Assessment is based on supervisor evaluation, practice reports, presentation and defense of practice results, and compliance with the approved practice program. Evaluation is conducted in accordance with university regulations.
Requirements for studies and exams	Successful completion of the module requires full completion of the practice program, submission of written reports, and successful defense of practice results before a departmental commission. The final grade is assigned based on supervisor evaluation, report quality, and defense performance.
Reading list	1. Biggs, J., Tang, C. Teaching for Quality Learning at University. McGraw-Hill. 2. Creswell, J. Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. Sage Publications. 3. ASM Handbook (selected volumes related to laboratory and industrial practice). 4. University guidelines for pedagogical and research practice.

Module designation	**Module of final attestation**
Semester(s) in which the module is taught	**Spring (4)**
The person responsible for the module	Kakimov U.K.
Language	Kazakh / Russian / English
Attitude to the curriculum	Final Attestation (FA) – Mandatory Component
Teaching methods	Lecture, practical classes, independent work of students
Workload (including contact hours, self-study hours)	Total workload: 8 ECTS
Credits	8 ECTS
Necessary and recommended prerequisites for joining the module	Successful completion of all theoretical modules (BD and PD) Completion of research work of the master's student (RWMS) Completion of pedagogical and research practice Fulfillment of all academic credit requirements of the educational program

Module objectives / expected learning outcomes	The aim of the module is to assess the achievement of program learning outcomes and the readiness of the master's student for independent scientific and professional activity. Upon completion of the module, the master's student demonstrates the ability to: • formulate and justify a scientific research problem in materials science; • apply advanced theoretical and experimental methods; • conduct independent research and analyze experimental data; • interpret results using modern scientific approaches; • present research findings in accordance with academic standards; • defend scientific results before an examination committee. The module confirms the student's research competence and readiness for doctoral studies or high-level professional activity.
Description	The Module of Final Attestation includes preparation, submission, and public defense of the master's thesis. The thesis represents an independent research work conducted under academic supervision and reflects the integration of theoretical knowledge, experimental skills, and analytical competence developed throughout the master's program. The master's thesis must demonstrate scientific relevance, methodological rigor, originality of analysis, and practical or theoretical significance in the field of materials science and technology of new materials.
Exams and assessment formats	Assessment is conducted in the form of: • Public defense of the master's thesis before the State Examination Committee. Evaluation criteria include: • scientific novelty and relevance of the research; • depth of theoretical analysis; • quality of experimental or analytical results; • practical significance; • quality of written thesis; • quality of oral defense and ability to answer questions.
Requirements for studies and exams	Admission to final attestation is granted to master's students who have successfully completed all required modules, research work, and practice components of the educational program. The final grade is assigned by the State Examination Committee in accordance with established academic standards and university regulations.
Reading list	

Module designation	**Experimental research module**
Semester(s) in which the module is taught	**Autumn, spring (1, 2, 3, 4)**
The person responsible for the module	Kudaibergenov K.K., Smagulov D.U., Kerimkulova A.Y., Beisebayeva A.S.,
Language	Kazakh / Russian / English
Attitude to the curriculum	Research Work of Master's Student (RWMS) – Mandatory Component
Teaching methods	Lecture, practical classes, research seminars, independent work of students
Workload (including contact hours, self-study hours)	Total workload: 24 ECTS
Credits	24 ECTS
Necessary and recommended prerequisites for joining the module	Enrollment in the master's program Completion of core theoretical modules Approval of research topic and scientific supervisor
Module objectives / expected learning outcomes	The aim of the module is to develop independent scientific research competencies and prepare the master's student for thesis defense. Upon completion of the module, the master's student is able to: • formulate research objectives and hypotheses in materials science; • design and conduct experimental investigations; • apply advanced characterization techniques and data analysis methods; • critically analyze scientific literature; • interpret experimental results using modern theoretical approaches; • prepare scientific reports, conference papers, and journal articles; • integrate research results into the master's thesis. The module forms the core research component of the master's educational program.
Description	The Experimental Research Module includes systematic scientific research conducted under academic supervision throughout the entire period of study. The research work is directly related to the topic of the master's thesis and may involve experimental studies, computational modeling, materials characterization, technological development, or applied industrial research. The module includes participation in research seminars, preparation of scientific publications, presentation of research results at conferences, and internship activities where applicable. The research outcomes contribute directly to the final thesis.
Exams and assessment formats	Assessment is conducted in the form of: • Interim reports each semester; • Evaluation of research progress by the supervisor;

	• Presentation of research results at departmental seminars; • Approval of thesis readiness for defense. Evaluation is carried out according to established academic regulations and research performance criteria.
Requirements for studies and exams	Successful completion of the module requires systematic progress in research activities, submission of semester reports, participation in scientific seminars, and confirmation of research results by the academic supervisor. The final assessment is based on cumulative evaluation of research achievements throughout the master's program.
Reading list	