KURSPLAN
Microstructural Engineering, 7,5 högskolepoäng

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Kurskod:	TMES22	**Utbildningsnivå:**	Avancerad nivå
Fastställd av:	VD 2021-03-01	**Utbildningsområde:**	Tekniska området
Gäller fr.o.m.:	2022-01-01	**Ämnesgrupp:**	MA2
Version:	1	**Fördjupning:**	A1F

Lärandemål

After a successful course, the student shall:

Kunskap och förståelse
- demonstrate comprehension of the relation between thermodynamics and phase diagrams
- demonstrate comprehension of the mechanisms of diffusion
- demonstrate comprehension of the principles of phase transformations and the role of interfaces for solidification and solid-state transformations

Färdighet och förmåga
- demonstrate skills of describing the phase selection, nucleation and growth of phases
- demonstrate the ability to use thermodynamics for predicting phase diagrams

Värderingsförmåga och förhållningssätt
- demonstrate the ability to quantitatively describe the details and mechanisms of diffusion
- demonstrate an understanding of a quantitative description of the selection of type and generation of the scale of microstructure during processing
- demonstrate the ability to decide a suitable route to achieve the desired engineered microstructure

Innehåll

The core concept of this course is the detailed description and understanding of the principles of phase transformation in metals and alloys.

The course includes the following elements:
• Thermodynamics and phase diagrams
• Diffusion
• Crystal interfaces and microstructure
• Solidification
• Diffusional transformations in solids
• Diffusionless transformations.

Undervisningsformer

Lectures, laboratory sessions and/or project work, and assignments/quizzes.

Undervisningen bedrivs på engelska.

Förkunskapskrav

Passed courses at least 90 credits within the major subject Mechanical Engineering, 15 credits Mathematics, and completed courses in Materials and Manufacturing, 7,5 credits and Thermodynamics, 7,5 credits, 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
Inlämnigsuppgifter	2 hp	U/G
Quizzes	2 hp	U/G
Examination[I]	3,5 hp	5/4/3/U

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

Kurslitteratur

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

Porter and Easterling, Phase transformations in metals and alloys, Third Edition, CRC Press, 1992
Selected publications will be made available during the course.