Z1-PU7	WYDANIE N1	Strona 1 z 3

(pieczęć wydziału)   **COURSE DESCRIPTION**

1. **Course title:** NUMERICAL METHODS	2. **Course code:** NM

3. Validity of course description: 2018/2019

4. Level of studies: first degree

5. Model of studies: stationary

6. Field of study: INFORMATICS

7. Profile of studies: general academic

8. Programme: ALL

9. Semester: 4

10. Faculty teaching the course: Faculty of Automatic Control, Electronics and Computer Science, Institute of Informatics

11. Course instructor: prof. Andrzej Polański

12. Course classification: general

13. Course status: obligatory

14. Language: English

15. Pre-requisite qualifications: Algebra and Analytic Geometry, Fundamentals of computer programming

16. Course objectives:

The aim of the course is making students familiar with issues related to numerical methods for scientific and engineering applications. Basic issues are presented, related to theory of error in numerical algorithms, models of errors, most important algorithms of numerical solutions to engineering and scientific problems, as well as computation complexity of presented algorithms.

The course covers the following educational aims in the discipline of informatics: fixed and floating point computations, systems of linear equations, interpolation, approximation, solving algebraic equations, elements of numerical optimization.

Students acquire the following skills: ability to implementation of computer algorithms of interpolation, approximation and linear algebra. Analysis and modeling of computational errors. Understanding of most important algorithms for engineering and scientific computing.

17. Description of learning outcomes:[1]

Nr	Lerning outocmes description	Method of assessment	Teaching methods	Reference code
W1	Knowledge of numerical methods.	test	lecture	K1A_W01, K1A_W02

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[1] należy wskazać ok. 5 – 8 efektów kształcenia

W2	Knowledge of numerical algorithms for solutions fo engineering problems.	test	lecture	K1A_W01, K1A_W02
W3	Knowledge of fixed and floating point computations, systems of linear equations, interpolation, approximation, solving algebraic equations, elements of numerical optimization.	test	lecture	K1A_W01, K1A_W02
U2	Ability to implementation of computer algorithms of interpolation, approximation and linear algebra.	test	Classroom exercises	K1A_U08, K1A_U12
U3	Understanding of most important algorithms for engineering and scientific computing.	test	Classroom exercises	K1A_U08, K1A_U12

18. Teaching modes and hours

Lecture / BA /MA Seminar / Class / Project / Laboratory:

30/0/0/0/0/30

19 Syllabus description:

Lecture:

1.	Introduction

2.	Theory of errors

3.	Solving systems of linear equations

4.	Evaluating

5.	Elements of operational calculus

6.	Interpolation

7.	Approximation

8.	Numerical differentiation

9.	Numerical integration

10.	Numerical integration of differentia equations

11.	Numerical solutions to algebraic equations

12.	Elements of numerical optimization

Class:

Classroom exercises aim at practicing skills gained at lecture reads follow topics of lectures

20. Exam: no

21. Primary sources:

- Jerzy Klamka, Zbigniew Ogonowski, Metody numeryczne, Wydawnictwo Politechniki Śląskiej
- A. Björck, G. Dahlquist, Metody numeryczne, Państwowe Wydawnictwo Naukowe, Warszawa 1987.

22. Secondary sources:

- A.Ralston. Wstęp do analizy numerycznej. PWN 1971.
- B. P. Demidowicz, I. A. Maron, E. Z. Szuwałowa. Metody Numeryczne. PWN 1965.
- Z. Fortuna, B. Macukow, J. Wąsowski. Metody Numeryczne. WNT 1993.
- J. Stoer, R. Bulirsch. Wstęp do analizy numerycznej. PWN 1987.

23. Total workload required to achieve learning outcomes

Lp.	Teaching mode	Contact hours / Student workload hours
1	Lecture	30/30
2	Classes	15/15
3	Laboratory	/
4	Project	/
5	Seminar	/
6	Other	10/10
	Total number of hours	55/55

24. Total hours: 110

25. Numbers of ECTS: 3

26. Number of ECTS credits allocated for contact hours: 3

27. Number of ECTS credits allocated for in-practice hours (laboratory classes, projects):

26. Comments:

Approved:

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(date, Instructor's signature)   (date, the Director of the Faculty Unit signature)