

Subject				
Financial Mathematics				
ECTS code	Semester	Faculty: Finance		
	2	Major: Finance and Accounting		
		Corporate Finance and Accounting		
Faculty:				
Lecture: dr Beata Ciałowicz				
Classes: dr Beata Ciałowicz				
System of studies:				
full-time first degree				
Subject status	Pass requirement	Number of contact hours		ECTS points
		Lectures	Classes	
Group B	Exam		30	4
Teaching language				
English				
Subject provisions and objectives (including the expected can-do of students on completion of the course)				
Subject provisions: To provide students with basic concepts and techniques of financial mathematics and real-world applications of mathematics of money.				
Objectives: The subject is applications-oriented. Its goals are: <ul style="list-style-type: none">• to teach how to use the basic mathematical tools for time value of money (evaluate present and future value of cash flows – savings, credits, individual retirement accounts)• to introduce evaluation of different investment projects (how to compare the attractiveness of interest rates, the designation of the cost of credit)• to use scientific calculator in solving financial problems				
Teaching curriculum (in case of prescribed subjects, compliance with the standards, maximum 15 topics)				
<div>1. Theory of Interest:<ul style="list-style-type: none">a) Simple interest, Compound interest, Continuous Compounded Interestb) Nominal interest rate, Effective Interest Rate, Equivalencec) Inflation and Taxes</div> <div>2. Cash Flow Valuation<ul style="list-style-type: none">a) future value, present value of an annuity (annuity immediate, annuity due, deferred annuity)b) the value of the cash flow at a given time pointc) loan payments (prospective method, retrospective method, perpetuity immediate, perpetuity due)d) mortgage payments (lifetime pension, equivalent pension - the different models of distribution)</div>				
Class topics (maximum 15 topics)				

1. Future value and present value of money
 - a) Simple interest,
 - b) Compound interest,
 - c) Continuous Compounded Interest
2. Interest rate
 - a) nominal
 - b) effective
 - c) equivalent
3. Inflation and Taxes
4. Future value, present value of an annuity
 - a) annuity immediate
 - b) annuity due
 - c) deferred annuity
5. Loan payments (credits)
 - a) prospective method
 - b) retrospective method
 - c) perpetuity immediate
 - d) perpetuity due)
6. Mortgage payments
 - a) lifetime pension
 - b) equivalent pension
 - c) different models of distribution

Introductory topics

Basic calculus course as well as some mathematical sophistication.
Specifically: sequences, log, exp.

Teaching methods

Lecture, Power-point presentations, Workshop,

Basic literature and other sources

1. *An Introduction to the Mathematics of Money* – D. Lovelock, M. Mendel, A. L. Wright ; Springer; 2007
2. *Economic and Financial Analysis for Engineering and Project Management* – A. Ardalan, Technomic Publishing Company, Inc.; 2000

Pass requirements for signature/examination

final exam (written, descriptive)

Examples of questions for tests and examinations

1. Suppose \$1,000 is invested AT an annual interest rate of 6%. Compute the balance after 10 years if the interest is:
A) Simple B) Compounded monthly C) Compounded Continuously
2. How quickly will money double if it is invested at an annual interest rate of 8% and interest is quarterly compounded ?
3. One bank offers interest at an annual rate of 5% compounded quarterly, and competing bank offers interest at an annual rate of 4,5% compounded continuously. Compare the effective interest rates at the two banks.
4. Each year on January first, you deposit \$ 1,000 in an account that pays interest at an annual rate of 8% compounded monthly. How much will you have in the account at the end of 4 years.
5. A loan is being repaid with a payment of 200 at the end of the first year, 190 at the end of the second year, and so on, until the final payment of 110 at the end