Systems Engineering
Courses fall 2009

HØGSKOLEN i Buskerud

SDOE 605 Systems Integration

Date: 31. August – 04. September 2009

Target group: Master students 2. year, course participants

Course description: This module is designed to provide participants with an understanding of the systems integration (SI) process, the tools and techniques required for successful SI, critical success factors, and best practices.
The module objective is to provide participants with and understanding of technical and business process issues involved in systems integration. Case studies and examples from the IT, defense, energy, and financial services domain will be used to illustrate the concepts discussed.

Registration deadline: 25. August 2009

SDOE 625 Fundamentals of Systems Engineering

Date: 07. – 11. September 2009

Target group: Master students 1. year, course participants

Course description: This module presents the fundamental principles and processes for designing effective systems, including how to determine customer needs, how to distinguish between needs and solutions, and how to translate customer requirements into design specifications. The focus is on designing systems that not only provide the required capabilities, but that are reliable, supportable and maintainable throughout their lifecycle. The course concludes with a Systems Requirements Review (SRR) in which students present their class projects.

Registration deadline: 1. September 2009

SEMA 6201 System Modelling and Analysis

Date: 14. – 18. September 2009

Target group: Master students 2. year, course participants

Course description: The objective of this course is to provide means to model the system, the design of the system, the usage context and the system life cycle in such a way that decisions are supported quantitatively.

The course is based on the extended CAFCR framework. The CAFCR model is a decomposition of an architecture description into five views:

- The Customers objective view (*what* does the customer want to achieve)
- The Application view (*how* does the customer realize his goals) captures the needs of the customer.
- The *what* and *how* customers view provide the justification (*why*) for the specification and the design.
- The Functional view describes the *what* of the product, which includes (despite its name) the *non-functional* requirements.
- The *how* of the product is described in the Conceptual and Realization views.

The CAFCR model is extended with the life cycle context with all creation and product life cycle considerations.

Registration deadline: **8. September 2009**

SERE 6301 Robust Engineering

Date: **21. – 25. September 2009**

Target group: Master students 3. year, course participants

Course description: The goal with this course is to:

- convey the basic principles of Robust Design and Engineering
- form a deeper understanding of the customer value of a product
- get a deeper understanding of quality and its relation to robustness

Historical background of Robust Design and the contributions from Dr. Genichi Taguchi. The concept of Robust Design. Definition of customer value. The evolution of customer value over time. A product's interaction with the customer thru various stages. Needs, Functions, Solutions and Processes. The Kano model. Contributions to customer value expressed in a functional domain. Definition of quality and robustness. Reduction of variability and adjustment of mean. Noise factors and control parameters. Signal-to-Noise ratio and Response tables. Ideal function. Noise strategies. P diagram. Orthogonal arrays. Interactions between control parameters. The quadratic loss function. Analysis of experimental data in Excel.
Hands-on optimization of a simple design.

Registration deadline: **15. September 2009**

SECS 6201 Signals and systems and system identification.

Dates: **10./11.09 +** 8./9.**10 +**5/6.11 **+** 3./4.12 **+ exam** 18.**12**

Target group: Master students 2. year, course participants

Course description: The aim of this subject is to give students with different backgrounds a common foundation in signal processing and control engineering in preparation for further studies. Sampling and quantization, discrete systems, the z-transform, frequency response and convolution. The DFT and its application to cyclic convolution and spectral analysis. Nonparametric spectral analysis and minimisation of spectral leakage in practical applications. The principles for divide-and-conquer FFT-algorithms. Design of FIR and IIR filters and filter structures. Basic properties of filter banks and some typical applications. Correlation. Introduction to stochastic signals and systems, state estimation using the Kalman filter, parameter estimation using the Kalman filter, the least squares method, prediction error methods and subspace methods, application of estimated models and states for analysis, design and implementation of control systems. MatLab/Simulink and will be extensively used for the course work.

Registration deadline: **4. September 2009**

SEPD 6201 Mechanical vibrations and advanced materials

Dates: **10./11.09 +** 8./9.**10 +** 5/6.11 **+** 3./4.12 **+ exam** 18.**12**

Target group: Master students 2. year, course participants

Course description: The purpose of Mechanical Vibration part of the course is to give the student the fundamental concepts of mechanical vibrations and Avanced Materials, preparing for further studies.

Mechanical Vibrations: Practical application of the theory of mechanical vibrations for engineers and scientists working with systems and structures subjected to harsh dynamics environments.

Advanced materials: Light metals: Alloys of Aluminium, Magnesium, Titanium and copper. Polymers, Ceramics, Composites. Rules of mixture. Dislocations and surface defects. Surface science, Dispersion strengthening by phase transformation and heat treatment, Aging. Martensite and shape-memory alloys. Material Selection: General concept, Material Properties for Design. Software practice.

Registration deadline: **4. September 2009**

Praktisk informasjon

Undervisningsform
Undervisningene er lagt opp som intensivundervisning. I kursuken vil undervisningen foregå fra 0830 til ca 1630 hver dag. Det vil være en blanding av forelesninger og gruppearbeid. For våre masterstudenter og for de som ønsker det av andre kursdeltagere, avsluttes kurset med en innleveringsoppgave som er individuell og som skal leveres inn 10 uker etter siste kursdag. Leverer du inn oppgaven, og får den godkjent, vil du få studiepoeng for kurset.

Undervisningsspråk
Undervisningsspråket er engelsk; både skriftlig og muntlig.

Undervisningssted
All undervisning foregår i Høgskolens lokaler på Kongsberg.

Pris
Prisen på kurset er avhengig av om du leverer inn oppgaven eller ikke

- Alt. 1: Kun kursuken kr. 20.000,-
- Alt. 2: Kursuke + innlevering av oppgave/eksamen kr. 25.000,-

Kursprisen inkluderer i tillegg til undervisning: alt studiemateriell, kaffepauser og lunsj alle dager i kursuken, samt veiledning og retting av oppgave (alt 2)

Påmelding
Påmelding skjer per mail til Merete Ræstad Faanes, **merete.r.faanes@hibu.no**

Påmeldingsfrist
Se hvert enkelt kurs.
Etter påmeldingsfristen fyller vi opp eventuelt ledige plasser fortløpende.Vi har begrenset med plasser på alle kurs, så det lønner seg å være tidlig ute med påmeldingen.

Kontakt oss

- Faglige spørsmål: Gunnar Berge, **gunnar.berge@hibu.no**
- Praktiske spørsmål: Merete Ræstad Faanes, **merete.r.faanes@hibu.no**
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