

<b>Course title</b>	<b>Mathematical models in economics</b>
<b>Course code</b>	Mate3012
<b>Branch of science</b>	Mathematics
<b>Science sub-sector</b>	Mathematical modelling
<b>Credit points</b>	2
<b>ECTS credits</b>	3
<b>Total contact hours</b>	32
Number of lectures	16
Seminars and practical work hours	16

<b>Course developer(s)</b>
Dr.paed., docents Vitolds Gedroics

<b>Prior knowledge (title of the course, part of the program where the course to learn)</b>
Mate1009, Mate1012, Mate2003.

<b>Course summary</b>
The course is designed for Bachelor's study program "Mathematics" students. The course aims to acquaint students with the usage of differential and integral calculus for analyzing mathematical models in economics.

<b>Results</b>
<ul style="list-style-type: none"> <li>• be able to analyze the simplest economic processes;</li> <li>• be able to calculate, analyze un graphically display relationships; □ be able to create, solve and analyze mathematical models.</li> </ul>

<b>Course content</b>
Lectures – 16 contact hours, seminars – 16 contact hours
Simple and compound interest. Savings. Discounting. Annuity. Loan cancellation. Index of profit margin. Supply and demand functions. Equilibrium. Cost, income and profit functions. Average and marginal quantities. Elasticity of a function and its economical interpretation. Economics applications of the integral. Consumer and producer acquisition. Relative extrema of a function of two variables. Minimization of production costs and profit maximization.

<b>Course plan</b>
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Lectures – 16 contact hours, seminars – 16 contact hours

**Lecture topics:**

1. Simple and compound interest. Savings. Discounting. Annuity.
2. Loan cancellation. Index of profit margin.
3. Supply and demand functions. Equilibrium.
4. Cost, income and profit functions.
5. Average and marginal quantities.
6. Elasticity of a function and its economical interpretation.
7. Economics applications of the integral. Consumer and producer acquisition.
8. Relative extrema of a function of two variables. Minimization of production costs and profit maximization.

**Seminar topics:**

1. Simple and compound interest. Savings. Discounting. Annuity.
2. Loan cancellation. Index of profit margin.
3. Supply and demand functions. Equilibrium.
4. Cost, income and profit functions.
5. Average and marginal quantities.
6. Elasticity of a function and its economical interpretation.
7. Economics applications of the integral. Consumer and producer acquisition.
8. Relative extrema of a function of two variables. Minimization of production costs and profit maximization.

**Students' independent work:**

During the semester must fulfill five independent works. Each of the master students' independent work options is individual. A report on the individual performance of the work is to be submitted by the beginning of the session.

***Requirements for credits***

The course provides the knowledge, skills, skills acquisition.

During the study course examination form – marked pass.

Requirements of the course learning – regular attendance and active work in 60%, independent work execution of 40%.

Used in study methods and forms – lectures, seminars, independent work.

***Basic Training***

1. M.Buiķis. Finanšu matemātika. – Rīga, 2004.
2. L.Grīnglāz, J.Kopitovs. Augstākā matemātika ekonomistiem: Ar datoru lietojuma paraugiem uzdevumu risināšanai-R.: RSEBAA, 2003.
3. I. Revina, M. Gulbe, M. Peļņa, S. Bāliņa. Uzdevumu krājums matemātiskā ekonomistiem. – Rīga, 1997.
4. M.Hazans, A.Jaunzems. Augstākās matemātikas kursa pamatjēdzienu ekonomiskā interpretācija un realizācija. - R.: LVU, 1980.
5. N.Hritonenko, Y.Yatsenko. Mathematical Modeling in Economics, Ecology and the Environment, Springer, 2014.
6. I.Revina, M.Gulbe, M.Peļņa, S.Bāliņa. Matemātika ekonomistiem. - R.: Zvaigzne ABC, 2003.
7. Curwin I., Slater R. Quantitative Methods for Business decisions. Chapman & Hall, 1991.
8. М.Хазан. Функции в математических моделях экономики. - Р.: ЛГУ, 1988.
9. Яунзем А. Математика для экономических наук. - Р.: ЛГУ, 1988.

### ***Further reading***

1. M. Hazans, S. Bāliņa. Kā aug nauda. Ievads finanšu matemātiskā. – Tīga, 1994.
2. M.Hazans, S.Bāliņa. Tirgus ekonomikas vienkāršie matemātiskie modeļi. - R., 1993.
3. M.Jaunzeme. Finanšu matemātika.-R.: Turība, 2000.
4. Высшая математика для экономистов: учебное пособие для вузов/  
Н.Ш.Кремер, И.Е.Тришин, М.Н.Фридман; под ред. Проф. Н.Ш.Кремера. – М.: Банки и биржи, ЮНИТИ, 1997.
5. Клейнер Г.Б. Производственные функции: теория, методы, приложения. - М.: Финансы и статистика, 1988.
6. Курс высшей математики. Т.1./ В.Г.Зубков, В.А.Ляховский, А.И.Мартыненко, В.Б.Миносцев. – М.: ГИНФО, 2000.
7. Курс высшей математики. Т.2./ В.Г.Зубков, В.А.Ляховский, А.И.Мартыненко, В.Б.Миносцев. – М.: ГИНФО, 2000..
8. Солодовников А.С., Бабайцев В.А., Браилов А.В., Шандра И.Г. Математика в экономике. Ч. 2. – М.: Финансы и статистика, 1999.
9. Солодовников А.С., Бабайцев В.А., Браилов А.В. Математика в экономике. Ч. 1. – М.: Финансы и статистика, 2001.
10. Справочник по математике для экономистов. Под редакцией В.И.Ермакова. – М.:Высшая школа, 1997.
11. Красс М.С., Чупрынов Б.П. Основы математики и её приложения в экономическом образовании. – М.: Дело, 2001.
12. Сборник задач по высшей математике для экономистов. Под редакцией В.И.Ермакова. - М.: ИНФРА, 2002.