

Name of the course: INFPHD649 Modelling and Simulation of Dynamic Systems (complex exam preparatory)		Total credits: 6
CODE: (Neptun)		
Type: Optional/Compulsory		
Total hours of per semester: lecture: 2 practice: 1 consultation: Other:		
Type of testing: Other:		
Semester:		
Description Equilibria of dynamical systems, stability. Application of numerical methods for stability analysis and for studying the dynamics of the system. Stabilization of unstable equilibria by gyroscopes and by control. Dynamics of digitally controlled systems. Digital control, discrete systems, delay differential equations. Nonlinear vibrations, simulation of periodic and chaotic motions. Piecewise linear systems. Applications.		
Literature Compulsory / Recommended Farkas, M. Periodic Motions, Springer-Verlag, 1994. Nayfeh, A. H., Balachandran, B., Applied Nonlinear Dynamics, Jon Wiley & Sons, New York, NY, 1995. Stépán, G., Retarded Dynamical Systems: Stability and Characteristic Functions, Longman, Harlow, UK, 1989.		
Competencies Knowledge		

Competencies

- Expertise in the application of the concepts and methods of software technology in modeling of complex software and architecture design. Ability to develop applications with real-time requirements.
- Ability to formalize complex technical problems, to analyze theoretical and practical background, and to provide adequate solutions.
- Expertise in design, development, operation and management tasks in the domain of complex software systems and database management systems.
- Skills for cooperation and team work, and ability to take leading role.
- Ability for written and oral communication in English, using the technical terms and expressions of computer science. Ability to argue, to prepare reports, to read, understand and exploit scientific and technical material (e.g. books and papers).
- Expertise in utilizing sources of technical information, their critical interpretation and evaluation, and the extraction of information relevant to the solution of a specific problem.
- Ability to perform supervised scientific research, and skills required for post-graduate studies.

Attitude

- Attends professional, technological development related to their qualification.
- Commitment to critical feedback and self-assessment.
- Commitment to lifelong learning and receptivity to new IT competencies.
- Adopts and coordinates the ethical principles of work, organizational culture and research.
- Shares professional knowledge, mediates professional results.
- Mediates and implements eco-conscious behavior and social responsibility, helping them with IT tools.
- Commitment to quality standards and its IT tools.
- Open to initiate collaboration with IT and other specialists.

Autonomy and responsibility

- a) Takes responsibility for his professional decisions taken during his professional activities.
- b) Takes responsibility for observing and enforcing deadlines.
- c) Takes responsibility for own and fellow workers' work.
- d) In the case of operational critical IT systems, he/she can be assigned responsibility for development and operation, according to his/her professional competencies.