

COURSE SYLLABUS

Higher Mathematics

Degree of higher education first (bachelor)

Specialty 161 Chemical technology and engineering, 162 Biotechnology and bioengineering, 226 Pharmacy, industrial pharmacy. 015.36 Vocational education (Technology of consumer goods manufacturing), 182 Consumer industry technologies.

Educational program Chemical technologies and engineering. Biotechnology. Industrial pharmacy. Technology of consumer goods manufacturing. Styling, design and artistic finishing of fashion industry products. Fashion industry.

Course status – compulsory.

Instructor (s) Department of Applied Physics and Higher Mathematics: Nesterenko O. B., Head of the Department, Cand. Phys.-Math. Sci., Assoc. Prof.

1. Course description

Semester(s): 1.

Scope: total number of hours – 180, including: lectures – 24 hours, practical – 36 hours, independent work – 120 hours; number of ECTS credits – 6.

Course objectives – mastering competencies: ability to make reasonable decisions; ability for abstract thinking, analysis and synthesis; ability to learn and master modern knowledge; ability to apply knowledge and understanding of mathematics to solve qualitative and quantitative problems in professional activities; ability to solve complex specialized problems and practical problems characterized by complexity and uncertainty of conditions; ability to search, process and analyze information from various sources; ability to apply knowledge in practical situations; ability to use knowledge of mathematics and physics to the extent necessary to achieve other results of the educational program.

Learning outcomes of the course:

know: theoretical essentials of the fundamental sections of mathematics and practical methods of solving problems at the level necessary to achieve the results of the educational program;

be able: apply modern mathematical methods to solve practical problems in the chosen profession; use the acquired knowledge and skills for calculations, display and modeling of systems and processes in professional activities, processing of experimental data;

able to demonstrate: ability to apply mathematical methods, computational skills, and abilities in practical situations; readiness to read and interpret information presented in various forms (tables, graphs, diagrams);

have the skills: use of information and communication technologies in solving applied problems; stimulation of cognitive interest, motivation to study, professional self-determination and self-development in professional activity;

solve independently: applied tasks in professional activity, bringing up to practical result (formulas, numbers, graphs, qualitative conclusion) with the use, if necessary, of information and communication technologies.

Required educational components (prerequisites, co-requisites, post-requisites): information systems and technologies.

Course content: **Topic 1.** Determinants. Matrices. Systems of linear equations. **Topic 2.** Vectors. Scalar and vector product of vectors. **Topic 3.** Lines on a plane. **Topic 4.** Straight line and a plane in a space. Surfaces of the second order. **Topic 5.** Sets. Functions. Limit and continuity of a function. **Topic 6.** Derivatives of functions. Application of derivatives to the study of functions. **Topic 7.** Functions of several variables and their differentiation. Some applications of partial derivatives. **Topic 8.** Indefinite integral. **Topic 9.** Definite integral. Application of a definite integral. **Topic 10.** Differential equations of the first order. **Topic 11.** Differential equations of the higher order. Systems of differential equations. **Topic 12.** Series.

Forms of final control: exam (semester 1).

Tools for diagnosing learning success: individual tasks, namely: presentations, tasks, tests, questions for current and final control.

Language of instruction: Ukrainian

2. Assessment

Distribution of points received by applicants for higher education

Exam

Ongoing assessment and independent work												Presentations	MC	Exam	Total
T 1	T 2	T 3	T 4	T 5	T 6	T 7	T 8	T 9	T 10	T 11	T 12				
6	6	5	5	6	6	6	6	6	6	6	6	10	10	10	100

Distribution of points in the course

Activities evaluated in points	T 1	T 2	T 3	T 4	T 5	T 6	T 7	T 8	T 9	T 10	T 11	T 12	Total
Individual tasks	4	4	3	3	4	4	4	4	4	4	4	4	46
Ongoing (theoretical) control	1	1	1	1	1	1	1	1	1	1	1	1	12
Activity in class (lecture, practical)	1	1	1	1	1	1	1	1	1	1	1	1	12
Presentations	10												10
Modular control (MC) (test)	10												10
Exam	10												10
Total in the course													100

Exam evaluation criteria

The exam consists of 5 tasks, 2 of which are theoretical questions, and other 3 – are practical problems (2 points for each task).

Types of evaluation	Total
Knowledge of theoretical material	4
Solving applied problems	6
Total	10

Compliance with the scales for assessing the quality of learning material

Score on the national scale	Points	Assessment on the ECTS scale	Definition
excellent / passed	90-100	A	Excellent (outstanding performance without errors)
good / passed	82-89	B	Very good (above the average standard but with minor errors)
	74-81	C	Good (generally sound work with some errors)
satisfactory / passed	64-73	D	Satisfactory (fair but with significant shortcomings)
	60-63	E	Fair (performance meets the minimum criteria)
unsatisfactory / failed	35-59	FX	Fail (some more work required before the credit can be awarded)
	0-34	F	Fail (considerable further work is required)

3. Course policy:

3.1. Attendance is mandatory as an important part of the educational process.

3.2. Missed classes (for valid reasons / without valid reasons) should be completed in extracurricular time.

3.3. For each performed control, individual work, current (theoretical) control, test and activity in the class the number of points is obtained, according to the table of distribution of points. To obtain a positive assessment, you must obtain at least 60 percent of the maximum number of points for each type of work.

3.4. Cheating during tests and exams are prohibited (including using mobile devices).

3.5. Mobile devices are allowed to be used only when performing calculations of practical tasks.

3.6. When plagiarism is detected, the work is not evaluated, but must be repeated with a change of tasks.

3.7. All tasks provided by the program must be completed on time. In case of untimely performance of work without valid reasons, the score will be reduced.

3.8. Postponement of delivery / retransmission for valid reasons (hospital, academic mobility, etc.) will not affect the assessment.

3.9. Unsatisfactory grades received by the student during the semester must be retaken one week before the final control.

3.10. The student can increase the final scores for the semester on the exam. Only students who have scored at least 60 points during the semester are allowed to take the exam.

3.11. Students receive additional points for scientific work and participation in competitions.

3.12. Recognition of learning outcomes obtained in non-formal education using a factor of 0.1 of the total number of hours specified in the certificate or other document is allowed.

3.13. Compliance to the academic integrity by students is obligatory, namely:

- independent performance of all types of works, tasks, forms of control provided by the working program of the discipline "Higher Mathematics";
- references to sources of information in use of ideas, creations, statements, information,
- compliance with copyright and related rights;
- providing reliable information about the results of their own educational (scientific) activities, used research methods and sources of information.