

## SYLLABUS OF A MODULE

Polish name of a module	<i>Wprowadzenie do metod numerycznych</i>
English name of a module	<i>Introduction To Numerical Methods</i>
ISCED classification - Code	0541
ISCED classification - Field of study	<i>Mathematics</i>
Languages of instruction	<i>English</i>
Level of qualification:	1
Number of ECTS credit points	6
Examination:	A

### Number of hours per semester:

Lecture	Exercises	Laboratory	Seminar	E-learning	Project
15 (e-learning)	-	45	-	-	-

### **MODULE DESCRIPTION**

#### **Module objectives**

- O1. Making the students familiar with selected elements of numerical methods
- O2. Acquaint students with practical skills to solve and interpret solutions to simple problems in the field of numerical methods

### **PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES**

1. Course of linear algebra.
2. Course of the calculus of one variable
3. Ability to use different sources of information
4. Ability to work independently and in a group

### **LEARNING OUTCOMES**

- LO 1 – student will be able to solve simple numerical problems using Maple

## MODULE CONTENT

Type of classes – lecture (e-learning)	Number of hours
Course introduction. Taylor series. Order of convergence.	2
Maple's floating-point arithmetic.	3
Solving equations and systems of equations.	2
Interpolation.	3
Numerical differentiation and integration	5
<b>Sum</b>	<b>15</b>
Type of classes– laboratory.	Number of hours
Maple introduction.	6
Errors in floating-point arithmetic.	9
Solving equations and systems of equations by using Maple.	6
Interpolation.	9
Numerical differentiation and integration.	15
<b>Sum</b>	<b>45</b>

## TEACHING TOOLS

1. – e-learning lectures
2. – computers with Maple software

## WAYS OF ASSESSMENT ( F – FORMATIVE, S – SUMMATIVE )

<b>F1.</b> - assessment of preparation for laboratory exercises
<b>F2.</b> - assessment of activity during classes
<b>F3.</b> - assessment of completion of all activities during e-learning lectures
<b>S1.</b> - assessment of the ability to solve the problems posed and the manner of presentation obtained results

## STUDENT'S WORKLOAD

L.p.	Forms of activity	Average number of hours required for realization of activity
<b>1. Contact hours with teacher</b>		
1.1	Lectures (e-learning)	15
1.2	Tutorials	-
1.3	Laboratory	45
1.4	Seminar	-
1.5	Project	-
1.6	Consulting teacher during their duty hours	5
1.7	Examination	-
Total number of contact hours with teacher:		65
<b>2. Student's individual work</b>		
2.1	Preparation for e-learning activities	25
2.2	Preparation for laboratory exercises	20
2.3	Preparation for laboratory assessments	25
2.4	Individual study of literature	15
Total number of hours of student's individual work:		85
Overall student's workload:		150
<b>Overall number of ECTS credits for the module</b>		6 ECTS
Number of ECTS points that student receives in classes requiring teacher's supervision:		1,8 ECTS
Number of <b>ECTS</b> credits acquired during practical classes including laboratory exercises and projects:		-

## BASIC AND SUPPLEMENTARY RESOURCE MATERIALS

1. Lloyd N. Trefethen and David Bau, Numerical Linear Algebra, SIAM, 1997.
2. Grégoire Allaire and Sidi Mahmoud Kaber. Numerical linear algebra, volume 55 of Texts in Applied Mathematics. Springer, New York, 2008. Translated from the 2002 French original by Karim Trabelsi.
3. W.H. Press, S.A. Teukolsky, W.T. Vetterling and B.P. Flannery, Numerical Recipes: The Art of Scientific Computing, 3rd Ed. Cambridge University Press,

New York, 2007.

4. Jonathan M. Borwein, Matthew P. Skerritt, An Introduction to Modern Mathematical Computing with Maple, Springer Undergraduate Texts in Mathematics and Technology, Springer-Verlag, New York, 2011.

5. W. Cheney, D. Kincaid, Numerical Mathematics and Computing, Brooks/Cole: Cengage Learning, 2013.

**MODULE COORDINATOR (NAME, SURNAME, E-MAIL ADDRESS)**

**dr hab. Tomasz Błaszczyk, CUT prof., [tomasz.blaszczyk@pcz.pl](mailto:tomasz.blaszczyk@pcz.pl)**