



# FMG3920 Additive processes, materials and design for metallic components 7.5 credits

Additiva processer, material och design för metalliska komponenter

This is a translation of the Swedish, legally binding, course syllabus.

## Establishment

On 22/06/2020, the Dean of the ITM School has decided to establish this official course syllabus to apply from autumn term 2020 (registration number M-2020-0217). M-2020-0575.

## Grading scale

P, F

## Education cycle

Third cycle

## Specific prerequisites

Admitted to third-cycle programmes.

## Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

## Intended learning outcomes

The major aim with the course is to give doctoral students in industrial production, material science, machine design and solid mechanics an interdisciplinary understanding of additive production with a focus on metallic materials. Different perspectives will be presented based on different disciplines of teachers and researchers from departments at the school for industrial technology and management (ITM)/KTH Royal Institute of Technology and the unit for Solid Mechanics at the Department of engineering mechanics, the school for technological sciences (SCI)/KTH Royal Institute of Technology.

The course also intends to increase the interaction between doctoral students with a focus on additive manufacturing in different disciplines to strengthen the connections between the different departments and contribute to the interdisciplinary research in KTH Royal Institute of Technology.

### **On completion of the course, the student should be able to:**

- summarise and explain the different additive manufacturing processes and describe limitations and possibilities with state-of-the-art 3D printers.
- give examples of process-structure-property relations for metallic materials produced using additive manufacturing.
- apply knowledge to anticipate mechanical properties on macro level.
- apply design criteria for components produced with additive manufacturing processes including cost aspects and sustainability.
- summarise questions relevant to additive manufacturing in different disciplines in addition to the student's own subject area.

## Course contents

This is an interdisciplinary course that covers fields relevant to additive manufacturing. The course content includes: the manufacturing techniques such as SLM (selective laser melting), EBM (electron beam melting) and DED (directed energy deposition); material and material design for additive manufacturing; mechanical properties of additively manufactured components; component design; and sustainability aspects including LCAs and circular economy. The course is given through 15 lectures and an own work in the form of a shorter project task in groups with compulsory project work presentation for all participants of the course.

## Examination

- DEL1 - Participation, 7.5 credits, grading scale: P, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

If the course is discontinued, students may request to be examined during the following two academic years.

## Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.