



COURSE UNIT (MODULE) DESCRIPTION

Course unit (module) title	Code
Logic	

Lecturer(s)	Department(s) where the course unit (module) is delivered
Coordinator: dr. Mindaugas Gilaitis	Faculty of Philosophy, Universiteto st. 9, Vilnius
Other(s): dr. Monika Morkūnaitė	

Study cycle	Type of the course unit (module)
First (Bachelor)	Optional

Mode of delivery	Period when the course unit (module) is delivered	Language(s) of instruction
Face-to-face	Spring semester	English

Prerequisites
None

Course (module) volume in credits	Total student's workload	Contact hours	Self-study hours
5	130	48	82

Purpose of the course unit (module): programme competences to be developed		
The course aims at introducing students to theoretical basics of logic, the principal methods of logical analysis and their application, to develop students' skills of critical and analytical thinking, to enhance their ability of structured and consistent thought, to train the ability to recognize types of arguments and critically reflect the arguments of the opponents.		
Learning outcomes of the course unit (module)	Teaching and learning methods	Assessment methods
Students will master the principal logical laws and inference rules. They will become familiar with the basic levels and methods of logical analysis.	Interactive lectures, study of literature.	Midterm and final test (closed-ended theory questions and problems of logical analysis).
Students will be able to understand the toolkit of logical analysis and will be able to recognize the logical structure of expressions of natural language.	Interactive lectures, reading of texts, exercises of application of logical grammar and formalization of logical structure of natural language.	
Students will be able to evaluate logical validity of arguments and proofs of various levels of complexity. They will also be able to recognize formal and informal fallacies within arguments and proofs. They will be able to evaluate consistency and prove inconsistency of systems of propositions (descriptions, sets of premises of arguments or proofs).	Interactive lectures, reading of texts, exercises of logical analysis.	

Course content: breakdown of the topics	Contact hours			Individual work: time and assignments		
	Lectures	Seminars	Total contact hours	Individual work	Assignments	
					Reading (No. in the reading list):	Exercises (No. in the reading list):
1. The object of logic. Arguments and their logical structure. Enthymeme. Proofs and arguments. Types of arguments: deductive and inductive. Factual and logical truths.	2		2	4	<u>1:</u> 1-18 <u>2:</u> 1-75 <u>3:</u> 1-61	<u>1:</u> 18-20 <u>2:</u> 1.1-1.6 <u>3:</u> 1.1-1.4
2. Formal logic. The notion of logical form. Logical operator. Method of formalization. Fundamental logical relations. Theory of sets. Set-theoretic relationships. Types of definitions and basic rules of a definition.	2	1	3	4	<u>2:</u> 76-116 <u>3:</u> 109-139	<u>2:</u> 2.1-2.5 <u>3:</u> 3.1-3.3
3. Categorical statements. Types of categorical statements, their structure, distribution of terms. Square of opposition. Immediate inferences from categorical statements: obversion, conversion, contraposition.	2	1	3	5	<u>1:</u> 225-245 <u>2:</u> 199-252 <u>3:</u> 197-216	<u>1:</u> 245-249 <u>2:</u> 4.1-4.7 <u>3:</u> 5.1-5.3
4. Simple categorical syllogisms, their structure (moods and figures). Rules of categorical syllogism. Venn diagrams for testing validity of categorical syllogisms.	2	1	3	5	<u>1:</u> 393-397 <u>2:</u> 253-300 <u>3:</u> 223-273	<u>1:</u> 397 <u>2:</u> 5.1-5.7 <u>3:</u> 6.1-6.5
5. Propositional logic: simple and compound propositions. Truth-functional propositional connectives: negation, conjunction, disjunction, material conditional and biconditional. Types of truth-functional compounds.	2	1	3	5	<u>1:</u> 21-49 <u>2:</u> 301-363 <u>3:</u> 277-308	<u>1:</u> 31, 49 <u>2:</u> 6.1-6.6 <u>3:</u> 7.1-7.2
6. Formalizing sentences of natural language in propositional logic.	2	1	3	5	<u>1:</u> 51-69	<u>1:</u> 69-73
7. Properties of deductive argument. Validity and soundness. Analyzing deductive arguments in propositional logic. Truth table method. Short truth table method for proving invalidity.	2	1	3	4	<u>1:</u> 33-49 <u>3:</u> 308-340	<u>1:</u> 49-50 <u>2:</u> 6.6 <u>3:</u> 7.3-7.5
8. Basic laws of natural deduction. Inference rules. Validity proofs by derivation.	2	1	3	5	<u>1:</u> 113-138 <u>2:</u> 364-370 <u>3:</u> 345-361	<u>1:</u> 139-146 <u>2:</u> 7.1-7.2 <u>3:</u> 8.1
9. Replacement rules. Validity proofs by natural deduction using inference rules and replacement rules.	2	2	4	5	<u>1:</u> 147-168 <u>2:</u> 374-380, 395-400 <u>3:</u> 375-377, 381-385	<u>1:</u> 168-174 <u>2:</u> 7.3-7.4 <u>3:</u> 8.2-8.3
10. Proving inconsistency by natural deduction. Conditional proof and indirect proof for validity.	4	2	6	6	<u>1:</u> 175-195 <u>2:</u> 405-407, 410-414 <u>3:</u> 392-398, 401-407	<u>1:</u> 195-199. <u>2:</u> 7.5-7.6. <u>3:</u> 8.5-8.6.
11. Formalizing sentences of natural language in predicate logic.	2	1	3	5	<u>1:</u> 201-267	<u>1:</u> 269-272
12. Predicate logic. Propositional function, universal and existential quantification. Rules for quantifier negation.	2	1	3	5	<u>2:</u> 420-428 <u>3:</u> 419-445	<u>2:</u> 8.1-8.3 <u>3:</u> 9.1
13. Quantifiers and finite universe. Proving invalidity in predicate logic. Validity proofs in predicate logic: natural deduction, conditional proof and indirect proof.	2	2	4	6	<u>1:</u> 273-311 <u>2:</u> 445-458 <u>3:</u> 435-469	<u>1:</u> 311-312 <u>2:</u> 8.4-8.5 <u>3:</u> 9.2-9.4
14. Informal criteria of rational argumentation and reasoning. Main types of informal fallacies.	4	1	5	4	<u>2:</u> 118-198 <u>3:</u> 147-188	<u>3:</u> 4.1-4.3
15. Preparation for mid-term and final exams.				14		
Total	32	16	48	82		

Assessment strategy	Weight, %	Deadline	Assessment criteria
Participation in the seminars	5 %	During the semester	5 % – participates actively, solves problems, raises questions, provides critical comments. 0 % – participates passively or is absent.
Mid-term test	35 %	Eighth week of semester	Midterm test consists of one multiple choice question and four problems of logical analysis. Correct solution of all 5 tasks earns 35 %, 4 tasks – 30 %, 3 tasks – 20 %, 2 tasks – 10 %, less than 2 tasks – 0 %.
Final test	60 %	June	Final test consists of one multiple choice question and six problems of logical analysis. Correct solution of all 7 tasks earns 60 %, 6 tasks – 50 %, 5 tasks – 40 %, 4 tasks – 30 %, 3 tasks – 20 %, 2 tasks – 10 %, less than 2 tasks – 0 %.

No.	Author	Publishing year	Title	Issue No or volume	Publishing house or Internet site
Required reading					
<u>1.</u>	Klenk, V.	2011	Understanding Symbolic Logic		Prentice Hall.
<u>2.</u>	Hurley, P.	2000	A Concise Introduction to Logic. 7 th Ed.		Cengage Learning.
<u>3.</u>	Howard-Snyder F., Howard-Snyder D., Wasserman R.	2009	The Power of Logic. 4 th Ed.		McGraw-Hill Education.
Optional reading					
4.	Copi, I. M., Cohen, C., McMahon, K.	2010	Introduction to Logic.		New Jersey: Prentice Hall.
5.	Simpson, R. L.	2008	Essentials of Symbolic Logic.		Peterborough: Broadview Press.
6.	Cannon, D.	2003	Deductive Logic in Natural Language.		Peterborough: Broadview Press.