STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Computer science and computational methods		**1010341531010344918**
Field of study: **Mathematics**	Profile of study (general academic, practical): **(brak)**	Year /Semester: **2 / 3**
Elective path/specialty: **-**	Subject offered in: **Polish**	Course (compulsory, elective): **obligatory**
Cycle of study: **First-cycle studies**	Form of study (full-time,part-time): **full-time**	
No. of hours: Lecture: **2** Classes: **2** Laboratory: **2** Project/seminars: **-**		No. of credits: **7**
Status of the course in the study program (Basic, major, other): **(brak)**	(university-wide, from another field): **(brak)**	
Education areas and fields of science and art: **the sciences**		ECTS distribution (number and %): **7 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Basic knowledge of mathematics (in terms of linear algebra, calculus and combinatorics). Basic knowledge of operating systems.
2	**Skills**	Familiar with basics computer. Can for formulate different ways to simple problems them by describing the different stages of implementation these methods.
3	**Social competencies**	Has a willingness to work together as a team. Understand the role of computerization process. Understand the need for lifelong learning.

Assumptions and objectives of the course:

-Presentation of classical data structures with emphasis on graphs.

-Presentation of the classical computational algorithms.

-Developing skills: constructing algorithms, evaluating their quality and efficiency, and writing in the language high-level programming.

-Presentation of the problems associated with recursion.

-Acquainted with the possibilities of the mathematical package (MATLAB) and its use in solving mathematical problems.

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

Knowledge:

1. Knows the basic data structures and classical computinging algorithms. - [K_W05 K_W08 + + + + +]

2. Knows the basics of programming in a high level language and is able to use a package supporting technical and scientific calculations (MATLAB). - [K_W09 K_W12 + + + + +]

3. Has a basic knowledge of graph theory and recursive equations. - [K_W03 K_W04 + + + + +]

Skills:

1. Can construct a simple calculation algorithms selecting appropriate data structures and knows how to implement them in the high-level programming language. - [K_U25 K_U27 + + + + +]

2. Able to solve mathematical problems using the software package - [K_U25 K_U37 + + + +]

Social competencies:

1. Understands the need for lifelong learning - [K_K01 +]

2. Can use the technical documentation and search for needed information in the literature (also in foreign languages) - [K_K06 + + +]

Assessment methods of study outcomes

Lectures:
- Assess the knowledge and skills listed on writing exam (student can use any printed materials),
- Control of perception during lectures.

Laboratory:
- Test and rewarding knowledge necessary to perform of the laboratory tasks
- Continuous evaluation class - rewarding gain skills
- Assess the knowledge and skills associated with the implementation of the tasks your practice

Get extra points for the activity in the classroom, and in particular for:
- Propose to discuss further aspects of the subject;
- The effectiveness of the application of the knowledge gained during solving a given problem;
- Subsequent to the improvement of teaching materials;
- Developed aesthetic diligence reports and jobs - in the self-study.

Course description

- Ways to represent numbers in a computer and the properties of floating point account.
- Basic instructions and data structures in high-level programming language.
- Bases of computational complexity and evaluating the correctness of the algorithms.
- Examples of classic algorithms and analysis.
- Opportunities mathematical package MatLab supporting the work of mathematician. Elements of graph theory: a family of graphs, algorithms
- Search graphs. Recursion and recursive equation.

Basic bibliography:

1. T.H. Cormen, Ch.E. Leiserso, R.L. Rivest - Wprowadzenie do algorytmów, WNT, 1994.
2. J. Brzóska, L. Dorobczyński - MATLAB ? Środowisko obliczeń naukowo -technicznych, MIKOM, 2008.
3. B. Mrozek, Z. Mrozek - MATLAB i Simulink Poradnik użytkownika. Wydanie II, Helion, Wrocław, 2004.
4. Ross, Ch.R.B. Wright ? Matematyka dyskretna. PWN, Warszawa 1996
5. M. Szmit - Delphi. Szybki start , Helion, 2006.

Additional bibliography:

1. M. Sadowski - Praktyczny kurs Turbo Pascala. Wydanie IV, Helion, 2003.
2. R.J. Wilson - Wprowadzenie do teorii grafów. PWN, Warszawa 2002

Result of average student's workload

Activity	Time (working hours)
1. Participation in lectures, exercises, preparation of programs for laboratory classes and individual work with manual	210

Student's workload

Source of workload	hours	ECTS
Total workload	210	7
Contact hours	120	4
Practical activities	90	3