# SYLLABUS: Financial Mathematics

| Course Basic Information | |
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| **Academic Unit:** | Economic Faculty |
| **Course title:** | **Financial Mathematics** |
| **Level:** | Bachelor |
| **Course Status:** | Mandatory |
| **Year of Study:** | 1$^{st}$year, |
| **Number of Classes per Week:** | 2+1 |
| **ECTS Credits:** | 4 ECTS |
| **Time /Location:** | Economic Faculty |
| **Teacher:** | Ajet Ahmeti |
| **Contact Details:** | ajet.ahmeti@uni-pr.edu |
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| **Course Description:** | Through this course students will be introduced to:<br>• Understanding and calculating simple interest and compound interest;<br>• decursive vs. anticipative compounding;<br>• decursive vs. anticipative ways of annuity calculation;<br>   • Loans, loan amortization;<br>   • Loan amortization schedule, Amortization schedule control;<br>   • Loan conversion;<br>   • Loan consolidation;<br>   • Investment profitability |
| **Course Goals:** | Through this course students will be introduced to:<br>• Understanding and calculating simple interest and compound interest;<br>• decursive vs. anticipative compounding;<br>• decursive vs. anticipative ways of annuity calculation;<br>   • Loans, loan amortization;<br>   • Loan amortization schedule, Amortization schedule control;<br>   • Loan conversion;<br>   • Loan consolidation;<br>   • Investment profitability |
| **Expected Learning Outcomes:** | **Upon course completion students shall:** |

| | • be able to demonstrate skills in solving problems;<br>• know how to use quantitative techniques in analyzing managerial decisions;<br>• be able to show increased level of critical thinking and reasoning skills;<br>• have sufficient theoretical and practical knowledge in the implementation of simple and compound interest;<br>• have sufficient theoretical and practical knowledge in decursive and anticipative compounding;<br>• have sufficient theoretical and practical knowledge in decursive and anticipative ways of annuity calculation;<br>• have sufficient theoretical and practical knowledge on loans and loan amortization; |
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## Student Workload (should be in compliance with student's Learnign Outcomes)

| Activity | Hours | Day/ Week | Total |
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| Lectures | 2 | 15 | 30 |
| Theory/ Lab Work/Exercises | 1 | 15 | 15 |
| Practical Work | | | |
| Consultations with the teaher | 1 | 15 | 15 |
| Field Work | | | |
| Test, seminar paper | 1 | 2 | 2 |
| Homework | 1 | 15 | 15 |
| Self-study (library or home) | 1 | 15 | 15 |
| Preparation for final exam | 2 | 3 | 6 |
| Assessment time (test, quiz, final exam) | 1 | 2 | 2 |
| Projects, presentations, etc. | | | |
| **Total** | | | **100** |

| Teaching Methods: | Lectures, exercises during class using different materials, one project work in group of 2-3 students (independent work), individual homework |
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| Assessment Methods: | Individual assignments completed in class 30%;<br>Individual assignments completed at home 30%;<br>Exam 40%. |

| Primary Literature: | 1. Ajet Ahmeti. Matematikë financiare , Prishtinë 2017. <br> 2. Faton M Berisha, Muharrem Q. Berisha, Matematikë për biznes dhe ekonomiks, Prishtinë 2007 |
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| Additional Literature: | 1. Alpha,C. Chiang,Fundamental methods of Mathematical Economics, McGraw-Hill International Edition,third Edition 1984. <br> 2. Edward T. Dowling, Introduction to Mathematical Economics, McGraw-Hill, 2001 <br> 3. Eugene Don, Joel Lerner, Basic Business Mathematics, McGraw-Hill, 2000. |

**Designed teaching plan**

| Week | Title of the lecture | Exercises |
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| **Week 1:** | ❖ **Ratios and proportions** <br> ❖ **Percentage calculation** | Problem solving |
| **Week 2:** | ❖ **Simple interest calculation** | Problem solving |
| **Week 3:** | ❖ **Compound interest calculation** | Problem solving |
| **Week 4:** | ❖ **Decursive compounding** <br> ❖ **Calculation of capital value added** <br> ❖ **Decursive compounding factor** <br> **Conform norm of interes** <br> ❖ **Initial capital value calculation** | Problem solving |
| **Week 5:** | ❖ **Periodic deposits** <br> ❖ **Depositing at the beginning period depositing at the end of calculating period** <br> ❖ **Iterative methods for calculating the interest rate** | Problem solving |

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| | ❖ **Application of iterative method for calculating interest rate in continuous compounding** | |
| **Week 6:** | ❖ **Variable periodic deposits**<br>❖ **Harmonization of deposits with capitalization periods** | Problem solving |
| **Week 7:** | **Periodic rent**<br>❖ **Dekursiv rent .Cakculation of rents and mizës**<br>❖ **Aantisipativ rent . Calculation of rent and mizës**<br>❖ **Calculation of interest rate by using the iterative method** | Problem solving |
| **Week 8:** | **Loans. Loan amortization**<br>❖ **Loans with equal annuities**<br>❖ **Calculation of loan and annuity**<br>❖ **Calculating installments when the loan and annuity are known**<br>❖ **Calculation of the loan paid** | Problem solving |
| **Week 9:** | **Preparing amortization plan**<br>❖ **Amortization plan**<br>❖ **Amortization plan control** | Problem solving |
| **Week 10:** | ❖ **Rounded annuity loans**<br>❖ **Amortization plan**<br>❖ **Amortization plan control** | Problem solving |
| **Week 11:** | **Amortization of loans with variable annuities**<br>❖ **Do annuities increase or decrease according to arithmetic progression**<br>❖ **Do annuities increase or decrease according to geometric progression** | Problem solving |

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| **Week 12:** | **Amortization of loans with equal annuities**<br>❖ **Calculation of installment and annuity. Amortization plan**<br>❖ **Calculation of paid and remaining debt**<br>❖ **Loans divided into bonds**<br>❖ **Bond payment according to nominal value. Amortization plan** | Problem solving |
| **Week 13:** | ❖ **Loan conversion**<br>❖ **Loan consolidation** | Problem solving |
| **Week 14:** | ❖ **Loan amortization in anticipative compounding**<br>❖ **Amortization of loans with equal annuities**<br>❖ **Amortization plan with equal annuities**<br>❖ **Amortization plan with rounded annuities** | Problem solving |
| **Week 15:** | **Review of profitability of investment**<br>❖ **The equivalent annual cost method**<br>❖ **General method for determining the effectiveness of investment** | Problem solving |

## Academic Policies and Code of Conduct

We start and finish class on time.
Tools used during class must be cleaned and stored away at the end of class.
Mobile/smart phones, and other electronic devices (e.g. iPods) must be turned off (or on vibrate) and hidden from view during class time.
Laptop and tablet computers are allowed for quiet use only; other activities such as checking personal e-mail or browsing the Internet are prohibited.

**Note |** **If a student has more than 3 class assignements evaluated below 50% he/she loses the right on taking the final exam. Evaluation is done from 0-100 %.**