

## MODULE DESCRIPTION

Module code	<b>Z-0045z</b>
Module name	<b>Matematyka finansowa</b>
Module name in English	<b>Financial Mathematics</b>
Valid from academic year	<b>2016/2017</b>

## A. MODULE PLACEMENT IN THE SYLLABUS

Field of study	<b>Management and Production Engineering</b>
Level of education	<b>1st degree</b> <i>(1st degree / 2nd degree)</i>
Studies profile	<b>General</b> <i>(general / practical)</i>
Form and method of conducting classes	<b>Full-time</b> <i>(full-time / part-time)</i>
Specialisation	<b>All</b>
Unit conducting the module	<b>The Department of Applied Computer Science and Applied Mathematics</b>
Module co-ordinator	<b>Prof. Krzysztof Grysa, PhD hab.</b>
Approved by:	

## B. MODULE OVERVIEW

Type of subject/group of subjects	<b>Basic</b> <i>(basic / major / specialist subject / conjoint / other HES)</i>
Module status	<b>Compulsory</b> <i>(compulsory / non-compulsory)</i>
Language of conducting classes	<b>English</b>
Module placement in the syllabus - semester	<b>2nd semester</b>
Subject realisation in the academic year	<b>Summer semester</b> <i>(winter / summer)</i>
Initial requirements	<b>No requirements</b> <i>(module codes / module names)</i>
Examination	<b>No</b> <i>(yes / no)</i>
Number of ECTS credit points	<b>2</b>

Method of conducting classes	Lecture	Classes	Laboratory	Project	Other
Per semester	<b>15</b>	<b>15</b>			

### C. TEACHING RESULTS AND THE METHODS OF ASSESSING TEACHING RESULTS

<b>Module target</b>	The aim of the module is to acquire knowledge and understand such notions as: simple and compound interests, string payments, credit repayment, or operation of the additional pension fund. Another aim is to acquire skills as regards calculating sequences of financial operations until any period of time.
----------------------	--

Effect symbol	Teaching results	Teaching methods (l/c/lab/p/other)	Reference to subject effects	Reference to effects of a field of study
W_01	A student has knowledge as regards time-related financial operations; in addition, a student knows such notions as: the rate of return, simple and compound interest, and a bill of exchange.	l/c	K-W01	T1A_W02 T1A_W03 T1A_W03
W_02	A student has knowledge as string payments and managing them, calculating their value at any period of time.	l/c	K-W01	T1A_W02 T1A_W03 T1A_W03
U_01	A student can compare deposit interests in terms of their profitability and is able to calculate present and future value of string payments.	l/c	K-U12	T1A_U01
U_02	A student is able to analyse credit profitability individually and analyse simple string annuities.	l/c	K-U12	T1A_U01 T1A_U02
K_01	A student understands the necessity of continuous improvement of his/her knowledge as regards financial mathematics.	l/c	K-K01	T1A_K01
K_02	A student is able to co-operate, communicate effectively, and act ethically as regards financial operations.	l/c	K-K04	T1A_K06

#### Teaching contents:

##### 1. Teaching contents as regards lectures

Lecture number	Teaching contents	Reference to teaching results for a module
1	Simple interest, simple discounting, interest in advance.	W_01 K_01
2	Bills of exchange. T-bills.	W_01 W_02
3	Compound interest, continuously compounded rate.	W_01 U_01
4	Periodic investment and string payments.	W_02 U_02
5	Instalments – credit repayment.	W_02 U_02 K_01
6	Credits with additional charge, with a delayed payment period.	W_02 U_02 K_01
7	Rents, Internal Rate of Return (IRR).	W_02 U_02 K_01
8	Net Present Value (NPV).	W_02 U_02 K_02

## 2. Teaching contents as regards classes

Class number	Teaching contents	Reference to teaching results for a module
1	Simple interest, simple discounting, interest in advance.	W_01 K_01
2	Bills of exchange. T-bills.	W_01 W_02
3	Compound interest, continuously compounded rate.	W_01 U_01
4	Periodic investment and string payments.	W_02 U_02
5	Instalments – credit repayment.	W_02 U_02 K_01
6	Credits with additional charge, with a delayed payment period.	W_02 U_02 K_01
7	Rents, Internal Rate of Return (IRR).	W_02 U_02 K_01
8	Test 2: Net Present Value (NPV).	W_02 U_02 K_02

## 3. Teaching contents as regards laboratory classes

Laboratory class number	Teaching contents	Reference to teaching results for a module

## 4. The characteristics of project assignments

### The methods of assessing teaching results

Effect symbol	Methods of assessing teaching results <i>(assessment method, including skills – reference to a particular project, laboratory assignments, etc.)</i>
W_01	<b>A discussion and assessing individual work; a test.</b> In order to gain a B mark, a student should know basic notions used in financial mathematics. In order to gain an A mark, a student should additionally know and understand the significance of the financial system in economy.
W_02	<b>A discussion and assessing individual work; a test.</b> In order to gain a B mark, a student should know basic notions used in financial mathematics. In order to gain an A mark, a student should additionally know and understand the significance of the financial system in economy.
U_01	<b>A discussion and assessing individual work; tests; a project.</b> In order to gain a B mark, a student should be able to compare interest rates of deposits in terms of their profitability and calculate present and future value of string payments. In order to gain an A mark, a student should additionally be able to evaluate these operations correctly.
U_02	<b>A discussion and assessing individual work; tests; a project.</b>

	<p>In order to gain a B mark, a student should be able to independently analyse credit profitability as well as simple string annuities. In order to gain an A mark, a student should additionally be able to make his/her own analysis of the processes and suggest appropriate solutions in this respect.</p>
K_01	<p><b>A discussion and assessing individual work; tests; a project.</b></p> <p>In order to gain a B mark, a student ought to understand the necessity of improving his/her knowledge as regards financial engineering and broaden it regularly. In order to gain an A mark, a student should broaden this knowledge to a larger extent than other group members.</p>
K_02	<p><b>A discussion and assessing individual work; tests; a project.</b></p> <p>In order to gain a B mark, a student ought to co-operate efficiently, work in a team, communicate effectively, and act ethically as regards financial operations. In order to gain an A mark, a student should additionally undertake initiative during teamwork; in addition, a student ought to prepare and lead project works effectively.</p>

## D. STUDENT'S INPUT

ECTS credit points		
	Type of student's activity	Student's workload
1	Participation in lectures	15
2	Participation in classes	15
3	Participation in laboratories	
4	Participation in tutorials (2-3 times per semester)	2
5	Participation in project classes	
6	Project tutorials	
7	Participation in an examination	
8		
9	<b>Number of hours requiring a lecturer's assistance</b>	<b>32</b> <i>(sum)</i>
10	<b>Number of ECTS credit points which are allocated for assisted work</b> <i>(1 ECTS point=25-30 hours)</i>	
11	Unassisted study of lecture subjects	8
12	Unassisted preparation for classes	8
13	Unassisted preparation for tests	
14	Unassisted preparation for laboratories	
15	Preparing reports	
15	Preparing for a final laboratory test	
17	Preparing a project or documentation	6
18	Preparing for an examination	
19		
20	<b>Number of hours of a student's unassisted work</b>	<b>28</b> <i>(sum)</i>
21	<b>Number of ECTS credit points which a student receives for unassisted work</b> <i>(1 ECTS point=25-30 hours)</i>	1
22	<b>Total number of hours of a student's work</b>	<b>60</b>
23	<b>ECTS points per module</b> <i>1 ECTS point=25-30 hours</i>	<b>2</b>
24	<b>Work input connected with practical classes</b> <i>Total number of hours connected with practical classes</i>	<b>30</b>
25	<b>Number of ECTS credit points which a student receives for practical classes</b> <i>(1 ECTS point=25-30 hours)</i>	1

## E. LITERATURE

Literature list	<ol style="list-style-type: none"> <li>1. Podgórska M., <i>Matematyka finansowa</i>, Wydawnictwo FFF, 2007.</li> <li>2. Grysa K., <i>Podstawy Matematyki Finansowej</i>, Wydawnictwo Stachurski, Kielce 1999.</li> <li>3. Dobija M., Smaga E., <i>Podstawy matematyki finansowej i ubezpieczeniowej</i>, PWN, Warszawa-Kraków 1995.</li> <li>4. Bijak W., Podgórska M., Utkin J., <i>Matematyka finansowa</i>, Wydawnictwo Bizant, Warszawa 1994.</li> <li>5. Sobczyk M., <i>Matematyka finansowa</i>, Wydawnictwo Placet, Warszawa 2000.</li> <li>6. Foltynowicz I., <i>Ćwiczenia z matematyki finansowej w Excelu</i>, Wydawnictwo MIKOM 2001.</li> </ol>
Module website	<a href="http://www.tu.kielce.pl/~grysa">www.tu.kielce.pl/~grysa</a>

