

**Federal State Autonomous Educational Institution of Higher Education "Moscow
Institute of Physics and Technology
(National Research University)"**

APPROVED
Vice Rector for Academic Affairs

A.A. Voronov

Work program of the course (training module)

course: English Language. Modern Combinatorics/Английский язык. Комбинаторика
major: Applied Mathematics and Informatics
specialization: Modern State of Artificial Intelligence/Современные методы искусственного интеллекта
“Pusk” Online and Supplementary Education Centre
Foreign Languages Department
term: 1
qualification: Master

Semesters, forms of interim assessment:

1 (fall) - Pass/fail exam

2 (spring) - Grading test

Academic hours: 120 AH in total, including:

lectures: 0 AH.

seminars: 120 AH.

laboratory practical: 0 AH.

Independent work: 60 AH.

In total: 180 AH, credits in total: 4

Number of course papers, tasks: 4

Authors of the program:

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The program was discussed at the Foreign Languages Department 28.02.2025

Annotation

The course work program is designed for students improving their professional communication skills in English (level B2). The course (module) takes 1 year to complete, 4 classroom hours per week. The program is aimed at creating a holistic understanding of combinatorics, a branch of mathematics that studies combinatorial structures and explores various ways of combining and arranging objects in order to solve problems related to the number of possible combinations and arrangements; reveals the main features of communication on topics such as graph theory, coding theory, optimization and many other areas of mathematics and science and is aimed at developing knowledge of the specifics and patterns of oral and written interaction in the scientific community, correlating with the areas of activity of the future graduate; practical skills in describing and discussing methods for counting, generating and analyzing combinatorial objects to ensure an effective solution to real problems.

1. Study objective

Purpose of the course

Study of the history of mathematics; development of master's students' foreign language competence for successful interaction in the field of the studied science, ability to correctly interpret specific manifestations of communicative behavior in different situations of professional context; practical skills and abilities in communicating oral and written discourse; development of creative and analytical thinking for the implementation of projects in the field of mathematics and computer science; refraction of English language skills to the study and application of knowledge in a specific field of mathematics and computer science; development of the skills of master's students in the field of mathematics and computer science

Tasks of the course

To develop the student's ability to use language tools to solve communication problems in various situations of professional and general cultural interaction, to carry out interpersonal and professional communication in a foreign language, taking into account the cultural characteristics of the language being studied, as well as the ability to overcome intercultural differences in situations of social and professional communication; develop the ability to accumulate subject knowledge and operate with it in foreign language communication; expand knowledge in the studied area for a deep understanding of the terminological corpus, the area of application of combinatorics, development, prospects and challenges; acquire new knowledge about the basics of combinatorics.

To achieve the goals and objectives of mastering the discipline, students must master foreign language general professional communicative competence, including:

Linguistic competence: the ability to correctly construct grammatical forms and syntactic constructions in accordance with the norms of the language being studied.

Sociolinguistic competence (the ability to use and transform language forms in accordance with the situation of foreign language communication).

Sociocultural competence: the ability to take into account in communication the speech and non-speech behavior accepted in the country of the language being studied..

Social competence: the ability to interact with communication partners, possession of appropriate strategies.

Discursive competence (the ability to understand and achieve coherence of individual statements in significant communication models)

Strategic competence: the ability to use the most effective strategies when solving communication problems.

Subject competence: knowledge of subject information when organizing one's own statement or understanding the statement of others.

Pragmatic competence: the ability to choose the most effective and appropriate way of expressing thoughts depending on the conditions of the communicative act and the task at hand.

2. List of the planned results of the course (training module), correlated with the planned results of the mastering the educational program

Mastering the discipline is aimed at the formation of the following competencies:

Code and the name of the competence	Competency indicators
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UC-1 Use a systematic approach to critically analyze a problem, and develop an action plan	UC-1.1 Systematically analyze the problem situation, identify its components and the relations between them
	UC-1.2 Search for solutions by using available sources
	UC-1.3 Develop a step-by-step strategy for achieving a goal, foresee the result of each step, evaluate the overall impact on the planned activity and its participants
UC-2 Able to manage a project through all stages of its life cycle	UC-2.1 Set an objective within a defined scientific problem; formulate the agenda, relevance, significance (scientific, practical, methodological or other depending on the project type), forecast the expected results and possible areas of their application
	UC-2.2 Forecast the project outcomes, plan necessary steps to achieve the outcomes, chart the project schedule and monitoring plan
	UC-2.3 Organize and coordinate the work of project stakeholders, provide the team with necessary resources
	UC-2.4 Publicly present the project results (or results of its stages) via reports, articles, presentations at scientific conferences, seminars, and similar events
UC-3 Able to organise and lead a team, developing a team strategy to achieve a goal	UC-3.1 Organize and coordinate the work of the project stakeholders and help resolve disputes and conflicts
	UC-3.2 Consider the interests, specific behavior, and diversity of opinions of team members/colleagues/counterparties
	UC-3.3 Foresee the results (consequences) of both individual and collective actions
	UC-3.4 Plan teamwork, distribute tasks to team members, hold discussions of different ideas and opinions
UC-4 Use modern communication tools in the academic and professional field, including those in a foreign language	UC-4.1 Exchange business information in oral and written forms in Russian and at least one foreign language
	UC-4.2 Use the acquired skills to write, translate, and edit various academic texts (abstracts, essays, reviews, articles, etc.)
	UC-4.3 Present the results of academic and professional activities at various academic events, including international conferences
	UC-4.4 Use modern ICT tools for academic and professional collaboration
UC-5 Analyze and consider cultural diversity in intercultural interactions	UC-5.1 Identify specific philosophical and scientific traditions in major world cultures
	UC-5.2 Define the theoretical and practical significance of cultural and linguistic factors within various interrelated philosophical and scientific traditions
UC-6 Determine priorities and ways to improve performance through self-assessment	UC-6.1 Achieve personal growth and professional development, determine priorities and ways to improve performance
	UC-6.2 Evaluate performance results in correlation with the set objectives and applied methods

3. List of the planned results of the course (training module)

As a result of studying the course the student should:

know:

- the relationship, mutual influence and interaction of language and culture;
- the role of language as an organic part of culture in human life, behavior and communication with speakers of other languages and other cultures, national identity and identity of peoples;
- an idea of cultural and anthropological view of person, their way of life, ideas, views, customs, value system, perception of the world - their own and others';
- the influence of culture through language on human behavior, his worldview and life in general;
- the history of emergence , stages of development and methods of teaching intercultural communication;
- the content of the concept of "culture", its role in the communication process, as well as its relation to such concepts as "socialization", "enculturation", "acculturation", "assimilation", "behavior", "language", "identity", "global citizenship";
- the influence of various social transformations on the change of cultural identity;
- peculiarities of perception of other cultures, causes of prejudices and stereotypes in intercultural interaction;
- mechanisms of formation of intercultural tolerance and dialog of cultures;
- types, kinds, forms, models, structural components of intercultural communication;
- norms and styles of intercultural communication;
- mental peculiarities and national customs of representatives of different cultures, cultural standards of ethnic, political and economic plan;
- the linguistic picture of the world of speakers of a foreign language culture, the peculiarities of their worldview and understanding of the world;
- ethical and moral norms of behavior in a foreign cultural environment;
- language norms of oral communication culture, ethical and moral norms of behavior accepted in the country of the studied language; stereotypes and ways to overcome them; etiquette norms of the countries of the studied language;
- methods of systematic and critical analysis; methods of developing an action strategy for identifying and solving a problem situation;
- stages of the project life cycle; stages of project development and realization; methods of project development and management;
- methods of team building; methods of effective team leadership; basic leadership theories and leadership styles;
- rules and regularities of personal and business oral and written communication; modern communicative technologies in Russian and foreign languages; existing professional communities for professional interaction;
- regularities and peculiarities of socio-historical development of different cultures; peculiarities of intercultural diversity of society; rules and technologies of effective intercultural interaction;
- methods of self-assessment, self-control and self-development.

be able to:

- apply methods of studying cultural systems and intercultural situations;
- perceive, analyze, interpret and compare cultural facts;
- determine the role of basic cultural concepts in intercultural communication;
- find adequate solutions in various situations of intercultural communication;
- analyze the peculiarities of intercultural communication in a team;
- reflect the orientation system of one's own culture;
- recognize and correctly interpret non-verbal signals in the process of intercultural communication;
- compose a communicative portrait of a representative of a different linguoculture;
- reveal the meaning of concepts and actions in an intercultural situation;
- analyze coincidences and differences in communicative behavior from the perspective of the cultures in contact;
- adequately realize their communicative intention in communication with representatives of other linguocultures;
- switch when meeting with another culture to other not only linguistic but also non-linguistic norms of behavior;
- identify the causes of communicative failures and apply ways of overcoming them;
- take the position of a partner in intercultural communication and identify a possible conflict as conditioned by the values and norms of his/her culture;
- successfully overcome barriers and conflicts in communication and reach mutual understanding;
- reveal the interrelation and mutual influence of language and culture;
- show tolerance to the representatives of other cultures and languages;
- analyze the main stages and regularities of the historical development of society to form a civic position;
- respect and cherish historical heritage and cultural traditions;
- use models of social situations, typical scenarios of interaction between participants of intercultural communication;
- be guided by the principles of cultural relativism and ethical norms, which imply the rejection of ethnocentrism and respect for the uniqueness of foreign-language culture and value orientations of foreign-language society;
- overcome the influence of stereotypes and carry out intercultural dialog in general and professional spheres of communication;
- model possible situations of communication between representatives of different cultures and societies;
- apply methods of systematic approach and critical analysis of problem situations; develop a strategy of action, make concrete decisions for its realization;
- develop a project taking into account the analysis of alternative variants of its implementation, define target stages, main directions of work; explain the goals and formulate tasks related to the preparation and implementation of the project; manage the project at all stages of its life cycle;
- develop a plan of group and organizational communications in preparation and implementation of the project; formulate tasks for team members to achieve the set goal; develop a team strategy); apply effective styles of team leadership to achieve the set goal;
- to apply in practice communicative technologies, methods and ways of business communication for academic and professional interaction;
- determine the theoretical and practical significance of the cultural and linguistic factor in the interaction of different philosophical and scientific traditions;
- understand and tolerantly perceive the intercultural diversity of society; analyze and take into account the diversity of cultures in the process of intercultural interaction;
- to solve the problems of personal and professional development, to determine and realize priorities of improving one's own activity; to apply methods of self-assessment and self-control.

master:

- norms of etiquette and behavior when communicating with representatives of a foreign language culture;
- principles of tolerance in resolving intercultural contradictions;
- methods of communicative research, the ability to apply the acquired knowledge in research activities, oral and written communication;
- communicative strategies and tactics characteristic of other cultures;
- skills of correct intercultural communication, independent analysis of intercultural conflicts in the process of communication with representatives of other cultures and ways to resolve them;
- norms of etiquette and behavior when communicating with representatives of a foreign language culture;
- principles of tolerance in resolving intercultural contradictions;
- methods of communicative research, ability to apply the acquired knowledge in research activities, oral and written communication;
- communicative strategies and tactics characteristic of other cultures;
- skills of correct intercultural communication, independent analysis of intercultural conflicts in the process of communication with representatives of other cultures and ways of their resolution;
- skills of correct interpretation of specific manifestations of verbal and non-verbal communicative behavior in different cultures;
- communication skills in oral and written forms in Russian and foreign languages to solve problems of interpersonal and intercultural interaction;
- skills of activity with orientation on ethical and moral norms of behavior accepted in a foreign cultural society;
- the necessary interactive and contextual knowledge to overcome the influence of stereotypes and adapt to changing conditions in contact with representatives of different cultures;
- methodology of systematic and critical analysis of problem situations; methods of setting a goal, determining ways to achieve it, and developing strategies of action;
- methods of project development and management; methods of assessing the need for resources and project efficiency;
- the ability to analyze, design and organize interpersonal, group and organizational communications in a team to achieve the goal; methods of organization and team management;
- methods of interpersonal business communication in Russian and foreign languages, using professional language forms, means and modern communication technologies;
- methods and skills of effective intercultural interaction;
- technologies and skills to manage and improve their cognitive activity on the basis of self-assessment, self-control and principles of self-education throughout life.

4. Content of the course (training module), structured by topics (sections), indicating the number of allocated academic hours and types of training sessions

4.1. The sections of the course (training module) and the complexity of the types of training sessions

№	Topic (section) of the course	Types of training sessions, including independent work			
		Lectures	Seminars	Laboratory practical	Independent work
1	1. Topic 1. Mathematics as a science		20		10
2	Topic 2: Scientific discoveries and achievements in mathematics and computer science		20		10
3	Topic 3: Fundamentals of Combinatorics		20		10
4	4. Topic4: Combinatorics and graph theory		20		10
5	Topic 5: Scope of combinatorics		20		10
6	6. Topic 6: Derivative functions		20		10
AH in total			120		60
Exam preparation		0 AH.			

Total complexity	180 AH., credits in total 4
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4.2. Content of the course (training module), structured by topics (sections)

Semester: 1 (Fall)

1. 1. Topic 1. Mathematics as a science

History of development of mathematics as a science. Outstanding scientists and fundamental discoveries. Connection of mathematics with other sciences. Basic arithmetic operations. The concept of number. History of numbers. Numerical systems. Axioms. Logic and proofs. Definitions. Variety of theories.

Communicative tasks: to reason about the development of mathematics as a science; to make reports on outstanding discoveries in mathematics and computer science; to participate in a role-playing game on the theme "Outstanding mathematicians of different epochs"; to exchange opinions on the relationship between mathematics and other sciences; to participate in debates on the theme of the discovery or invention of mathematics; to operate with basic mathematical concepts; to analyze different number systems; to participate in a conversation on the theme of the evolution of number as a basic mathematical component.

2. Topic 2: Scientific discoveries and achievements in mathematics and computer science

Scientific and technological revolution. The contradictory nature of scientific and technological progress. Development of information technologies. Natural sciences in the second half of XX - early XXI century. New approaches to explaining the world. Game theory of John von Neumann. Jordaan's theory of sets. Theory of algorithms. Graphical processing units (GPUs). Machine learning stored procedure in databases (PL/Python).

Communicative tasks: to participate in a discussion on the topic of scientific and technological revolution; to build logical statements about the contradictions of scientific and technological progress; to tell about scientific discoveries in the field of mathematics and computer science; to analyze new approaches to explaining the world; to search for necessary information on the topic; to find and offer a combinatorial problem for the group to solve.

3. Topic 3: Fundamentals of Combinatorics

History of combinatorics. Possible and impossible in combinatorics. Basic concepts of combinatorics. Permutation. Enumeration of combinations. The concept of factorial. Binomial coefficient. Partitioning problems. Formulas. Placements. Principle of inclusion and exclusion. Pigeonhole principle.

Communicative tasks: discuss and operate with the basic concepts of combinatorics; solve cases/problems on combinatorics of different types and explain their solution; in small groups exchange opinions about the possibility of applying one or another approach when solving combinatorial problems; express a reasoned opinion when solving a logic puzzle on the example of TED Talk Riddles; summarize the main ideas of a scientific article.

Semester: 2 (Spring)

4. 4. Topic4: Combinatorics and graph theory

Basic concepts of graph theory. Eulerian graphs. Hamiltonian graphs. Shortest paths. Trees. Planar graphs. Coloring of graphs. Dimensions of graphs. Combinatorial objects and methods of combining and permutation. Network theory, connectivity, optimization.

Communicative tasks: participate in a conversation on graph theory, give a proof of theorems on graph theory, describe the construction of the Eulerian cycle; in small groups discuss and propose a solution to the letter carrier's problem for different types of graphs; formulate in combinatorial terms problems related to discrete objects; apply basic algorithms of discrete optimization; speak out about possible ways of decoding ciphers, solving other problems of information theory.

5. Topic 5: Scope of combinatorics

Relation of combinatorics to other sciences. Game theory. Probability theory. Cryptography. Complexity analysis of various algorithms. Statistical physics. Number of combinations. Sets. Formation of ordered sets.

Communicative tasks: discuss solutions to typical combinatorial problems; participate in brainstorming and make an oral report on the topic "Scope of Combinatorics"; exchange opinions on the possibility of expanding the scope of combinatorics; in small groups discuss the cultural value of combinatorics in different countries of the world and present their point of view to the group; participate in a role-play on solving combinatorial problems in everyday life; compare combinatorial methods used in various industries, identify and discuss in small groups

6. Topic 6: Derivative functions

Fibonacci numbers, definition and notation. Golden Ratio. Catalan numbers, recurrence and explicit formulas. Applications: correct bracket sequences, number of triangulations of a convex polygon, number of ways to connect points on a circle by non-intersecting chords.

Communicative tasks: to explain in an argumentative manner the significance of Fibonacci numbers and the golden section in various spheres of human life (cybernetics, computer science, engineering, architecture, art, biology); to participate in the discussion of the topic; to formulate questions on the essence of the discussed problem.

5. Description of the material and technical facilities that are necessary for the implementation of the educational process of the course (training module)

A classroom for conducting classes provided for by the program of the discipline (module), equipped with equipment and technical teaching aids: tables and chairs for students and the teacher; interactive whiteboard (screen); multimedia projector; sound-reproducing equipment; a computer for the teacher, as well as laptops for students (if necessary) with the ability to connect to the Internet and provide access to the electronic information and educational environment of MIPT.

6. List of the main and additional literature, that is necessary for the course (training module) mastering

Main literature

1. Английский язык для естественно-научных направлений / Л. В. Полубиченко, Е. Э. Кожарская, Н. Л. Моргун, Л. Н. Шевырдяева. – Москва: Юрайт, 2022.
2. Academic English for Engineering and Technology Studies. Академический английский язык для магистров инженерно-технических направлений подготовки / Н. Н. Николаева, Е. Б. Лежнева. – Москва: МГТУ им. Н.Э. Баумана, 2020.

Additional literature

1. Академическое письмо. Лексика. Developing Academic Literacy / В. В. Меняйло, Н. А. Тулякова, С. В. Чумилкин. – Москва: Юрайт, 2022.
2. Английский язык для технических вузов / Г. В. Шевцова, Л. Е. Москалец. – Москва: Флинта, 2018.

Рекомендуемые литературные источники для самостоятельного изучения

1. Roberts, F. S., & Tesman, B. (2009). Applied combinatorics. CRC.
2. Seife, C. (2000b). Zero: The biography of a dangerous idea. Penguin.
3. Poundstone, W. (1993). Prisoner's dilemma: John von Neumann, game theory, and the puzzle of the bomb. Anchor Books.
4. Spaniel, W. (2015). Game theory 101: The complete textbook. wydawca nieznany.

7. List of web resources that are necessary for the course (training module) mastering

1. lms.mipt.ru – виртуальная обучающая среда LMS МФТИ для обеспечения образовательного процесса с применением электронного обучения (далее – ЭО) и дистанционных образовательных технологий (далее – ДОТ).
2. <http://uefap.com/reading/readfram.htm> – дополнительные тексты для чтения
3. <http://uefap.com/writing/writfram.htm> – задания по развитию навыков письменной речи
4. https://owl.purdue.edu/owl_exercises/esl_exercises/paraphrase_and_summary_exercises/intermediate_paraphrase_exercises.html - упражнения по письменному реферированию на более высоком уровне
5. <http://ted.com> – сайт с видео-отрывками, которые магистранты смотрят в качестве домашнего задания
6. Grammarly – бесплатный онлайн-сервис на основе искусственного интеллекта для помощи в написании текстов на английском языке (<https://www.grammarly.com/>)
7. Reverso - веб-сайт, специализирующийся на автоматизированном переводе и помощи в изучении языка. Сайт предлагает онлайн-словари, перевод в контексте, проверку орфографии, поиск синонимов и средства грамматического спряжения (<https://context.reverso.net>)
8. Linguee — онлайн-словарь и система контекстуального поиска переводов, позволяющая найти, как слова и фразы переводились людьми в существующих билингвистических текстах (<https://www.linguee.ru/>)
9. Ludwig.guru - лингвистическая поисковая система, которая проверяет грамматику, синтаксис, стилистику и последовательность предложений на английском языке (<https://ludwig.guru/>)
10. Quizlet - сервис для быстрого создания тестов, которые помогут запомнить любой материал разными способами (на слух, написание и т.д.) (<https://quizlet.com/ru>)
11. Glossary maker – сервис для создания списка лексических единиц по уровню сложности, включая определения, синонимы, антонимы, производные слова и др. <https://www.wordsmyth.net/>

8. List of information technologies used for implementation of the educational process, including a list of software and information reference systems (if necessary)

Multimedia technologies are used in practical classes: multimedia presentations, work on the interactive whiteboard, use of Internet information resources.

Independent work of students is carried out using a virtual learning environment based on LMS Moodle (<http://moodle.phystech.edu>), through which students are given access to various sources of multimedia information, organized communication of all participants of the educational process, interactive control and self-control of tasks, testing.

9. Guidelines for students to master the course

The student, mastering the discipline (module) "English Language. Combinatorics" must master the intercultural communicative competence, which includes: linguistic competence (the ability to correctly construct grammatical forms and syntactic constructions in accordance with the norms of the studied language), sociolinguistic competence (the ability to use and transform language forms in accordance with the situation of foreign language communication), sociocultural competence (the ability to take into account in communication speech and non-speech behavior adopted in the country of the studied language), sociolinguistic competence (ability to use and transform language forms in accordance with the situation of foreign language communication), sociocultural competence (ability to take into account in communication the speech and non-speech behavior adopted in the country of the studied language), social competence (ability to interact with communication partners, possession of appropriate strategies), discursive competence (ability to understand and achieve coherence of individual statements in meaningful communicative patterns), strategic competence (ability to understand and achieve coherence of individual statements in meaningful communicative patterns), strategic competence (ability to understand and achieve coherence of individual statements in meaningful communicative patterns). discursive competence (the ability to understand and achieve coherence of individual utterances in meaningful communicative patterns), strategic competence (the ability to use the most effective strategies in solving communicative tasks), subject matter competence (knowledge of subject matter information when organizing one's own utterance or understanding the utterances of others), pragmatic competence (the ability to communicate and the ability to implement any utterance taking into account the conditions under which the act of speaking (listening, writing, writing, etc.) is carried out.

The mastering of the discipline takes place in practical classes and in the independent work of the student. In practical classes the main attention is paid to the formation of skills of receptive and productive types of speech activity, which are realized both in the classroom and on the platform of virtual learning environment "Moodle" in the conditions of self-control, peer control and peer assessment by students, as well as remote control by the teacher.

Practical classes are conducted based on a communicative approach using active/interactive forms of work:

- work in small groups;
- discussion and debate;
- educational games (role-playing, problematic role-playing, business, etc.);
- heuristic conversation on the content of the text read or listened to, the video material watched;
- discussion of issues and exchange of opinions;
- practicing skimming of texts, checking understanding of the content and meaning of the text watched;
- viewing and discussing video material;
- presentations based on modern multimedia tools.

Successful mastery of the discipline (module) program as a whole and the effectiveness of each practical lesson directly depend on the regular independent work of the student. Assignments for independent work must be completed by the student in full and exactly within the specified time frame.

Independent work includes:

- repetition and consolidation of the material covered;
- completion of lexical and grammatical exercises aimed at developing language skills;
- reading and checking understanding of texts;
- listening to audio recordings and watching video materials, completing assignments for them;
- completion of creative written assignments aimed at developing speech skills;
- home reading, note-taking, translation into Russian;
- preparation of monologues and dialogic statements on the topic under study. If questions or difficulties arise related to mastering the content of a discipline (module), the student can contact the teacher using MIPT information and communication resources (corporate mail, chat and other components of the telecommunications environment).

Assessment funds for course (training module)

major: Applied Mathematics and Informatics
specialization: Modern State of Artificial Intelligence/Современные методы искусственного интеллекта
“Pusk” Online and Supplementary Education Centre
Foreign Languages Department
term: 1
qualification: Master

Semesters, forms of interim assessment:

1 (fall) - Pass/fail exam

2 (spring) - Grading test

Authors:

E.G. Korneeva, candidate of philological sciences, senior professor

O.V. Shadrina, senior professor

E.A. Musorina, senior methodologist

1. Competencies formed during the process of studying the course

Code and the name of the competence	Competency indicators
UC-1 Use a systematic approach to critically analyze a problem, and develop an action plan	UC-1.1 Systematically analyze the problem situation, identify its components and the relations between them
	UC-1.2 Search for solutions by using available sources
	UC-1.3 Develop a step-by-step strategy for achieving a goal, foresee the result of each step, evaluate the overall impact on the planned activity and its participants
UC-2 Able to manage a project through all stages of its life cycle	UC-2.1 Set an objective within a defined scientific problem; formulate the agenda, relevance, significance (scientific, practical, methodological or other depending on the project type), forecast the expected results and possible areas of their application
	UC-2.2 Forecast the project outcomes, plan necessary steps to achieve the outcomes, chart the project schedule and monitoring plan
	UC-2.3 Organize and coordinate the work of project stakeholders, provide the team with necessary resources
	UC-2.4 Publicly present the project results (or results of its stages) via reports, articles, presentations at scientific conferences, seminars, and similar events
UC-3 Able to organise and lead a team, developing a team strategy to achieve a goal	UC-3.1 Organize and coordinate the work of the project stakeholders and help resolve disputes and conflicts
	UC-3.2 Consider the interests, specific behavior, and diversity of opinions of team members/colleagues/counterparties
	UC-3.3 Foresee the results (consequences) of both individual and collective actions
	UC-3.4 Plan teamwork, distribute tasks to team members, hold discussions of different ideas and opinions
UC-4 Use modern communication tools in the academic and professional field, including those in a foreign language	UC-4.1 Exchange business information in oral and written forms in Russian and at least one foreign language
	UC-4.2 Use the acquired skills to write, translate, and edit various academic texts (abstracts, essays, reviews, articles, etc.)
	UC-4.3 Present the results of academic and professional activities at various academic events, including international conferences
	UC-4.4 Use modern ICT tools for academic and professional collaboration
UC-5 Analyze and consider cultural diversity in intercultural interactions	UC-5.1 Identify specific philosophical and scientific traditions in major world cultures
	UC-5.2 Define the theoretical and practical significance of cultural and linguistic factors within various interrelated philosophical and scientific traditions
UC-6 Determine priorities and ways to improve performance through self-assessment	UC-6.1 Achieve personal growth and professional development, determine priorities and ways to improve performance
	UC-6.2 Evaluate performance results in correlation with the set objectives and applied methods

2. Competency assessment indicators

As a result of studying the course the student should:

know:

- the relationship, mutual influence and interaction of language and culture;
- the role of language as an organic part of culture in human life, behavior and communication with speakers of other languages and other cultures, national identity and identity of peoples;
- an idea of cultural and anthropological view of person, their way of life, ideas, views, customs, value system, perception of the world - their own and others';
- the influence of culture through language on human behavior, his worldview and life in general;
- the history of emergence , stages of development and methods of teaching intercultural communication;
- the content of the concept of "culture", its role in the communication process, as well as its relation to such concepts as "socialization", "enculturation", "acculturation", "assimilation", "behavior", "language", "identity", "global citizenship";
- the influence of various social transformations on the change of cultural identity;
- peculiarities of perception of other cultures, causes of prejudices and stereotypes in intercultural interaction;
- mechanisms of formation of intercultural tolerance and dialog of cultures;
- types, kinds, forms, models, structural components of intercultural communication;
- norms and styles of intercultural communication;
- mental peculiarities and national customs of representatives of different cultures, cultural standards of ethnic, political and economic plan;
- the linguistic picture of the world of speakers of a foreign language culture, the peculiarities of their worldview and understanding of the world;
- ethical and moral norms of behavior in a foreign cultural environment;
- language norms of oral communication culture, ethical and moral norms of behavior accepted in the country of the studied language; stereotypes and ways to overcome them; etiquette norms of the countries of the studied language;
- methods of systematic and critical analysis; methods of developing an action strategy for identifying and solving a problem situation;
- stages of the project life cycle; stages of project development and realization; methods of project development and management;
- methods of team building; methods of effective team leadership; basic leadership theories and leadership styles;
- rules and regularities of personal and business oral and written communication; modern communicative technologies in Russian and foreign languages; existing professional communities for professional interaction;
- regularities and peculiarities of socio-historical development of different cultures; peculiarities of intercultural diversity of society; rules and technologies of effective intercultural interaction;
- methods of self-assessment, self-control and self-development.

be able to:

- apply methods of studying cultural systems and intercultural situations;
- perceive, analyze, interpret and compare cultural facts;
- determine the role of basic cultural concepts in intercultural communication;
- find adequate solutions in various situations of intercultural communication;
- analyze the peculiarities of intercultural communication in a team;
- reflect the orientation system of one's own culture;
- recognize and correctly interpret non-verbal signals in the process of intercultural communication;
- compose a communicative portrait of a representative of a different linguoculture;
- reveal the meaning of concepts and actions in an intercultural situation;
- analyze coincidences and differences in communicative behavior from the perspective of the cultures in contact;
- adequately realize their communicative intention in communication with representatives of other linguocultures;
- switch when meeting with another culture to other not only linguistic but also non-linguistic norms of behavior;
- identify the causes of communicative failures and apply ways of overcoming them;
- take the position of a partner in intercultural communication and identify a possible conflict as conditioned by the values and norms of his/her culture;
- successfully overcome barriers and conflicts in communication and reach mutual understanding;
- reveal the interrelation and mutual influence of language and culture;
- show tolerance to the representatives of other cultures and languages;
- analyze the main stages and regularities of the historical development of society to form a civic position;
- respect and cherish historical heritage and cultural traditions;
- use models of social situations, typical scenarios of interaction between participants of intercultural communication;
- be guided by the principles of cultural relativism and ethical norms, which imply the rejection of ethnocentrism and respect for the uniqueness of foreign-language culture and value orientations of foreign-language society;
- overcome the influence of stereotypes and carry out intercultural dialog in general and professional spheres of communication;
- model possible situations of communication between representatives of different cultures and societies;
- apply methods of systematic approach and critical analysis of problem situations; develop a strategy of action, make concrete decisions for its realization;
- develop a project taking into account the analysis of alternative variants of its implementation, define target stages, main directions of work; explain the goals and formulate tasks related to the preparation and implementation of the project; manage the project at all stages of its life cycle;
- develop a plan of group and organizational communications in preparation and implementation of the project; formulate tasks for team members to achieve the set goal; develop a team strategy); apply effective styles of team leadership to achieve the set goal;
- to apply in practice communicative technologies, methods and ways of business communication for academic and professional interaction;
- determine the theoretical and practical significance of the cultural and linguistic factor in the interaction of different philosophical and scientific traditions;
- understand and tolerantly perceive the intercultural diversity of society; analyze and take into account the diversity of cultures in the process of intercultural interaction;
- to solve the problems of personal and professional development, to determine and realize priorities of improving one's own activity; to apply methods of self-assessment and self-control.

master:

- norms of etiquette and behavior when communicating with representatives of a foreign language culture;
- principles of tolerance in resolving intercultural contradictions;
- methods of communicative research, the ability to apply the acquired knowledge in research activities, oral and written communication;
- communicative strategies and tactics characteristic of other cultures;
- skills of correct intercultural communication, independent analysis of intercultural conflicts in the process of communication with representatives of other cultures and ways to resolve them;
- norms of etiquette and behavior when communicating with representatives of a foreign language culture;
- principles of tolerance in resolving intercultural contradictions;
- methods of communicative research, ability to apply the acquired knowledge in research activities, oral and written communication;
- communicative strategies and tactics characteristic of other cultures;
- skills of correct intercultural communication, independent analysis of intercultural conflicts in the process of communication with representatives of other cultures and ways of their resolution;
- skills of correct interpretation of specific manifestations of verbal and non-verbal communicative behavior in different cultures;
- communication skills in oral and written forms in Russian and foreign languages to solve problems of interpersonal and intercultural interaction;
- skills of activity with orientation on ethical and moral norms of behavior accepted in a foreign cultural society;
- the necessary interactive and contextual knowledge to overcome the influence of stereotypes and adapt to changing conditions in contact with representatives of different cultures;
- methodology of systematic and critical analysis of problem situations; methods of setting a goal, determining ways to achieve it, and developing strategies of action;
- methods of project development and management; methods of assessing the need for resources and project efficiency;
- the ability to analyze, design and organize interpersonal, group and organizational communications in a team to achieve the goal; methods of organization and team management;
- methods of interpersonal business communication in Russian and foreign languages, using professional language forms, means and modern communication technologies;
- methods and skills of effective intercultural interaction;
- technologies and skills to manage and improve their cognitive activity on the basis of self-assessment, self-control and principles of self-education throughout life.

3. List of typical control tasks used to evaluate knowledge and skills

The list of typical control tasks is provided in the attached file.

Methodological recommendations defining the procedure for assessing knowledge, skills and proficiency and (or) experience of current monitoring of academic performance in the discipline

The assessment of knowledge, skills and proficiency, characterizing the stages of formation of competencies in the discipline of a foreign language, is comprehensive and is carried out in the form of current and midterm monitoring of students' academic performance, carried out using the MIPT point-rating system (BRS). The assessment of the success of mastering a discipline (module) is expressed in a 100-point scale of the MIPT BRS, as the total points that the student scores based on the results of current monitoring of academic performance and midterm assessment in the semester (final rating).

Current monitoring of academic performance is carried out during the semester in order to monitor the acquisition of knowledge, skills and level of proficiency in a foreign language by students to solve communicative problems in the socio-cultural, academic and professional-business spheres of activity, timely identification of difficulties in mastering the discipline (module) and their elimination, as well as providing timely individual advisory assistance to students.

The indicator of current monitoring of academic performance is the completion of all types of academic work provided for by the working program of the discipline (module), including the student's classroom work, attendance of practical (seminar) classes and academic activity in foreign language classes.

The types, forms, assessment criteria, frequency and procedure for conducting current monitoring of students' academic performance (hereinafter referred to as control points) are determined independently in accordance with the set tasks and the specifics of the implemented working program of the discipline (module).

Monitoring current academic performance includes checking knowledge, skills and abilities:

- in classes (surveys, interactive conversations, reports, presentations, role-playing games, completing control tasks on various types of speech activity and tests to check lexical and grammatical skills);
- based on the results of individual independent work (preparation of oral reports, completion of online training tests and assignments for monitoring and self-monitoring of listening, reading, writing and lexical and grammatical skills in the MIPT LMS.
- during individual consultations with students who have academic debts.

To organize current monitoring of academic achievements within an academic discipline (module), checkpoints are determined that are optimally located in the time interval for studying the discipline (module) (Learning Outcomes Monitoring Plan) and are communicated to students: for the first year in the second week of the academic semester, in other cases - in the first lesson of the semester, and are also posted on the educational platform in the MIPT LMS.

No more than 7 calendar days are allocated for checking written work as part of the current monitoring of academic performance in the semester. The teacher leading the discipline (module) is obliged to promptly inform students about the results of passing each checkpoint, about academic achievements at different stages of mastering the discipline (module) and make timely results of assessment activities (including for written assignments) in the electronic journal so that students can see grades on the MIPT LMS platform in a timely manner.

If a student falls behind the schedule of current assessment activities (failure to complete all control points provided for by the program and failure to submit individual assignments, etc.) for the discipline (module) being studied, this results in the formation of a current debt.

The grade for current work in the semester is determined in total at the end of the semester based on the intermediate rating points received by the student in the semester, taking into account their overall workload, and is set as a weighted average grade.

The points that make up the current rating are recorded by the teaching staff in the MIPT LMS electronic journal. When calculating rating points in the MIPT LMS, the rounding rule to an integer is applied.

Academic Honesty and Plagiarism

Plagiarism: Plagiarism is the theft of someone else's ideas and work. It is the incorporation of facts, ideas, or specific language which are not common knowledge, are taken from another source, and are not properly cited. In submitting any work, whether on paper or electronically, you agree to abide by the MIPT's regulations on plagiarism. You also undertake that the work is all your own, that you have properly acknowledged and cited all materials used from the published or unpublished works of others, and that the work has not previously been submitted for any other of your courses. You also agree, in submitting the work, that MIPT may take steps to authenticate the material submitted, including (but not limited to) submitting the work to a plagiarism checking service and copying the work to another member or members of staff.

Using ChatGPT and other Generative AI tools: In this course, generative AI is permitted in specific contexts and with acknowledgment. The Department of Foreign Languages supports responsible experimentation with generative AI tools, such as OpenAI's ChatGPT and/or others, but there are important considerations to keep in mind when using these tools, including information security and data privacy, compliance, copyright, and academic integrity. You must give credit to AI tools whenever they are used, even if it is simply to create ideas rather than usable text or illustrations. When using AI tools on assignments, you should add an appendix showing

- a) the entire exchange, highlighting the most relevant sections;
- b) a description of precisely which AI tools were used (e.g. ChatGPT or other);
- c) an explanation of how the AI tools were used (e.g. to generate ideas, turns of phrase, elements of text, long stretches of text, lines of argument, pieces of evidence, illustrations of key concepts, etc.);
- d) an account of why AI tools were used (e.g. to save time, to overcome writer's block, to stimulate thinking, to handle mounting stress, to clarify prose, to translate text, etc.).

Research, Fabrication and Falsification: Students are expected to be honest and accurate in all work submitted, whether it involves scientific research or writing articles in journalism courses, or any other course. Fabrication is the intentional act of making up data, results, or quotes, and includes falsely citing sources or citing sources never utilized. Falsification is the manipulation of research including the distortion or omission of important data or results. Like plagiarism, fabrication and falsification are serious violations of academic integrity that are subject to review by the Administrative Board for disciplinary action.

Course Policies and Expectations

Class attendance and participation points are given to encourage your active class participation and discussion. You will be rewarded with an extra score as long as you frequently come to class and actively contribute to the class discussions.

Attendance

Your consistent attendance is essential. If you are absent without medical excuse more than once, your total course grade will be lowered. On your first unexcused absence, you will receive a letter from your course instructor warning you of your situation. Three late arrivals in class of more than 15 minutes will count as an absence. If you must miss a class, please let your course instructor know in advance, and know that your assigned work is still due on time. Please get in touch with a classmate to learn what was covered.

4. Evaluation criteria

A list of typical (approximate) questions and tasks is in the attached file.

Assessment of the success of students in mastering the material on the subject (knowledge, skills, proficiency) characterizing the stages of formation of competencies is carried out in the form of current and intermediate control, carried out using the point-rating system (PRS) of MIPT and is expressed in a 100-point scale (Score/Points):

Excellent:

The grade "excellent (10)" is given to a student who received 96-100 points in the point-rating system of assessment.

The grade "excellent (9)" is given to a student who received 91-95 points in the point-rating system of assessment.

The grade "excellent (8)" is given to a student who received 86-90 points in the point-rating system of assessment.

Good:

The grade "good (7)" is given to a student who received 81-85 points in the point-rating system.

The grade "good (6)" is given to a student who received 76-80 points in the point-rating system.

The grade "good (5)" is given to a student who received 71-75 points in the point-rating system.

Satisfactory:

The grade "satisfactory (4)" is given to a student who received 66-70 points in the point-rating system.

The grade "satisfactory (3)" is given to a student who received 60-65 points in the point-rating system.

Unsatisfactory:

The grade "unsatisfactory (2)" is given to a student who received 48-59 points in the point-rating system.

The grade "unsatisfactory (1)" is given to a student who received 0-47 points in the point-rating system.

The criteria for assessing knowledge, skills and abilities and (or) work experience are presented in the attached file.

5. Methodological materials defining the procedures for the assessment of knowledge, skills, abilities and/or experience

Midterm assessment upon completion of the course is conducted in the 1st semester (fall) in the form of a credit and in the 2nd semester (spring) in the form of a differentiated credit. Each of them consists of 2 parts: oral and written.

Interim assessment in the form of a test is carried out during the test week. Each part of the test (oral and written) is allocated 10 points in the rating.

Out of 10 points for the oral part of the test:

0-5 points are formed based on the results of students' participation in all types of oral speech activities during classes and are entered into the LMS MIPT electronic journal automatically as a total score at the end of the fall semester;

The student receives 0-5 points during the test week during the midterm assessment.

The written part of the midterm assessment in the form of credit z is completed through independent testing ISTOK, conducted by DIYA in the last academic week of the semester and assessed from 0 (zero) to 10 points (clause 2.2 of the Regulation on testing in the Department of Foreign Languages, in the current version).

Interim assessment in the form of an exam is carried out during the examination week and includes an oral and written part.

Each part (oral and written) is worth 5 points.

All students are admitted to the oral part of the differentiated test, regardless of the number of points received for the written part.

The final rating for the semester when mastering a discipline is a maximum of 100 points and is formed as a sum of points consisting of the following components:

Fall semester (credit):

The current rating (points based on the results of current monitoring of academic performance in the semester) is a maximum of 80 points, including:

- 4 points - class attendance;
- 12 points - academic activity in classes;
- 48 points - current control milestones (checkpoints);
- 16 points - completion of mandatory written work for the semester.

The maximum number of points for midterm assessment is 20 points, including:

- 10 points for the oral part;
- 10 points for the written part.

Spring semester (differentiated credit).

Current rating (points based on the results of the current monitoring of academic performance in the semester) - maximum 90 points, including:

- 4 points - class attendance;
- 12 points - academic activity in classes;
- 48 points - current monitoring milestones (checkpoints);
- 10 points - independent testing;
- 16 points - completion of mandatory written work for the semester.

The maximum number of points for midterm assessment is 10 points, including:

- 5 points - for the oral part;
- 5 points - for the written part.

During the academic semester, the current rating for the discipline must be at least 60% of the maximum current rating.

All types of academic work must be completed exactly within the timeframes stipulated by the curriculum.

3. List of typical (exemplary) questions, tasks, topics for preparation for the current control on modules

Topic 1: Mathematics as a science

Classroom work: conversation on the content of the read or listened to text; checking the assimilation of lexical and grammatical material; debate on the theme "Was mathematics discovered or invented?"; formation of skills of reading the system of mathematical notations, expressions and calculation exercises in English; terminology test; role-play on the theme "Scientists of different epochs".

Independent work: reading authentic magazines and newspapers on the topic: Mathematics Magazine "MAA Mathematical Association of America", Quanta Magazine, MDPI Open Access Journals "Mathematical and Computational Applications", Mathematics Today; compiling a thematic dictionary on the material covered.

Example of a vocabulary assignment

Complete the definitions with the terms:

1. _____ number is a positive integer that is not divisible without remainder by any integer except itself and 1, with 1 often excluded. PRIME
2. _____ number is a rational number or the limit of a sequence of rational numbers, as opposed to a complex number. REAL
3. _____ number is an exact number such as 1, 7, and 24, as opposed to a number with fractions or decimals. WHOLE
4. An adjective that is used to describe that it pertains to the fourth degree is _____. QUARTIC
5. _____ is a number that can be expressed as a proportion of two whole numbers. FRACTION
6. _____ is a number that cannot be exactly expressed as a ratio of two integers. IRRATIONAL
7. In geometry, a _____ is a straight line that joins two opposite corners in a flat four-sided shape such as a square. DIAGONAL
8. An adjective that is used to show that a measurement is the volume of something, that is the height multiplied by the length and the width is _____. CUBIC
9. The decimal number system is an example of a _____ system, in which, after the base b has been adopted, the digits 1, 2, ..., $b - 1$ are given special names, and all larger numbers are written as sequences of these digits. POSITIONAL

Topic2: Scientific discoveries and achievements in the field of mathematics and informatics

Auditorium work: conversation on the content of the read or listened text of the message; checking the assimilation of lexical and grammatical material; working in groups, discussing the main achievements of scientific and technical progress; practicing the skills of reading the system of mathematical notations, expressions and computational exercises in English; terminology test.

Independent work: working with information resources, studying the materials of practical classes, reading the main and recommended literature; compiling a thematic dictionary on the material covered.

Example of "Speaking" assignment

Individual work.

Think over the questions and get ready for the debate:

1. The Fibonacci sequence is perhaps best known from its appearance in the novel and movie "The Da Vinci Code." What are some of the real world applications of this famous sequence?

2. Name at least one mathematical idea or principle that you feel is a universal truth. Support your choice.

3. Name at least one mathematical idea or principle that you feel is a strictly man-made application or phenomena.

Topic 3: Fundamentals of combinatorics

Auditorium work: conversation on the content of the read or listened text, video material; checking the assimilation of lexical and grammatical material; practicing the skills of reading the system of mathematical notations, expressions and computational exercises in English; terminology test; solving problems on combinatorics.

Independent work: working with information resources, studying the materials of practical classes, reading the main and recommended literature; compiling a thematic dictionary on the material covered.

Example of reading assignment

Read the text and for questions 1-5, decide if the statement is TRUE or FALSE.

Combinatorics.

There are various ways in which one can try to define combinatorics. None is satisfactory on its own, but together they give some idea of what the subject is like. A first definition is that combinatorics is about counting things. For example, how many ways are there of filling an $n \times n$ square grid with 0s and 1s if you are allowed at most two 1s in each row and at most two 1s in each column? Because this problem asks us to count something, it is, in a rather simple sense, combinatorial. Combinatorics is sometimes called "discrete mathematics" because it is concerned with "discrete" as opposed to "continuous" structures. Roughly speaking, an object is discrete if it consists of points that are isolated from each other and continuous if you can move from one point to another without making sudden jumps. (A good example of a discrete structure is the integer lattice \mathbb{Z}^2 , which is the grid consisting of all points in the plane with integer coordinates, and a good example of a continuous one is the surface of a sphere.) There is a close affinity between combinatorics and theoretical computer science (which deals with the quintessentially discrete structure of sequences of 0s and 1s), and combinatorics is sometimes contrasted with analysis, though in fact there are several connections between the two. A third definition is that combinatorics is concerned with mathematical structures that have "few constraints." This idea helps to explain why number theory, despite the fact that it studies (among other things) the distinctly discrete set of all positive integers, is not considered a branch of combinatorics. In order to illustrate this last contrast, here are two somewhat similar problems, both about positive integers. i. Is there a positive integer that can be written in a thousand different ways as a sum of two squares? ii. Let a_1, a_2, a_3, \dots be a sequence of positive integers, and suppose that each a_n lies between n^2 and $(n+1)^2$. Will there always be a positive integer that can be written in a thousand different ways as a sum of two numbers from the sequence? The first question counts as number theory, since it concerns a very specific sequence – the sequence of squares – and one would expect to use properties of this special set of numbers in order to determine the answer, which turns out to be yes.¹ The second question concerns a far less structured sequence. All we know about a_n is its rough size – it is fairly close to n^2 – but we know nothing about its more detailed properties, such as whether it is a prime, or a perfect cube, or a power of 2, etc. For this reason, the second problem belongs to combinatorics. The answer is not known. If the answer turns out to be yes,

then it will show that, in a sense, the number theory in the first problem was an illusion and that all that really mattered was the rough rate of growth of the sequence of squares.

1. Combinatorics studies structures which have many constraints on them.
 - a. True
 - b. False
2. For two points of a continuous object one can move from one point to the other without sudden jumps.
 - a. True
 - b. False
3. The integer lattice is a continuous structure.
 - a. True
 - b. False
4. There exists a positive integer which can be represented as a sum of two squares in a thousand of different ways.
 - a. True
 - b. False
5. Combinatorics is a branch of number theory.
 - a. True
 - b. False

Topic 4: Combinatorics and graph theory

Auditorium work: conversation on the content of the read or listened to text, video material; checking the assimilation of lexical and grammatical material; solving problems on combinatorics; practicing the skills of reading the system of mathematical notations, expressions and computational exercises in English; terminology test; round table - report on the work done in mini groups, evaluation of results, feedback and corrections.

Independent work: working with information resources, studying the materials of practical classes, reading the main and recommended literature; compiling a thematic dictionary on the material covered.

Example of grammar assignment

Complete the second sentence so that it has a similar meaning to the first, using the words given. Use contractions whenever possible.

1. If you don't revise, you won't pass your exams.
If you revise, _____.
2. If we see your teacher, we should ask him for the correct answer.
We should ask your teacher for the correct answer when _____.
3. The world might only have one or two languages in the future if we don't protect them.
The world might only have one or two languages in the future unless _____.
4. I won't go if you don't go.
I won't go unless _____.
5. I'll be there at about 5 p.m. unless there's lots of traffic.
If there _____, I'll be there at about 5 p.m.
6. We'll go for coffee as soon as the class ends.
When _____.

Topic 5: Scope of application of combinatorics

Auditorium work: conversation on the content of the read or listened to text, video material; checking the assimilation of lexical and grammatical material; practicing the skills of reading the

system of mathematical notations, expressions and computational exercises in English; terminology test; solving problems on combinatorics; discussion.

Independent work: working with information resources, studying materials of practical classes, reading the main and recommended literature; compiling a thematic dictionary on the material studied.

Example of a writing assignment

1. Read the text (one of the related scientific articles) and list the main ideas.

2. Write an introductory sentence that states the topic.
In the article X the author Y states / claims / suggests that ____ the topic_____.
3. Turn the main ideas from your list into sentences using your own words. Avoid repetitive language: paraphrase and use synonyms.
4. Add linkers and transition words to connect the sentences.
5. Write a concluding sentence that summarizes the key points.
6. Proofread.

Topic 6: Derivative functions

Auditorium work: discussion on the content of the read or listened text, video material; checking the assimilation of lexical and grammatical material; practicing the skills of reading the system of mathematical notations, expressions and computational exercises in English; terminology test; solving problems on combinatorics.

Independent work: working with information resources, studying the materials of practical classes, reading the main and recommended literature, compiling a thematic dictionary on the material covered.

Example of a speaking task

Team work.

In small groups, prepare a short talk on one of the most important breakthroughs in mathematics and computer science. Provide valid arguments and examples to prove your assumptions. Support your talk with images from the Internet. Timing 3-5 min talk.

Methodological materials defining the procedure for assessing knowledge, skills and possessions and (or) experience of current control activities.

The grade for the current work in the semester is given as a weighted average score based on the results of three point-rating attestations during the semester.

Assessment for each point-rating attestation is 100 points includes attendance (10%), and fulfillment of control and training tasks in classroom and independent work on the platform of virtual learning environment "Moodle". Parameters of the point-rating system used to assess the progress of students in the Department of Foreign Languages.

Current progress control is carried out during the semester in order to control the assimilation of students' knowledge, skills and proficiency in a foreign language to solve communicative problems in socio-cultural, academic and professional-business spheres of activity, timely identification of difficulties in mastering the discipline (module) and their elimination, as well as the provision of timely advisory individual assistance to students.

The control of current academic performance includes the verification of knowledge, skills and possessions:

- in class (surveys, interactive discussions, reports, presentations, role-playing games, control tasks on different types of speech activities and tests to check lexico-grammatical skills);
- according to the results of individual independent work (preparation of oral reports, performance of online practice tests and tasks for control and self-control of listening, reading, writing and lexico-grammatical skills on the platform "Moodle");
- during individual consultations with students who have academic arrears.

4. List of typical (exemplary) questions and topics for interim certification of students on the results of training

Intermediate certification of the discipline (module) "Modern Combinatorics" is held at the end of each semester.

1 semester (A1-A2) - credit: test; presentation

Written part - test

Oral part - presentation on one of the semester topics.

Examples of assignments for the written part of the credit.

1. Put questions to the underlined words.

1. They have just finished the research.
2. Over 1,000 people took part in the survey.
3. It takes him ten minutes to get to the university.
4. Most calculations were done in their lab.
5. She was talking to her supervisor.

2. Complete the sentences with 'some', 'any', 'no', 'much', 'many' or 'a lot of'.

1. Which pencil do you like best? You may choose _____ colour you like.
2. I can't make you white tea – unfortunately, there is _____ milk left.
3. Could you lend me _____ money till the day after tomorrow? I don't need much.
4. Our department has put _____ effort into developing this project. We all have worked hard.
5. How _____ application forms have been submitted?
6. How _____ money does he owe you?

3. Put the verbs either in Present Simple, Past Simple, Present Perfect (Active or Passive).

1. He is a famous lecturer and _____ (invite) to give his talks at many universities.
2. What _____ (he/think) of our new project?
3. She _____ (translate) only part of the chapter so far.
4. These phenomena _____ (not explain) so far.
5. He _____ (write) this book when he was a very young man.
6. This month the lectures on discreet math _____ (give) in room 335.
7. She _____ (work) as a researcher in our laboratory for almost ten years.
8. When exactly _____ (the papers/submit) yesterday?
9. Over centuries, a lot of mathematicians _____ (inspire) by Pierre de Fermat's works.
10. The post (deliver) yet.
11. This year she _____ (do) a lot of work in this field.

5. Fill in the gaps with English equivalents of the Russian words in brackets.

1. They were asked to (перечислять) the factors that had influenced their choice.
2. After six (последовательный) defeats, the team was almost ready to give up.
3. Physics used to be very much a male (область (сфера)).
4. The school has decided to adopt a different (подход) to discipline.
5. The first part of the plan has been safely (завершать).
6. If you are a student, you can (опускать) questions 16–18.
7. Licenses are only granted under the most (строгий) conditions.
8. Teachers should be (использовать) computers in education.

9. (подразумеваемый) in his speech was the assumption that they were guilty.
10. His resignation was (предшествовать) by weeks of speculation.

6. Fill in the gaps with suitable prepositions.

1. Women make _____ 56% of the student numbers.
2. The term 'accent' refers _____ pronunciation.
3. He made a very positive contribution _____ the success of the project.
4. Coursework is taken _____ account as well as exam results.
5. The novel's success gave rise _____ a number of sequels.
6. We started sequence (*) with $n = 0$ so the formula above is valid _____ n equal _____ 2 or greater, and $F_0 = 0$ and $F_1 = 1$.

2 semester (A2-B1) - differentiated credit: test and presentation on one of the topics of the semester.

Written part - test and written abstract of a scientific article

Oral part - presentation on one of the semester topics.

Examples of assignments for the written part of the credit.

1. Fill in the gaps with suitable verb forms to make the Zero, First, Second or Third Conditionals or complex sentences with time clauses. Use contractions in negatives.

1. If Rachel _____ (be) more familiar with the concept of matroid theory, she could have solved challenging problems in optimization and algorithmic complexity.
2. You could solve challenging problems in optimization and algorithmic complexity if you _____ (be) more familiar with the concept of matroid theory,
3. If you had attended a summer school on combinatorics at a different university, you _____ (learn) new techniques in combinatorial design and coding theory.
4. If you _____ (prove) a long-standing conjecture in graph theory, you will be awarded a prestigious prize for excellence in combinatorics.
5. If you _____ (know) how to use the quadratic formula, you can solve quadratic equations.
6. If you were exposed to more research in enumerative combinatorics, you _____ better (prepare) to tackle challenges in graph theory and combinatorial optimization.
7. You can solve problems involving derivatives and integrals if you _____ (understand) the concept of limits,
8. If you prove a long-standing conjecture in graph theory, you _____ (award) a prestigious prize for excellence in combinatorics.
9. If Michael had a better grasp of the relationship between graph theory and theoretical computer science, he _____ (design) faster algorithms for optimization problems.
10. You will be recognized as a leading researcher in this field of mathematics if you _____ (develop) an innovative approach for tackling the Ramsey theory.

2. Fill in the gaps with either the Present Perfect, Present Perfect Continuous, Past Perfect or Past Perfect Continuous Tenses. Use contractions.

1. Do you know Clara? She (be) our secretary for almost five years.
2. When he arrived at the station, he remembered that he (not switch) off his office computer.
3. She (have) an awful headache since yesterday's evening.
4. How many letters (Bob/send) to our clients so far?
5. By the time I arrived, they (already discuss) all the details of the contract.
6. Since when (you/know) the results of the test?

3. Fill in the gaps with English equivalents of the Russian words in brackets.

1. He felt (поочерёдно) hot and cold.
2. He has his own (своеобразный) style which you'll soon get used to.
3. His book on social policy proved to be (основополагающий).
4. There is no need to (утверждать) the obvious.
5. The truth of his (предположение, гипотеза) was confirmed by the newspaper report.
6. The full (осуществление, выполнение) of the system will take some time.
7. People were evacuated from the coastal regions (заранее) of the hurricane.
8. His achievements have (превосходить) expectations.
9. I had (точный) the same problem as you when I first started.
10. An attempt was made to standardize the (метод).

4. Fill in the gaps with suitable prepositions.

1. These letters stand _____ the nucleotides adenine (A), thymine (T), guanine (G) and cytosine (C) (uracil, U, replaces thymine in RNA).
2. This is the category devoted _____ discrete mathematics in relation to computer science.
3. They all use the fact that one is dealing _____ a finite point set in an ingenious way.
4. Erdős made this conjecture, apparently unaware _____ Sylvester's earlier question.
5. An example of such a problem is due _____ the English mathematician James Joseph Sylvester.
6. It allows _____ bins to be shipped off quickly
7. So far we have alluded _____ only a few applications of bin packing
8. The simplest way to carry _____ this idea is known as First Fit.
9. Less strange perhaps is to form the infinite string shown below based _____ the entries of the Fibonacci word sequence.

Criteria for evaluation of tasks of interim certification by modules

Interim certification (credit/differential credit) is held in oral and written form at the end of each semester to determine the compliance of the level of competence in the discipline (module) to the requirements of the MIPT educational standard for the direction of training in the scope of the working program. Assessment for credit/differential credit is 20% of the total grade for the semester.

Written work for interim certification is conducted in the form of a test. Assessment is made by adding the points received by students for all tasks, and calculating the ratio of points to the maximum possible number of points for written work.

The oral part of the credit/differential credit/exam is taken by a teacher who does not teach in the given group. The grade is given on the basis of the criteria for evaluating a monologic/dialogic statement. In the final grade for the oral and written part of the test, equal weight is given to the skills in all types of speech activity: listening, reading, speaking and writing.

Intermediate certification on completion of the discipline (module) is held in the 1st semester in the form of credit and in the 2nd semester in the form of differentiated credit, each of them consists of 2 parts: oral form (reading / speaking / listening / translation) and written form: written work, testing to determine the level of language competence (English), to solve communicative problems in socio-cultural, academic and professional-business spheres of activity, as well as for the development of professional and personal qualities of the student.

Integrated Speaking

	General description	Content	Communicative achievement	Delivery	Language use
5	The response fulfills the demands of the task with minor lapses of completeness. A response at this level is characterised by all of the following:	<p>The answer</p> <ul style="list-style-type: none"> addresses the task completely contains appropriate and sufficient information from the text (written/audio/v video) and its analysis shows an excellent understanding of the task purpose and the target audience is logically and consistently organised 	<p>The student</p> <ul style="list-style-type: none"> demonstrates comprehensive knowledge of the norms of the specific task type uses an appropriate format and register throughout communicates ideas in an effective and convincing way constantly holds the target listeners' attention (monologue) or effectively interacts with a partner 	<p>The student</p> <ul style="list-style-type: none"> demonstrates clear and natural pronunciation uses intonation to convey the message effectively demonstrates accurate use of sentence and word stress shows no evident hesitations 	<p>The answer</p> <ul style="list-style-type: none"> demonstrates good control of varied grammatical structures and vocabulary adequate to the required level contains minor errors which do not affect comprehension
4	Contains the features of 5 and 3				
3	The response is connected to the task, though it misses some relevant information or contains inaccuracies. A response at this level is characterised by at least three of the following:	<p>The answer</p> <ul style="list-style-type: none"> mainly addresses the task includes some of the content from the text (written/audio/v video) relevant to the task shows difficulties in understanding of the task purpose and the target audience has some errors in logical organisation and consistency though they do 	<p>The student</p> <ul style="list-style-type: none"> demonstrates sufficient knowledge of the norms of the specific task type uses mainly appropriate format and register communicates ideas in a relatively effective and convincing way mainly holds the target listeners' attention or interacts with a partner 	<p>The student</p> <ul style="list-style-type: none"> demonstrates pronunciation which is mostly clear and natural uses intonation which is sometimes effective to convey the message uses sentence stress and word stress generally accurately maintains overall flow of speech despite 	<p>The answer</p> <ul style="list-style-type: none"> demonstrates limited range of vocabulary and grammatical structures which the student is expected to produce at the required level contains errors in vocabulary and grammar structures which do not hinder comprehension

		not seriously interfere with communication of the message		some hesitations	
2	Contains the features of 3 and 1				
1	The response is very limited in content or coherence or is only minimally connected to the task. A response at this level is characterised by at least three of the following:	<p>The answer</p> <ul style="list-style-type: none"> • partially addresses the task • provides insufficient content from the text (written/audio/video) relevant to the task • shows a lack of understanding of the task purpose and audience • is not logically organised and inconsistent 	<p>The student</p> <ul style="list-style-type: none"> • demonstrates insufficient knowledge of the norms of the specific task type • produces text with an inconsistent or inappropriate format and register • fails to communicate ideas in an effective and convincing way • fails to keep the target listeners' attention or communicate with a partner 	<p>The student</p> <ul style="list-style-type: none"> • demonstrates unclear pronunciation and/or inappropriate intonation which prevents clear understanding • fails to maintain overall flow of speech due to frequent hesitations which place strain on the listener 	<p>The answer</p> <ul style="list-style-type: none"> • demonstrates minimal control over vocabulary and grammatical structures adequate to the required level • uses language which is difficult to understand, due to errors in vocabulary and grammatical structures
0	Speaker makes no attempt to respond or response is unrelated to the task				

Integrated Writing

	General description	Content	Communicative achievement	Organisation	Language use
5	The response fulfills the demands of the task with minor lapses of completeness. A response at this level is characterised by all of the following:	<p>The answer</p> <ul style="list-style-type: none"> • addresses the task completely • contains appropriate and sufficient information from the text (written/audio/video) and its analysis • shows an excellent understanding of the task purpose and the target audience • presents a clear progression of 	<p>The student</p> <ul style="list-style-type: none"> • demonstrates comprehensive knowledge of the norms of the specific task type • uses an appropriate format and register throughout • communicates ideas in an effective and convincing way 	<p>The answer</p> <ul style="list-style-type: none"> • is coherent (logically and consistently organised, easy to understand) • uses a wide range of cohesive devices • meets word count requirements 	<p>The answer</p> <ul style="list-style-type: none"> • demonstrates good control of varied grammatical structures and vocabulary adequate to the required level • minor errors do not affect comprehension • demonstrates the accurate use of punctuation marks, spelling and capitalisation rules

		ideas with appropriate detail			
4	Contains the features of 5 and 3				
3	The response is connected to the task, though it misses some relevant information or contains inaccuracies. A response at this level is characterised by at least three of the following:	<p>The answer</p> <ul style="list-style-type: none"> mainly addresses the task includes some of the content from the text (written/audio/video) relevant to the task shows difficulties in understanding of the task purpose and the target audience demonstrates limited development of ideas 	<p>The student</p> <ul style="list-style-type: none"> demonstrates sufficient knowledge of the norms of the specific task type uses mainly appropriate format and register communicates ideas in a relatively effective and convincing way 	<p>The answer</p> <ul style="list-style-type: none"> demonstrates limited coherence uses some cohesive devices meets the word count requirements 	<p>The answer</p> <ul style="list-style-type: none"> demonstrates limited range of vocabulary and grammatical structures which the student is expected to produce at the required level contains errors in vocabulary and grammar structures which do not hinder comprehension contains errors in punctuation, spelling and capitalisation
2	Contains the features of 3 and 1				
1	The response is very limited in content or coherence or is only minimally connected to the task. A response at this level is characterised by at least three of the following:	<p>The answer</p> <ul style="list-style-type: none"> partially addresses the task provides insufficient content from the text (written/audio/video) relevant to the task shows lack of understanding of the task purpose and audience shows minimal development of ideas 	<p>The student</p> <ul style="list-style-type: none"> demonstrates insufficient knowledge of the norms of the specific task types produces text with an inconsistent or inappropriate format and register fails to communicate ideas in an effective and convincing way 	<p>The answer</p> <ul style="list-style-type: none"> lacks coherence uses cohesive devices either insufficiently or inappropriately is either above or below the required word count 	<p>The answer</p> <ul style="list-style-type: none"> demonstrates minimal control over vocabulary and grammatical structures adequate to the required level uses language which is difficult to understand, due to errors in vocabulary and grammatical structures demonstrates inaccurate use of punctuation, spelling and capitalisation
0	A response at this level merely copies sentences from the text, is not connected to the task, or is blank.				

Independent Speaking

	General description	Content	Communicative achievement	Delivery	Language use
5	<p>The response fulfills the demands of the task with minor lapses of completeness.</p> <p>A response at this level is characterised by all of the following:</p>	<p>The answer</p> <ul style="list-style-type: none"> – addresses the task completely – shows an excellent understanding of the task purpose and the target audience – is logically and consistently organised 	<p>The student</p> <ul style="list-style-type: none"> – demonstrates comprehensive knowledge of the norms of the specific task type – uses an appropriate format and register throughout – communicates ideas in an effective and convincing way – constantly holds the target listeners' attention (monologue) or effectively interacts with a partner 	<p>The student</p> <ul style="list-style-type: none"> –demonstrates clear and natural pronunciation –uses intonation to convey the message effectively –demonstrates accurate use of sentence and word stress –shows no evident hesitations –purposefully applies a range of digital tools (if required) –demonstrates a strong ability to to design effective and appealing visuals (if required) 	<p>The answer</p> <ul style="list-style-type: none"> –demonstrates good control of varied grammatical structures and vocabulary adequate to the required level –contains minor errors which do not affect comprehension
4	Contains the features of 5 and 3				
3	<p>The response is connected to the task, though it misses some relevant information or contains inaccuracies.</p> <p>A response at this level is characterised by at least three of the following:</p>	<p>The answer</p> <ul style="list-style-type: none"> – mainly addresses the task – shows difficulties in understanding of the task purpose and the target audience – has some errors in logical organisation and consistency though they do not seriously interfere with communication of the message 	<p>The student</p> <ul style="list-style-type: none"> –demonstrates sufficient knowledge of the norms of the specific task type –uses mainly appropriate format and register –communicates ideas in a relatively effective and convincing way –mainly holds the target 	<p>The student</p> <ul style="list-style-type: none"> –demonstrates pronunciation which is mostly clear and natural –uses intonation which is sometimes effective to convey the message –uses sentence stress and word stress generally accurately maintains overall flow of speech 	<p>The answer</p> <ul style="list-style-type: none"> – demonstrates limited range of vocabulary and grammatical structures which the student is expected to produce at the required level – contains errors in vocabulary and grammar structures which do not hinder comprehension

			listeners' attention or interacts with a partner	despite some hesitations –purposefully applies an average number of digital tools (if required) –demonstrates an average ability to design effective and appealing visuals (if required)	
2	Contains the features of 3 and 1				
1	<p>The response is very limited in content or coherence or is only minimally connected to the task.</p> <p>A response at this level is characterised by at least three of the following:</p>	<p>The answer</p> <ul style="list-style-type: none"> – partially addresses the task – shows a lack of understanding of the task purpose and audience – is not logically organised and inconsistent 	<p>The student</p> <ul style="list-style-type: none"> – demonstrates insufficient knowledge of the norms of the specific task type – produces text with an inconsistent or inappropriate format and register – fails to communicate ideas in an effective and convincing way – fails to keep the target listeners' attention or communicate with a partner 	<p>The student</p> <ul style="list-style-type: none"> –demonstrates unclear pronunciation and/or inappropriate intonation which prevents clear understanding –fails to maintain overall flow of speech due to frequent hesitations which place strain on the listener –fails to apply digital tools (if required) –fails to design effective and appealing visuals (if required) 	<p>The answer</p> <ul style="list-style-type: none"> – demonstrates minimal control over vocabulary and grammatical structures adequate to the required level – uses language which is difficult to understand, due to errors in vocabulary and grammatical structures
0	Speaker makes no attempt to respond or response is unrelated to the task				

Independent Writing

	General description	Content	Communicative achievement	Organisation	Language use
5	<p>The response fulfills the demands of the task with minor lapses of completeness.</p> <p>A response at this level is characterised by all of the following:</p>	<p>The answer</p> <ul style="list-style-type: none"> – addresses the task completely – shows an excellent understanding of the task purpose and the target audience – presents a clear progression of ideas with appropriate detail – accurately labels the diagram (if required) 	<p>The student</p> <ul style="list-style-type: none"> – demonstrates comprehensive knowledge of the norms of the specific task type – uses an appropriate format and register throughout – communicates ideas in an effective and convincing way 	<p>The answer</p> <ul style="list-style-type: none"> – is coherent (logically and consistently organised, easy to understand) – uses a wide range of cohesive devices – meets word count requirements – fully complies with APA citation guidelines (if required) 	<p>The answer</p> <ul style="list-style-type: none"> – demonstrates good control of varied grammatical structures and vocabulary adequate to the required level – minor errors do not affect comprehension – demonstrates the accurate use of punctuation marks, spelling and capitalisation rules
4	Contains the features of 5 and 3				
3	<p>The response is connected to the task, though it misses some relevant information or contains inaccuracies.</p> <p>A response at this level is characterised by at least three of the following:</p>	<p>The answer</p> <ul style="list-style-type: none"> – mainly addresses the task – shows difficulties in understanding of the task purpose and the target audience – demonstrates limited development of ideas – adequately labels the diagram (if required) 	<p>The student</p> <ul style="list-style-type: none"> – demonstrates sufficient knowledge of the norms of the specific task type – uses mainly appropriate format and register – communicates ideas in a relatively effective and convincing way 	<p>The answer</p> <ul style="list-style-type: none"> – demonstrates limited coherence – uses some cohesive devices – meets the word count requirements – generally follows APA citation guidelines (if required) 	<p>The answer</p> <ul style="list-style-type: none"> – demonstrates limited range of vocabulary and grammatical structures which the student is expected to produce at the required level – contains errors in vocabulary and grammar structures which do not hinder comprehension – contains errors in punctuation, spelling and capitalisation
2	Contains the features of 3 and 1				

1	<p>The response is very limited in content or coherence or is only minimally connected to the task.</p> <p>A response at this level is characterised by at least three of the following:</p>	<p>The answer</p> <ul style="list-style-type: none"> – partially addresses the task – shows lack of understanding of the task purpose and audience – shows minimal development of ideas – fails to label the diagram (if required) 	<p>The student</p> <ul style="list-style-type: none"> – demonstrates insufficient knowledge of the norms of the specific task types – produces text with an inconsistent or inappropriate format and register – fails to communicate ideas in an effective and convincing way 	<p>The answer</p> <ul style="list-style-type: none"> – lacks coherence – uses cohesive devices either insufficiently or inappropriately – is either above or below the required word count – fails to adhere to APA citation guidelines (if required) 	<p>The answer</p> <ul style="list-style-type: none"> – demonstrates minimal control over vocabulary and grammatical structures adequate to the required level – uses language which is difficult to understand, due to errors in vocabulary and grammatical structures – demonstrates inaccurate use of punctuation, spelling and capitalisation
0	A response at this level merely copies sentences from the text, is not connected to the task, or is blank.				