ITEM CARD (SYLLABUS)

Description of the course

Code course	Course name	FINANCIAL MATHEMATICS
IBF/O/I/S/B1.29		MATEMATYKA FINANSOWA

Language	English
Academic Year	*2024/2025*

Direction of study	*International Business and Finance*
Level of education (study)	*Level 1*
Profile of education (study)	*General academic*
Form of study	*Stationary*
Semester / semesters	*2*

Belonging to a course groups	*B1- Compulsory courses specific to the field of study*
Course status	*Compulsory*

Form of classes, hours, ECTS points	Form of classes	Number of hours	Number of ECTS points
	Lecture	15 [h]	4 ECTS
	Exercises	30 [h]	
	Seminar	[h]	

Relationship of subject	with profile of education (study)	Related to conducted scientific activity in the field of economics and finance	3 ECTS
	with qualifications	---	ECTS
	with discipline	Economics and finance	4 ECTS

Form of teaching	*traditional - classes organized at the University*
The criterion for the selection of students	All students of International Business and Finance

Unit running course	Department of International Business and Finance
Coordinator	Dr inż. Ewa Falkiewicz
Faculty www address	http://weif.uniwersytetradom.pl
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COURSE OUTCOMES, METHODS OF TEACHING AND VERIFICATION OF THE EFFECTS OF EDUCATION

Purpose of the course:	The aim of the course is to familiarize students with the basic apparatus necessary to measure the time value of money, effects of financial investments or economic activity.
Course teaching content:	The course content is related to conducted scientific research. **Lecture content:** 1. A reminder of needed math knowledge (number sequence, aritmetic and geometric sequence, convergence, Newton's binomial, number *e*). (1h, W2) 2. Deposit interest rates, capitalization of interest and its types. (3h, W1) 3. Simple, commercial, compound discount. (1h, W1) 4. Interest rate of savings deposits, methods for determinig the future value of saving deposits, different types of saving deposits w.r.t. capitalization. (3h, W1, W2, BN) 5. Repayment of debts and loans, different forms of repayments, effective interest rate, interest rate vs. inflation, leasing. (2h, W2) 6. Annuities, retirement funds. (2h, W2, BN) 7. Retirement age vs. pension amount. (1h, W2, BN) 8. Elements of valuation of selected financial instruments (stoks, bonds). (2h, W2, BN) **Exercises content:** 1. Determination of the value of future deposits with different capitalization of interest. (6h, K1, U1) 2. Determining the future and present value of savings deposits – solving exercises using spreadsheet. (6h, U1, U2) 3. Annuity account, calculaition of annuities at given contributions, retirement funds. (4h, U1, BN) 4. Determinig the pension amount depending on the lenght of work, retirement age and size of contributions. (4h, U1, K1, BN) 5. Determinig loan repayment plans. Measuring the effective interest rate of a loan at preset installments. The impact of additional fees on the effective interest rate (4h, U1, K1, BN) 6. Analysis of credit offers from selected banks. (2h, U1, BN) 7. Valuation of stocks and bonds. (2h, U1,, K1, BN) 8. Written test. (2h)
Method of teaching:	*Lecture including multimedia techniques and elements of discussion.* *Practical methods (analytical exercises, discussion, work in groups).*
Grading criteria, criteria for assessing learning outcomes, method of calculating the final grade:	*The condition for passing the course is achieving all the required learning outcomes specified for the course.* *Lecture – evaluation based on a written exam.* *Exercises – the grade is determined by the following: written tests (50%), project and activity at classes (50%).*

	Education effects for the course in relation to the direction effects and form of classes			Verification methods of learning outcomes (form check)	
Number of education effect	Description effects of education for the subject (PEU) Student who has completed the course (W) knows and understands/(U) is able to /(K) is ready to:	Directional learning effect (KEU)	Form of realization of teaching	Examination form	Form check
W1	Knows and understands to an advanced level the principles of time value of money.	K_W01 K_W04	Lecture	Pass with a grade	Written exam
W2	Knows and understands to an advanced level the principles of determining the value of future and present value of deposits, contrtibutions, annuities, loan repayment plan, valluation of selected financial instruments.	K_W04 K_W05	Lecture	Pass with a grade	Written exam
U1	Is able to use theoretical knowledge of economics and finance to determine the future value of deposits for different types of capitalization, the future and present value of conrtibutions and annuities, repayment plan.	K_U01 K_U07	Exercise	Pass with a grade	Written tests and project
U2	Can use a spreadsheet for simple financial calculations.	K_U02	Exercise	Pass with a grade	Project
K1	Is ready to critically evaluate his/her knowledge and to recognise the importance of knowledge in solving cognitive and practical problems.	K_K01	Exercise	Pass with a grade	Activity at clases
Recommended reading, literature supplement, teaching aids					

1) C.R. Llorens, C.L. Gutierrez, *Financial Mathematics: Fundamental Concepts, Editiones UPCT, 2017 (available for free download)*
   https://repositorio.upct.es/bitstream/handle/10317/11394/Financial%20Mathematics.pdf?sequence=1&isAllowed=y
2) J. Niesen, *Financial Mathematics I, University of Leeds (available for free download)*
   http://www1.maths.leeds.ac.uk/~jitse/math1510/notes-all.pdf
3) C. Ruckman, J. Francis, *Financial Mathematics, Warren Centre for Actuarial Studies and Research (available for free download)*
   https://actuarialscience.yolasite.com/resources/Ruckman.pdf
4) Z. Śleszyński, *Couple of thoughts on the consequences of changes in the pension system in Poland in 2017, „Central European Review of Economics & Finance", Faculty of Economics and Legal Sciences, K. Pułaski University of Technology and Humanities in Radom vol. 22, No 6 (2017), pp. 71-86; ISSN 2082-8500*
5) Z. Śleszyński, *About help attempts for borrowers in Poland who taken housing loans in CHF, „Central European Review of Economics & Finance", Faculty of Economics, K. Pułaski University of Technology and Humanities in Radom vol. 14, No 4 (2016), pp. 85-99; ISSN 2082-8500*

A detailed list of additional literature, web sources and teaching aids will be provided by a teacher during the first class

Student workload needed to achieve the assumed learning outcomes - balance of ECTS points			
Participation in classes, activities	Student's working hours [h]		
	Other hours. Contact (IGK)	Classes without a teacher – student's own work	Classes
Participation in Lectures/ Seminars	X	X	15 [h]
Participation in Exercises/Laboratories	X	X	30 [h]
Participation in the Consultation	5 [h]	X	X
Preparing to lectures/ exercises/seminars Preparation for an examination	X	50 [h]	X
Summary of student's workload	5 [h]/0,2 ECTS	50 [h]/2 ECTS	45 [h]/1,8 ECTS
Points of ECTS for subject	100 [h] /4 ECTS		

Additional information and remarks
For students with special needs, including those with disabilities and chronic illnesses, the methods and forms of verifying learning outcomes specified above (in the course syllabus) are appropriately adjusted to meet the individual needs of these students. "The detailed rules and rights of students with special needs, including those with disabilities and chronic illnesses, regarding participation, assessment, and examinations, are specified in the Study Regulations, Study Rules, and Procedures for Ensuring Accessibility of the Educational Process for Students with Special Needs, including those with disabilities and chronic illnesses."