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Course title: COMPUTER SIMULATION

ECTS credit allocation (and other scores): 4

Semester: autumn

Level of study: ISCED-7 - second-cycle programmes (EQF-7)

Branch of science: Engineering and technology

Language: English

Number of hours per semester: 15 lectures + 30 classes = 45 hours

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

Type of classes: classes and lectures

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Substantive content

CLASSES:

1. Malthus model, 2. Verhulst model, 3. Lotka-Volterra model, 4. Concurrent and symbiotic growth models, 5. Free falling, 6. Projectile motion, 7. Bungee, 8. Collisions, 9. Lorenz attractor, 10. Hit-or-miss (Monte Carlo), 11. Random walk, 12. Travelling salesman dilemma (simulated annealing), 13. Life, 14. Ghetto

LECTURES:

1. Introduction into Mod/Sim, 2. High-Performance Computing, 3. Simulation as an iterative process, 4. Continuous-time systems, 5. Discrete systems, 6. Simulation in sport science, 7. Molecular dynamics, 8. Deterministic chaos, 9. Monte Carlo methods, 10. Cellular automata.

Learning purpose:

Introduction into methods of setting-up and solving mathematical models of common physical phenomena and processes. Introduction into software for numerical computations.

On completion of the study programme the graduate will gain:

Knowledge:

Students are expected to describe typical models of physical phenomena.

Skills:

Social Competencies: (min. 50 znaków, max. 100 znaków - usuń nawias po zamieszczeniu treści):

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Basic literature:

1) Stephen L. Campbell, Jean-Philippe Chancelier, Ramine Nikoukhah, Modeling and simulation in Scilab/Scicos, wyd. Springer, 2006 ; 2) Krzysztof Ernst, Fizyka sportu, wyd. PWN, 2010 ; 3) Iwo Białynicki-Birula, Iwona Białynicka-Birula, Modelowanie rzeczywistości, wyd. WNT, 2007

Supplementary literature:

1) Daniel Kahnemann, Pułapki myślenia, wyd. Media Rodzina, 2012

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The allocated number of ECTS points consists of:

Contact hours with an academic teacher: 1,60 ECTS points,

Student's independent work: 2,40 ECTS points,