MODULE DESCRIPTION

Module code	**Z-ZIP2-0243**
Module name	**Matematyka stosowana**
Module name in English	**Applied Mathematics**
Valid from academic year	**2016/2017**

A. MODULE PLACEMENT IN THE SYLLABUS

Field of study	**Management and Production Engineering**
Level of education	**2nd degree** *(1st degree / 2nd degree)*
Studies profile	**General** *(general / practical)*
Form and method of conducting classes	**Full-time** *(full-time / part-time)*
Specialisation	**All**
Unit conducting the module	**Department of Production Engineering**
Module co-ordinator	**Wacław Gierulski, PhD hab., Eng., Professor of the University**
Approved by:	

B. MODULE OVERVIEW

Type of subject/group of subjects	**Major** *(basic / major / specialist subject / conjoint / other HES)*
Module status	**Non-compulsory** *(compulsory / non-compulsory)*
Language of conducting classes	**English**
Module placement in the syllabus - semester	**1st semester**
Subject realisation in the academic year	**Summer semester** *(winter semester/ summer)*
Initial requirements	**No requirements** *(module codes / module names)*
Examination	**No** *(yes / no)*
Number of ECTS credit points	**3**

Method of conducting classes	Lecture	Classes	Laboratory	Project	Other
Per semester	**10**			**20**	

C. TEACHING RESULTS AND THE METHODS OF ASSESSING TEACHING RESULTS

Module target	The aim of the course is to indicate the possibility of practical use of mathematical software for solving problems in the area of management and production engineering. It is a non-traditional approach to the implementation of mathematical calculations in different areas of activity.

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 a wider knowledge of in algebra, mathematical analysis, differential equations and the use of mathematical programs including the use of symbolic computation modules.	l/p	K_W01	T2A_W01 T2A_W02
W_02	A student has a basic knowledge of model building and the use of mathematical methods to describe real phenomena and processes.	l/p	K_W02	T2A_W01 T2A_W02
U_01	A student is able to apply mathematical tools, including differential equations to describe phenomena and processes.	l/p	K_U11 K_U12	T2A_U09 T2A_U10 T2A_U14 T2A_U16 T2A_U18
U_02	A student is able to use mathematical programs (Mathcad) to solve complex issues.	p	K_U11 K_U12	T2A_U09 T2A_U10 T2A_U14 T2A_U16 T2A_U18
K_01	A student understands the need for professional action in the analysis of phenomena and processes.	l/p	K_K02	T2A_K02 T2A_K04 T2A_U19

Teaching contents:

1. Teaching contents as regards lectures

Lecture number	Teaching contents	Reference to teaching results for a module
1	The use of mathematical tools in the construction of models. The presentation of Mathcad capabilities. Numerical and symbolic calculations.	W_01 W_02 K_01
2	Matrices determinants, linear equations, inequalities - an analysis using Mathcad programme.	W_01 W_02 K_01
3	Calculation and application of calculus of derivative calculus, function test, optimization – an analysis using Mathcad programme.	W_01 W_02 K_01
4	Differential equations solving methods – an analysis using Mathcad programme, the issue of the accuracy of solutions.	W_01 W_02 K_01
5	Graphical presentation of the results, the simulation using Mathcad programme.	W_01 W_02 K_01

2. Teaching contents as regards classes

Class number	Teaching contents	Reference to teaching results for a module

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

Students (in groups of 2 - 3 people) present (in the form of a written report): theories on the selected topics in the applied mathematics and solve problems of average complexity. The lecture is passed on the basis of the knowledge assessed during the discussion on the project.

Project class number	Teaching contents	Reference to teaching results for a module
1	Presentation of the scope of projects. The choice of the subject of projects for the following project's teams.	U_01 U_02 K_01
2	The presentation of partial or preliminary versions of projects - discussion, clarification of requirements - the implementation of calculations in a computer lab.	U_01 U_02 K_01
3	The presentation of partial or preliminary versions of projects - discussion, clarification of requirements - the implementation of calculations in a computer lab.	U_01 U_02 K_01
4	The presentation of partial or preliminary versions of projects - discussion, clarification of requirements - the implementation of calculations in a computer lab.	U_01 U_02 K_01
5	The presentation of partial or preliminary versions of projects - discussion, clarification of requirements - the implementation of calculations in a computer lab.	U_01 U_02 K_01
6	The presentation of projects by project's teams - the discussion on the applied methods of solving and results.	U_01 U_02 K_01
7	The presentation of projects by project's teams - the discussion on the applied methods of solving and results.	U_01 U_02 K_01
8	The presentation of projects by project's teams - the discussion on the applied methods of solving and results.	U_01 U_02 K_01
9	The presentation of projects by project's teams - the discussion on the applied methods of solving and results.	U_01 U_02 K_01
10	A synthetic discussion of completed projects, an identification of original solutions. Determining the final grade.	U_01 U_02 K_01

The methods of assessing teaching results

Effect symbol	**Methods of assessing teaching results** *(assessment method, including skills – reference to a particular project, laboratory assignments, etc.)*
W_01	Description of theoretical issues and solution of project exercises – discussion.
W_02	Description of theoretical issues and solution of project exercises – discussion.
U_01	Solution of project exercises – discussion.
U_02	Solution of project exercises – discussion.
K_01	Solution of project exercises - the need for professional action forced by computer programs.

D. STUDENT'S INPUT

ECTS credit points		
	Type of student's activity	**Student's workload**
1	Participation in lectures	**10**
2	Participation in classes	
3	Participation in laboratories	
4	Participation in tutorials (2-3 times per semester)	**4**
5	Participation in project classes	**20**
6	Project tutorials	**4**
7	Participation in an examination	
8	Passing the project - discussion	
9	**Number of hours requiring a lecturer's assistance**	**38** *(sum)*
10	**Number of ECTS credit points which are allocated for assisted work** *(1 ECTS point=25-30 hours)*	**1.5**
11	Unassisted study of lecture subjects	**10**
12	Unassisted preparation for classes	
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	**20**
18	Preparing for an examination	**8**
19	Preparing for an examination on the lecture	
20	**Number of hours of a student's unassisted work**	**38** *(sum)*
21	**Number of ECTS credit points which a student receives for unassisted work** *(1 ECTS point=25-30 hours)*	**1.5**
22	**Total number of hours of a student's work**	**72**
23	**ECTS points per module** *1 ECTS point=25-30 hours*	**3**
24	**Work input connected with practical classes** *Total number of hours connected with practical classes*	**38**
25	**Number of ECTS credit points which a student receives for practical classes** (1 ECTS point=25-30 hours)	**1.5**

E. LITERATURE

Literature list	1. Cannon R.H., *Dynamika układów fizycznych*, WNT, Warszawa 1973. 2. Chiang A.C., *Podstawy ekonomii matematycznej*, PWE, 1994. 3. Palczewski A., *Równania różniczkowe zwyczajne*, WNT, 2004. 4. Kucharski T., *Drgania mechaniczne – rozwiązywanie zagadnień z Mathcadem*, WNT, 2004. 5. Mathcad
Module website	