STUDY MODULE DESCRIPTION FORM

Name of the module/subject **Symbolic computation**		Code **1010341751010348918**
Field of study **Mathematics in Technology**	Profile of study (general academic, practical) **general academic**	Year /Semester **3 / 5**
Elective path/specialty -	Subject offered in: **Polish**	Course (compulsory, elective) **obligatory**
Cycle of study: **First-cycle studies** **(Polish Qualifications Framework level six)**	Form of study (full-time,part-time) **full-time**	
No. of hours Lecture: - Classes: - Laboratory: **15** Project/seminars: -		No. of credits **1**
Status of the course in the study program (Basic, major, other) **major**	(university-wide, from another field) **university-wide**	
Education areas and fields of science and art **The sciences** **Mathematical sciences**		**ECTS distribution (number and %)** **1 100%** **1 100%**

Responsible for subject / lecturer:

dr Piotr Rejmenciak
email: piotr.rejmenciak@put.poznan.pl
tel. 61 6652359
Wydział Elektryczny
ul. Piotrowo 3A 60-965 Poznań

Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Basic knowledge of mathematics [PQF_4].
2	**Skills**	Basic skills of programming [PQF_4].
3	Social competencies	Students should know the boundedness of their knowledge and understand the need of further education [PQF_4].

Assumptions and objectives of the course:

Understanding differences between symbolic methods of computing and numerical ones. Getting knowledge of Maxima - Computer Algebra System.

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. A student understand limitation of symbolic methods of computing [K_W06 (P6S_WG), K_W01 (P6S_WG)]
2. A student understand conections between mathematical theorems and symbolic computations in theoretical and practical problems [K_W01 (P6S_WG), K_W03 (P6S_WG)]
3. A student know how to use Maxma to prove choosen theorems [K_W01 (P6S_WG), K_W03 (P6S_WG)]

Skills:

1. A student can choose a better method of symbolic and numerical methods for choosen problem [K_U01 (P6S_UW), K_U03 (P6S_UW), K_U10 (P6S_UW)]
2. A student can write problem in Maxima - language [K_U03 (P6S_UW), K_U10 (P6S_UW)]
3. A student can verify a program written in Maxima [K_U01 (P6S_UW), K_U03 (P6S_UW), K_U10 (P6S_UW)]

Social competencies:

1. A student is able to formulate a problem precisely and try to solve it. - [K_K03 (P6S_KO)]

Assessment methods of study outcomes

Laboratory:

problem for homework (10 p.)

test (20 points)

3,0 from 16 p.,
3,5 from 19 p.,
4,0 from 22 p.,
4,5 from 25 p.,
5,0 from 28 p.

Course description – 23.10.2018

Introduction to MAXIMA: menu, help, loops, conditions.

Linear algebra: matrices.

Equations.

Analysis: limits, derivatives, integrals. Series, products.

Algebra: GCD, LCM, division, number theory.

Programming in Maxima, LaTeX.

Basic bibliography:

1. Maxima manual, http://michel.gosse.free.fr/documentation/fichiers/maxima.pdf

2. Paulo Ney de Souza, Richard J. Fateman, Joel Moses, Cliff Yapp, The Maxima Book, http://maxima.sourceforge.net/docs/maximabook/maximabook-19-Sept-2004.pdf

3. Roland Salz, *www.roland-salz.de/Maxima_Workbook.pdf*, 2018r.

Additional bibliography:

1. W. Młocek, Matematyka wyższa z Maximą, Akademia Rolnicza w Krakowie, Kraków 2006.

2. C. T. Lachowicz, Matlab, Scilab, Maxima. Opis i przykłady zastosowań, Wydawnictwo Politechniki Opolskiej, Opole 2005.

4. R.Filipów, J.Gulgowski, Zastosowanie pakietu Maxima w Analizie Matematycznej, Uniwersytet Gdański, Gdańsk 2010.

Result of average student's workload

Activity	Time (working hours)
1. Taking part in practical classes	15
2. Homework	10
3. Prepating for tests	5

Student's workload

Source of workload	hours	ECTS
Total workload	30	1
Contact hours	25	1
Practical activities	25	1