Course title: Computer Simulation of Chaotic Physical Processes	**Neptun code:** **GEFIT413-a**
Course coordinator: Dr. Endre Kovács, PhD, associate professor	
type of lesson and number of lessons: **lecture (2)**	
method of evaluation: colloquium	
curriculum location of the subject: (autumn/spring semester): autumn and spring	
pre-study conditions *(if any)*: -	
The task and purpose of the subject:	
To enhance the routine in solving ordinary differential equations numerically, to practice algorithmization, to strengthen the fundamentals of natural sciences	
Course description:	
The concept of chaotic motion, butterfly-effect. Attractors, bifurcations, fractals. Tools and methods to investigate continuous-time chaotic systems. Phase space, stroboscopic map, Lyapunov exponent, Fourier analysis. Numerical methods for solving chaotic systems. Adaptive time step methods. Mechanical three-body problem. Anharmonic oscillator. Nonlinear RLC circuits, ferroresonance, Chua's circuit. Waves in nonlinear media.	
Required literature:	
1. Hoppensteadt, F. C.: Analysis and Simulation of Chaotic Systems, Springer, 2000 2. Enns R. H., McGuire G. C.: Nonlinear physics with Maple for scientists and engineers, Second Edition, Springer, 2000.	
Recommended literature:	
1. Skiadas, C. H.: Chaotic Modelling and Simulation: Analysis of Chaotic Models, Attractors and Forms, 1st Edition, CRC Press, 2009 2. Matsumoto, T.: Chaos in Electronic Circuits, PROCEEDINGS OF THE IEEE, VOL. 75, NO. 8, 1987	