

FACULTY OF CHEMISTRY

SUBJECT CARD**Name of subject in Polish** Zaawansowane programowanie i metody numeryczne**Name of subject in English** Advanced programming and numerical methods**Main field of study (if applicable):** Biosciences**Specialization (if applicable):** Bioinformatics**Profile:** academic / ~~practical~~***Level and form of studies:** 1st/ 2nd level, ~~uniform magister studies*~~, full-time / ~~part-time~~***Kind of subject:** obligatory / ~~optional~~ / ~~university-wide~~***Subject code** W03BSS-SM2012L**Group of courses** ~~YES~~ / NO*

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)			45		
Number of hours of total student workload (CNPS)			75		
Form of crediting (Examination / crediting with grade)			Crediting with grade		
For group of courses mark (X) final course					
Number of ECTS points			3		
including number of ECTS points for practical classes (P)			3		
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)			2,1		

*delete as not necessary

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Knowledge of basics of any programming language
- 2.
- 3.

SUBJECT OBJECTIVES

C1 Familiarizing students with good practices in programming

C2 Teaching students the construction of algorithms

C3 Familiarizing students with numerical recipes

SUBJECT EDUCATIONAL EFFECTS

relating to skills:

PEU_U01 Student is able to apply a random number generator in Monte Carlo algorithms

PEU_U02 Student is able to design and implement an algorithm for different sorting algorithms

PEU_U03 Student is able to develop the code for numerical integration of Newton equations of motion

...

relating to social competences:

PEU_K01 Student is able to work in team

PROGRAMME CONTENT

Laboratory		Number of hours
Lab 1	Organization of course and conditions for passing the course. Programming environment.	3
Lab 2	Random number generators.	3
Lab 3	Numerical integration of functions.	3
Lab 4	Interpolation and extrapolation.	9
Lab 5	Numerical analysis of functions.	12
Lab 6	Monte Carlo methods.	12
Lab 7	End credit	3
Total hours		45

TEACHING TOOLS USED

N1.Multimedia presentation
N2.Specialized computer software
N3.Gamification

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement
P	PEU_W01-W03 PEU_U01-U03, PEU_K01	Final assignment (max 100 pts)
P 2.0, when $(F1+F2) < 50\%$ points 3.0, when $(F1+F2) = 51-59\%$ points 3.5, when $(F1+F2) = 60-69\%$ points 4.0, when $(F1+F2) = 70-79\%$ points 4.5, when $(F1+F2) = 80-89\%$ points 5.0, when $(F1+F2) = 90-99\%$ points 5.5, when $(F1+F2) = 100\%$ points		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] "Numerical Recipes in C: The art of scientific computing" W. Press, S. Teukolsky, W. Vetterling, B. Flannery, Cambridge University Press, 1988-1992, ISBN 0521 431085

SECONDARY LITERATURE:**SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)**

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