DESCRIPTION OF THE SUBJECT (MODULE) OF STUDY

Course unit (module) title	Code
Matematics veiled (Business Mathematics and Quantitative Management Solutions 5 cr., Accounting 5 cr.)	

Lecturer(s)	Department(s) where the course unit (module) is delivered
Coordinating: asist. Dr. Vaiva Petrylė **Kitas (-i): lect. Vitalija Razgienė**	Business School, Saulėtekio al. 22, Vilnius

Cycle of studies	Subject (module) type
First	Compulsory

Form of implementation	Execution period	Language(s) of execution
Auditory	Spring semester	English

Requirements for the student	
Preliminary requirements: School knowledge of mathematics Excel primers	**Related requirements (if any):** Microeconomics Macroeconomics

Scope of the subject (module) in credits	Full student workload	Contact hours	Self-employment hours
10	260	100	160

Purpose of the course unit (module): programme competences to be developed		
The purpose of the module is to develop students' abilities to apply the acquired knowledge of business mathematics, quantitative management decisions and accounting to the analysis of business management and economic problems and the adoption of managerial decisions.		
Learning outcomes of the course unit (module)	**Teaching and learning methods**	**Assessment methods**
Know the supporting concepts and methods of linear algebra, population theory, mathematical analysis and financial mathematics and understand the meaning and meaning of their application to the analysis and solution of business and economic problems	Lecture, problematic teaching, study of literature, independent solution of tasks.	Tasks for independent work, intermediate settlement, exam.
Will be able to perform operations with matrices and populations, identify the analytical expression of a linear function, find the derivatives of a multi-variable function, optimize the function (without restrictions and with them), calculate interest and the basic return of investments		
They will be able to write down (formalize) business and economic problems in mathematics, properly select and apply standard mathematical methods for solving them, and interpret the results obtained.		
Will be able to clearly define the needs of financial information, use data sources, independently find,		Independent work in a virtual learning environment,

accumulate, interpret and systematize the necessary information.	Lecture, problematic teaching, study of literature, independent solution of tasks.	intermediate settlement, case study.
Will understand the essential aspects, principles and methods of business process accounting policy taking place in the organization, will know the requirements and methods of providing accounting information to external and internal users, and will be able to evaluate the information provided in the financial statements.		
Will understand the principles of registration of operations in accounting, will be able to independently make decisions on the assessment of operations and management of the enterprise, guided by the provisions of professional ethics.		

Content: breakdown of the topics	**Contact hours**							**Self-study work: time and assignments**	
	Lectures	Tutorials	Seminars	Exercises	Laboratory work	Internship/work	**Contact hours**	**Self-study hours**	**Assignments**
1. Business Mathematics 5 cr.	**32**	**2**		**16**			**50**	**80**	Studying literature, independently solving problem tasks and their presentation, intermediate settlement, exam.
The basics of logic and the theory of sets and their applications.	2			1			3	3	
Linear equations and their systems. Ways to solve linear equations.	2			1			3	5	
Vectors. The concept of the vector and actions with them.	2			1			3	3	
Matrix. Their concept, concepts and basic actions with matrices.	2			1			3	5	
Inverse matrix and determinant. Cramer's rule. The application of matrix algebra to solve the tasks of economic equilibrium.	6			2			8	9	
Leontyev's input-output model. Leontyev's matrix and its application for the analysis of economic processes.	2			1			3	6	
Features. The concept and expressions of the function. Determination of the analytical expression of a linear function. Finding a "tipping point".	2			1			3	3	
Function boundary, uniformity, extremums and critical points. Derivatives and their calculation.	2			1			3	8	
Optimization of the single-variable function without restrictions. Application for the search for optimal business and economic solutions.	2			2			4	8	
Functions of several variables. Partial derivatives. Optimization of multi-variable functions without restrictions. Application for the search for optimal business and economic solutions.	2			2			4	12	
Optimization with limitations: Lagrange's method of multipliers.	4			1			6	10	
Basics of integration	2			1			2	4	
Introduction to Financial Mathematics	2			1			3	4	
Consultations		2					2		
2. Accounting for 5 kr.	**32**	**2**		**16**			**50**	**80**	

Information on accounting and its users, the international and national regulation of financial accounting.	2						2	5	Independent study of supplementary material; case study; problem solving, performance of tasks on e.Learning system. Preparation for Assignment 1.
The fundamental equation of accounting, the classification of company assets, equity capital, and liabilities, the recognition and types of revenue and expenses.	8			2			10	14	
The elements of the accountancy method and the accounting cycle.	10	1		3			14	12	
The principles of accounting of long-term asset purchases, depreciation (amortisation) and writing-off.	2			3			5	14	
Basic methods of the accounting and costing of inventories (stock). The principles of the accounting of purchasing and consumption of inventories.	2			3			5	9	
The basics of accounting of revenue and expenses, equity and liabilities.	4	1		3			8	18	
The set and content of financial statements. Principles of preparation of main financial statements (balance sheet, profit (loss) account).	4			2			6	8	
Information on accounting and its users, the international and national regulation of financial accounting.	2						2	5	
The fundamental equation of accounting, the classification of company assets, equity capital, and liabilities, the recognition and types of revenue and expenses.	8			2			10	14	
Total	**64**	**4**	**32**				**100**	**160**	

Assessment strategy	**Weight,%**	**Deadline**	**Assessment criteria**
The module is considered passed if both components of the module (accounting and business mathematics) are passed. If at least one part of the module is not passed, the module is considered failed, and the grade of the failed part of the module is recorded for the student. If both parts of the module are passed (or failed), 50% of the student's final grade will be made up of the business mathematics part and 50% of the accounting part. It is not possible to retake the exam externally.			
Principles for calculating the assessment of the part of Business Mathematics			
Work during Business Mathematics seminars	7,5 %	During the semester	100 - the student at least once a semester during the seminar came to the board, correctly solved and explained the task of independent work or their set 0 - the student did not come to the board during the seminars or solved it incorrectly or was not able to explain the task
Intermediate assignment of Business Mathematics	20 %	In the middle of the semester	Students are provided with a set of tasks, all of which, if correctly solved, can score a total of 100 points. The student receives as many points as he is able to score. In the interim settlement, the stunts are given tasks for the application of various types of theory from the topics outlined before. Students who for any reason do not write an interim settlement will not be able to (re)write it next time, except for those who have missed the settlement due to illness, who have given advance notice from those who have submitted documents confirming this.
Final assessment of Business Mathematics part	22,5 %	At the end of the semester	Students are provided with a set of tasks, all of which, if correctly solved, can score a total of 100 points. The student receives as many points as he is able to score. The exam presents tasks for the application of various types of theory from all the topics outlined during the semester.

<table>
<tr><td></td><td></td><td></td><td>The total score of the part of business mathematics is calculated by the formula:
Score in business mathematics = score during work seminars * 0.15 + intermediate settlement score1 * 0.4 + exam score * 0.45.
The final assessment of the part of business mathematics is written from the score in business mathematics on the following principle:
95,00 - 10
85,00 – 94,99 - 9
75,00 – 84,99 - 8
65,00 – 74,99 - 7
55,00 – 64,99 - 6
50,00 – 54,99 - 5
< 50,00 – <= 4.</td></tr>
<tr><td>Principles for calculating the valuation of the accounting part</td><td></td><td></td><td></td></tr>
<tr><td>The Midterm 1</td><td>10</td><td>During the semester</td><td>The test consists of 10 open-ended and closed-ended questions.
The assessment system of Midterm 1 is presented in the table below:<table><tr><th>The number of the answered questions</th><th>Value of test questions in points</th></tr><tr><td>10</td><td>1,0</td></tr><tr><td>9</td><td>0,9</td></tr><tr><td>8</td><td>0,8</td></tr><tr><td>7</td><td>0,7</td></tr><tr><td>6</td><td>0,6</td></tr><tr><td>5</td><td>0,5</td></tr><tr><td>4</td><td>0,4</td></tr><tr><td>3</td><td>0,3</td></tr><tr><td>2</td><td>0,2</td></tr><tr><td>1</td><td>0,1</td></tr><tr><td>0</td><td>0,0</td></tr></table></td></tr>
<tr><td>The Midterm 2</td><td>10</td><td>During the semester</td><td>The test consists of 10 open-ended and closed-ended questions.
The assessment system of Midterm 2 is presented in the table below:<table><tr><th>The number of the answered questions</th><th>Value of test questions in points</th></tr><tr><td>10</td><td>1,0</td></tr><tr><td>9</td><td>0,9</td></tr><tr><td>8</td><td>0,8</td></tr><tr><td>7</td><td>0,7</td></tr><tr><td>6</td><td>0,6</td></tr><tr><td>5</td><td>0,5</td></tr><tr><td>4</td><td>0,4</td></tr><tr><td>3</td><td>0,3</td></tr><tr><td>2</td><td>0,2</td></tr><tr><td>1</td><td>0,1</td></tr><tr><td>0</td><td>0,0</td></tr></table></td></tr>
<tr><td>Work in the classroom, solution of tasks/exercises/tests for lectures on e.Learning system</td><td>10</td><td>During the semester</td><td>Excellent: active participation in discussions, formulation of problems and questions, provision of critical comments, being the first to solve problems, provision of possible ways of the problem or situation solution, assistance to others, solution of 90-100 % tasks/exercises/tests for lectures on e.Learning system (assessed by 0,9-1 point).</td></tr>
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<tr><td></td><td></td><td></td><td>Very good/good: active participation in discussions, independent problem solution, the ability to analyse and compare, answering to the questions, solution of 70-80 % of tasks/exercises/tests for lectures on e.Learning system (assessed by 0,7-0,8 points).
Fair: independent problem solution, answering to some of the questions when encouraged by teacher, solution of 50-60 % of tasks/exercises/tests for lectures on e.Learning system (assessed by 0,5-0,6 points).
Satisfactory/poor: problem solution merely with the assistance of teacher or peers, answers to the questions abound in (essential) errors, avoidance of participation in discussions solution of 30-40 % of tasks/exercises/tests for lectures on e.Learning system (assessed by 0,3-0,4 points).
Unsatisfactory: failure to complete teacher-assigned tasks or their completion with the help from aside, non-active, and missing over a half of the seminars and classes, solution of 10-20 % of tasks/exercises/tests for lectures on e.Learning system (assessed by 0,1-0,2 points).
Very bad: failure to complete teacher-assigned tasks (assessed by zero points).</td></tr>
<tr><td>Final assessment of Accounting part</td><td>20</td><td>During the examination period</td><td>An assignment on the registration of transactions, and information summarisation in the form of a test. The test consists of 10 questions.
<table>
<tr><td colspan="2">The assessment system of the exam is presented in the table below:</td></tr>
<tr><td>The number of the answered questions</td><td>Value of test questions in points</td></tr>
<tr><td>10</td><td>2,0</td></tr>
<tr><td>9</td><td>1,8</td></tr>
<tr><td>8</td><td>1,6</td></tr>
<tr><td>7</td><td>1,4</td></tr>
<tr><td>6</td><td>1,2</td></tr>
<tr><td>5</td><td>1,0</td></tr>
<tr><td>4</td><td>0,8</td></tr>
<tr><td>3</td><td>0,6</td></tr>
<tr><td>2</td><td>0,4</td></tr>
<tr><td>1</td><td>0,2</td></tr>
<tr><td>0</td><td>0,0</td></tr>
</table></td></tr>
</table>

Author	**Year of authorisation**	**Title**	**Periodical No. or the volume of the publication**	**Place of publication and publishing house or web link**
Mandatory literature				
James, I.	2018	Mathematics for Economics and Business	9th ed.	Pearson
A. Hops, S. Stungurienė	2012	Business and management mathematics		Vilnius, VU TVM
Stungurienė, S.	2007	Business mathematics		Vilnius, TEV
Downer H., Annand D.	2019	Introduction to Financial Accounting		https://lifa1.lyryx.com/textbooks/ANNAND_1/marketing/DauderisAnnand-IntroFinAcct-2019A.pdf
Authors' collective	2015	Basics of accounting and auditing		http://talpykla.elaba.lt/elaba-fedora/objects/elaba:8215364/datastreams/MAIN/content
Further reading				

Bradley, T.	2018	Essential Mathematics for Economics and Business		John Wiley and Sons Ltd.
Authors' collective	2021	Financial statements: Compilation, approval and publication		Patiol