TKP4555 PROSESS- SYSTEMTEKNIKK / PROCESS- SYSTEM ENGINEERING

TKP10 PROSESSREGULERING VK
Prosessregulering, videregående kurs
Process Control, Advanced Course
Lecturer: Professor Sigurd Skogestad
Credits: 3.75 Sp
Time: According to agreement
Examination aids: D Exercises: marks
Learning outcome : The student should be able to design plantwide control system
Content: Control structure design for complere chemical plants.
Selection of controlled variables (self-optimizing control).
Consistent inventory Control.
Regulatory control.
Tuning of PID controllers.
Multivariable control.
Decentralized control.
RGA. Introduction to MPC. Use of dynamic simulators.
Teaching activities: Lectures, computer simulation. exercises.
Course material: Copies from scientific papers and books including Chapter 10 in Skoegstad and Postlethwaite, "Multivariable Feedback Control, Wiley, 2010
Exam: Oral

TKP11 PROSESS-SIMULERING VK
Prosess- simulering videregående kurs
Advanced Process Simulation
Lecturers: Professor Heinz Preisig og professor Magne Hillestad
Coordinator: Professor Heinz Preisig
Credits: 3.75 Sp
Time: Fall semester
Examination form: oral in form of a seminar with questions section added
Compulsory activities: exercises, presentations, project work
Language: English
Contents: Simulators solve sets of equations representing the behaviour of plants, namely mathematical models for the plant. The topic of the course is to shed some light on what is under the hood of these simulators. The subject is extended by optimisers which are superimposed on the simulators upwards and physical property interfaces downwards.
The course touches on the theoretical subjects associated with the methods used in simulators and optimisers, such as graph theory for the representation of networks, sequential modular approaches and simultaneous equation approaches and possibly integrators.
Course form: Lectures, tutorials and project. The course is largely project oriented. Lectures are given on key subjects by the lecturers in the first part. Relevant subjects are being defined in the form of projects, which then are being lead by a student and discussed in the group as a follow up of the project student's presentation.
The module is joint with the PhD course KP8100 withhigher requirements on the project.
Prerequisites: Course in numerics, optimisation and preferably TKP4135 Chemical Process Systems Engineering
Course material: Handouts
Exam: Oral

TKP12 TERMODYNAMIKK VK
Termodynamikk, videregående kurs
Thermodynamics, Advanced Course
Lecturer: Associate professor Tore Haug-Warberg
Credits: 3.75 Sp
Time: According to agreement
Eksamen: Will be announced
Aids: D Øvinger: Karakter:
Content: Thermodynamic methods (Euler functions and Legendre transformations) with applications to thermodynamic state theory. Systematic derivation of basic equations in canonical state variables. Conservation principles of mass and energy used in the analysis of practical problem solutions connected to phase and reaction equilibria. Introduction to thermodynamic modelling. The course is adapted to individual needs if feasible (more weight on the modelling and less weight on the problem analysis, or vice versa).
Teaching activities: Regular teaching and colloquiums.
Course materiall: Lecture notes and copies of articles.
Exam: Oral

TKP13 FEEDBACK SYSTEMS IN BIOLOGY
Lecturer: Associate Professor Nadi Skjøndal-Bar
Aim of the course: To present the concept of feedback in relation to biological intra- and intercellular processes
Time: According to agreement
Exam: Oral examination, no aids
Credits: 3.75 Sp
Prerequisites: TKP4140 process control or equivalent knowledge in control
Module description: The concept of feedback is well known from control theory, and is quite abundant in biology. The course will present the concept of negative and positive feedback inside the cells and in genetic circuits. Cellular response to combinations such as negative-negative, positive-negative feedback structures will be examined and properties such as oscillations and bi-stability will be presented. The course will also investigate the effect of feedback on the evolution of species.
Teaching methods: Seminars, self study, exercises/project work with presentations.
Course material: Articles and excerpts from textbooks.
Language: English