Faculty of Mathematics and Computer Science

Course title: NUMERICAL METHODS

ECTS credit allocation (and other scores): 5

Semester: autumn

Level of study: ISCED-6 - first-cycle programmes (EQF-6)

Branch of science: Natural sciences

Language: English

Number of hours per semester: 30 lectures + 30 classes = 60 hours

Course coordinator/ Department and e-mail: Erasmus coordinator Anna Szczepkowska/ WMiI, anna.szczepkowska@matman.uwm.edu.pl

Type of classes: classes and lectures

Substantive content

CLASSES:

Practical aspects of numerical calculations.

LECTURES:

Basic ideas of numerical methods. Examples of analytically unsolvable problems. Well-posedness and condition number of a problem. Floating-point arithmetic. Various methods for solving nonlinear equations. Polynomial interpolation. Various types of approximation. Numerical integration - simple and composite quadrature. Solving systems of linear equations - iterative methods. Basic methods for solving ordinary differential equations.

Learning purpose:

 Lectures present basic numerical algorithms used in solving various mathematical problems. The goal of laboratory classes is to acquaint students with practical aspects of numerical calculations.

On completion of the study programme the graduate will gain:

Knowledge:

The student knows basic numerical methods used for approximate solving various mathematical problems.

Skills:

The student is able to use numerical tools and methods for solving chosen problems from linear algebra and mathematical analysis, including those based on applications.

Social Competencies:

The student is able to work in a team.
The student knows the limitations of his knowledge and is aware that learning is a lifelong process.

Basic literature:

1) Z. Fortuna, B. Macukow, J. Wąsowski, Metody numeryczne, wyd. Wydawnictwa Naukowo-Techniczne, 2005 ; 2) A. Ralston, Wstęp do analizy numerycznej, wyd. Państwowe Wydawnictwo Naukowe, 1983 ; 3) A. Kiełbasiński, H. Schwetlick, Numeryczna algebra liniowa: wprowadzenie do obliczeń zautomatyzowanych, wyd. Wydawnictwa Naukowo-Techniczne, 1994

Supplementary literature:

1) J. Stoer, Wstęp do metod numerycznych, wyd. Państwowe Wydawnictwo Naukowe, 1979

The allocated number of ECTS points consists of:

Contact hours with an academic teacher: 2,52 ECTS points,

Student's independent work: 2,48 ECTS points,