

**List of courses in foreign languages at State University “Uzhhorod National University”
in academic year 2015-2016**

Subject areas: Natural Sciences, Mathematics, Physics, Informatics

№	Courses	Course content	Lecturer	ECTS	Total hours	Contact hours	Individual work
1.	Algebra	Sets, maps, complex numbers, systems of linear equations, matrices, determinants, n -dimensional vector space, rank of matrix, polynomials, roots of polynomial, irreducible polynomials,	Ph Dr. Ihor Shapochka, Assoc. Prof., Head of the Department of Algebra	5	180	80	100
2.	Linear Algebra	Linear spaces, quotient space, linear maps, basis of linear space, linear operators, eigenvalues and eigenvectors, Jordan normal form of matrix, Euclidian spaces, orthogonal and symmetric operators, quadratic forms.	Ph Dr. Ihor Shapochka, Assoc. Prof., Head of the Department of Algebra	5	180	74	106
3.	Representation Theory	Matrix representation of finite group, modules, irreducible and indecomposable representations, characters of group, induce representation.	Ph Dr. Ihor Shapochka, Assoc. Prof., Head of the Department of Algebra	3	90	50	40
4.	Analytical geometry	Vector algebra, lines on plane, lines in space, planes in space, canonical theory of curves of second order, general theory of curves of second order, canonical theory of surfaces of second order, geometrical transformations.	Ph Dr. Oleksandr Tylyshchak, Assistant Professor, Department of Algebra	7	210	134	76
5.	Group theory	Groups, subgroups, homomorphism of groups, finite groups, free groups, normal rows of groups, nilpotent groups, solvable	Ph Dr. Oleksandr Tylyshchak, Assistant Professor,	3	90	74	16

		groups.	Department of Algebra				
6.	Theoretical Mechanics	Classical (Newton) mechanics, kinematics and dynamics of a material point, kinematics and dynamics of mechanical systems and solids, analytical mechanics, relativistic mechanics	Ph Dr. Oleksandr Reity, Assoc. Prof., Department of Differential Equations and Mathematical Physics	5	180	80	100
7.	Asymptotic Methods for Ordinary and Partial Differential Equations	Regular and singular perturbations for linear ODEs, classical asymptotic methods (the Poincaré–Lindstedt method, Bogolyubov-Krylov method, slow variables method etc.), perturbation theory, WKB method, etalon equation method, boundary layer method. Applications of asymptotic method in classical physics, mathematical physics, quantum mechanics	Ph Dr. Oleksandr Reity, Assoc. Prof., Department of Differential Equations and Mathematical Physics	3	90	50	40
8.	Higher Mathematics	Elements of linear algebra, mathematical analysis, differential equations, probability theory combine in one course which are necessary to understanding of applied of mathematics in other sciences	Ph Dr. Oleksandr Pogoriliak, Assoc. Prof., Department of Probability Theory and Mathematical Analysis	5	180	50	130
9.	Probability Theory and Mathematical Statistics	Different equations of probability, Bernoulli scheme, random variable and its distribution, numerical characteristics of random variables(mean, variance, covariation), sampling and their characteristics, statistical estimations of distribution parameters, hypothesis testing	Ph Dr. Oleksandr Pogoriliak, Assoc. Prof., Department of Probability Theory and Mathematical Analysis	4	120	40	80
10.	Mathematical Analysis	This is the fundamental mathematical science that includes theories of limits, differentiation and integration of one	Ph Dr. Oleksandr Pogoriliak, Assoc. Prof., Department of	8	240	70	170

		variable functions and its applied, infinite numerical and functional series, differentiation of several variables functions, multiple integration	Probability Theory and Mathematical Analysis				
11.	Optimization Methods	The principal algorithms for linear, network, discrete, nonlinear, dynamic optimization and optimal control. Emphasis is on methodology and the underlying mathematical structures.	Ph Dr. Andrii Bryla, Assistant Prof., Department of Systems Analysis and Optimization	3	108	60	48
12.	Mathematical models in the natural, social and economic sciences	Introduction to the basics of mathematical modeling emphasizing model construction, analysis and application. Using examples from a variety of fields such as physics, biology, chemistry and economics, students will learn how to develop and use mathematical models of real-world systems.	Ph Dr. Andrii Bryla, Assistant Prof., Department of Systems Analysis and Optimization	1	36	24	12
13.	Informatics, modern information systems and technologies	The foundational Informatics concepts such as Information, Knowledge, Modeling. Basics of Information Theory. Solving real problems with information technologies. Using informatics tools in various human domains.	Ph Dr. Andrii Bryla, Assistant Prof., Department of Systems Analysis and Optimization	3,5	105	52	53
14.	Programming (Intro to Programming, C#).	Intro to Programming. Introduction to Algorithms. Object-oriented Programming. Data Structures. The course uses the C# programming language.	Ph Dr. Andrii Bryla, Assistant Prof., Department of Systems Analysis and Optimization	8	288	144	144
15.	The architecture of PC and networks	PC, the history of development, principles of storage and transfer information, the hardware and software parts, the main devices and their characteristics. The main and peripheral devices and their characteristics, computer networks and	Pavlo Mulesa, senior lecturer of the Department of Cybernetics and Applied Mathematics	4	144	72	72

		their topology.					
16.	Special software for operating system protection	System, applied and tool software, operating systems, classification of malware, the history of development, potential targets and the ways to protect them, methods of counteracting the malware, methods of counteracting the malicious network technologies, data security procedures.	Pavlo Mulesa, senior lecturer of the Department of Cybernetics and Applied Mathematics	1,5	54	28	26
17.	Higher mathematics	This course includes elements of linear and vector algebra, analytic geometry, mathematical analysis, the theory of series and the theory of differential equations.	Ph Dr. Vasyl V. Rubish, Assoc. Prof. (lecturer), Department of theoretical physics	22,5	810	384	426
18.	Thermodynamics and statistical physics	Course includes basic statistical and thermodynamical (phenomenological) description methods of the properties of equilibrium and non-equilibrium states of macroscopic systems.	Ph Dr. Vasyl V. Rubish, Assoc. Prof. (lecturer), Department of theoretical physics	8	288	116	172
19.	Quantum Mechanics	Basic principles of quantum mechanics, non-relativistic theory. Introduction to relativistic quantum theory.	Ph Dr. Vasyl V. Rubish, Assoc. Prof. (lecturer), Department of theoretical physics	8	288	136	152
20.	Group theory in molecular physics	Course includes application of the point group and nuclear permutation group for the problems of molecular physics.	Ph D. Mykhaylo V. Khoma, Assoc. Prof. (lecturer), Department of theoretical physics	2,5	90	40	50

21.	Thermodynamics and statistical physics	Course includes basic statistical and thermodynamical (phenomenological) description methods of the properties of equilibrium and non-equilibrium states of macroscopic systems.	Ph D. Mykhaylo V. Khoma, Assoc. Prof. (lecturer), Department of theoretical physics	8	288	116	172
22.	Quantum Mechanics	Basic principles of quantum mechanics, non-relativistic theory. Introduction to relativistic quantum theory.	Ph D. Mykhaylo V. Khoma, Assoc. Prof. (lecturer), Department of theoretical physics	8	288	136	152
23.	Higher mathematics	This course includes elements of linear and vector algebra, analytic geometry, mathematical analysis, the theory of series and the theory of differential equations.	Oleksandr M. Karbovanets, Senior Lecturer, Department of theoretical physics	22,5	810	384	426
24.	Theoretical Mechanics	The course is devoted to a systematic study of theoretical mechanics and fundamentals of continuum mechanics: fundamental concepts and laws of Newtonian mechanics, as well as the Lagrange, Hamilton and Hamilton-Jacobi formalism.	Oleksandr M. Karbovanets, Senior Lecturer, Department of theoretical physics	7	252	112	140
25.	Electrodynamics and the Field Theory	The course presents the electromagnetic field theory, the theory of field-matter interaction, and connections between electrical and magnetic phenomena.	Robert R. Lompay, Senior Lecturer, Department of theoretical physics	5	180	112	68
26.	Introduction to Computer Science Programming in Python	Introduction to computer science and programming for students with little or no programming experience. Students develop skills to program and use computational techniques to solve problems. Topics	PhD. Oksana Mulesa, Assoc. Prof., Department of Cybernetics and Applied	5	180	50	130

		include the notion of computation, Python, simple algorithms and data structures, testing and debugging, and algorithmic complexity.	Mathematics				
27.	Introduction to Algorithms	Introduction to mathematical modeling of computational problems, as well as common algorithms, algorithmic paradigms, and data structures used to solve these problems. Emphasizes the relationship between algorithms and programming, and introduces basic performance measures and analysis techniques for these problems.	PhD. Oksana Mulesa, Assoc. Prof., Department of Cybernetics and Applied Mathematics	5	180	50	130
28.	Math for Computer Science	Elementary discrete mathematics for computer science and engineering. Emphasis on mathematical definitions and proofs as well as on applicable methods. Topics: formal logic notation, proof methods; induction, well-ordering; sets, relations; elementary graph theory; integer congruences; asymptotic notation and growth of functions; permutations and combinations, counting principles; discrete probability.	PhD. Oksana Mulesa, Assoc. Prof., Department of Cybernetics and Applied Mathematics	5	180	50	130
29.	Design and Analysis of Algorithms	Techniques for the design and analysis of efficient algorithms, emphasizing methods useful in practice. Topics include sorting; search trees, heaps, and hashing; divide-and-conquer; dynamic programming; greedy algorithms; amortized analysis; graph algorithms; and shortest paths. Advanced topics may include network flow; computational geometry; number-theoretic algorithms; polynomial and	PhD. Oksana Mulesa, Assoc. Prof., Department of Cybernetics and Applied Mathematics	5	180	50	130

		matrix calculations; caching; and parallel computing.					
30.	Database and Internet Technologies	Fundamentals of Information technology; relational databases and SQL; internet technologies: using XML, JavaScript, JQuery, PHP.	PhD. Oksana Mulesa, Assoc. Prof., Department of Cybernetics and Applied Mathematics	5	180	50	130