T-806-SIMU   SIMULATION II   **6 ECTS**

Year of study: First or second year MSc.
Semester: Fall.
Level of course: 5. Second cycle, intermediate.
Type of course: Elective. *Recommended elective for MSc Engineering Management.*
Prerequisites: No prerequisites.
Schedule: Runs for 3 weeks – 4 teaching hours a day.
Supervisor: Páll Jensson.
Lecturer: Anna Hulda Ólafsdóttir.

Learning outcome: By the end of the course students should:

- know how different types of complex systems and processes can be understood, analyzed, and modeled (conceptually and numerically)
- understand different model development phases
- be able to apply the systems approach in solving a moderately complex problem
- learn how to critically evaluate models and their limitations (assumptions/simplifications)
- be familiar with validation of models
- understand how to develop a decision support tool for strategic planning.

Content:
The purpose of the course is that students will be able to understand and apply the basic tools of System Analaysis and System Dynamics Modelling from a practical perspective. It has the steps from mission statement, system conceptualization and the process of creating simulation models from the conceptualization using the most modern, user-friendly software available called Stella. The course focuses on the fundamental concepts of system dynamics modelling such as positive and negative feedback structures as well as causal loop diagrams. System dynamics model formulation and simulation is introduced; rate equations and auxiliary equations, delays and graphical converters. Furthermore, policy and sensitivity analysis will be discussed. The course will focus on technical, ecological and economical topics and how they are linked. However, it will also cite examples of a greater variety, such as epidemical studies, interpersonal communications and group dynamics. Practical examples will be analysed both regarding business as well as public policy. The coupling between soft systems, such as decisions and human reactions and physical systems will be trained. By the end of the course the students will hopefully agree that modelling is both fun and useful.

Reading material; Teaching and learning activities; Assessment methods: To be announced in the learning management system (Canvas) at the beginning of the semester.
Language of instruction: English.

All course descriptions may be subject to change. Revised information on the course schedule, reading material, teaching and learning activities, and assessment methods will be introduced in the learning management system Canvas at the beginning of the semester.