Course title: Computer Simulation of Deterministic Physical Processes	**Neptun code:** **GEFIT412-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 obtain routine in solving differential equations numerically, to practice algorithmization, to strengthen the fundamentals of natural sciences	
Course description:	
Fundamentals of modelling and simulation, non-dimensionalization. Numerical algorithms for solving ordinary differential equation systems and partial differential equations. Order of accuracy and stability. Stiff systems. Radioactive decay. Simple, damped and forced harmonic oscillator. Linear RLC circuits. Projectile motion: non-uniform gravitational field and air resistance. Mechanical two-body problem. Heat conduction and diffusion. Waves in linear media. The drift-diffusion model of semiconductors. Telegrapher's equations.	
Required literature:	
1. Steven C. Chapra, Raymond P. Canale: Numerical Methods for Engineers, McGraw-Hill, 2015. 2. Singh, V. P.: System Modelling and Simulation, New Age International Publishers, 2009., Chapter 5.	
Recommended literature:	
1. W. Gander, J. Hrebicek: Solving Problems in Scientific Computing Using Maple and MATLAB, Fourth Edition, Springer-Verlag, 2004. 2. Braun M., Differential Equations and Their Applications, Springer-Verlag, 1975	