KURSPLAN
Materialmekanik, 7,5 högskolepoäng

Continuum Mechanics, 7.5 credits

Kurskod:	TMMS22	**Utbildningsnivå:**	Avancerad nivå
Fastställd av:	VD 2021-03-01	**Utbildningsområde:**	Tekniska området
Reviderad av:	Utbildningschef 2022-02-24	**Ämnesgrupp:**	MA2
Gäller fr.o.m.:	2023-01-01	**Fördjupning:**	A1F
Version:	2	**Huvudområde:**	Produktutveckling

Lärandemål

After a successful course, the student shall:

Kunskap och förståelse
- display knowledge of the transition from observed material behavior to material modelling and simulations
- display knowledge of models within elasticity, viscoelasticity, plasticity and viscoplasticity
- display knowledge of modeling of material failure and transient behavior like creep and relaxation

Färdighet och förmåga
- demonstrate the ability to implement material models in commercial codes
- demonstrate the ability to simulate and predict material behavior
- demonstrate ability to select the appropriate mechanical model

Värderingsförmåga och förhållningssätt
- demonstrate the ability to discuss problems and solutions
- demonstrate ability to evaluate the applicability of chosen material model for simulating the observed material behavior

Innehåll

Continuum mechanics is a branch of mechanics that deals with the mechanical behavior of materials modeled as a continuous mass rather than discrete particles. The framework for this type of modeling, typical models and the study of phenomena in deformation of materials is studied and implemented for solving numerically. This knowledge is important when predicting and optimizing product behaviors.

The course includes the following elements:
• Thermodynamic framework for material modeling
• Viscoelasticity models, like Maxwell, Kelvin-Voigt and Standard linear solid model, for studying phenomenon like creep, relaxation and damping
• Plasticity and viscoplasticity models, with (and without) hardening and damage, for studying

behavior of metals as well as non-metallic materials
• Introduction to using material models in a FE-code like ABAQUS
• Implementing and running material models in commercials codes like Matlab and ABAQUS

Undervisningsformer

Teaching consists of lectures mixed with computational exercises.

Undervisningen bedrivs på engelska.

Förkunskapskrav

Passed courses at least 90 credits within the major subject Mechanical Engineering, 15 credits Mathematics included multivariable calculus and completed course in Numeric Analysis, proof of English proficiency is required (or the equivalent).

Examination och betyg

Kursen bedöms med betygen 5, 4, 3 eller Underkänd.

Poängregistrering av examinationen för kursen sker enligt följande system:

Examinationsmoment	Omfattning	Betyg
Examination[I]	5 hp	5/4/3/U
Inlämningsuppgifter	2,5 hp	U/G

[I] Bestämmer kursens slutbetyg vilket utfärdas först när samtliga moment godkänts.

Kurslitteratur

The literature list for the ourse will be provided 8 weeks behfore the course starts.

Lecture notes by L. Mähler.