

Course Syllabus

Powder Metallurgy with Additive Manufacturing 7.5 Credits*, First Cycle

Learning Outcomes

Upon completion of the course, students shall be able to:

- explain key concepts and terminology in powder metallurgy,
- describe and explain powder production, compaction, sintering and surface treatment of the powder metallurgical components,
- describe the relationship between the microstructure and mechanical properties of powder metallurgy components,
- describe various metal additive manufacturing technologies and their operating principles, capabilities and limitations,
- demonstrate knowledge of various materials that can be used with different additive manufacturing processes, process parameters and post processing of additive manufactured parts,
- identify various applications of additive manufacturing in industries such as aerospace, automobile and medical industries,
- produce simple powder metallurgy components by choosing the right materials,
- characterize and analyse the raw materials and finished product,
- prepare and use simple CAD models for additive manufacturing, and
- analyse the pros and cons of using additive manufacturing technology over conventional manufacturing techniques.

Course Content

The course introduces the fundamental concepts of powder metallurgy with a special focus on additive manufacturing. The powder production, compaction, and sintering of powder metallurgical components are explained. The microstructure and mechanical properties of powder metallurgical components are discussed in terms of design and applications.

A brief introduction to various metal additive manufacturing technologies is given. The

concepts of raw material, process parameters and post-processing of metal additive manufacturing are discussed in relation to some case studies.

Assessment

Written exam (5 credits), seminar (1 credit), active participation in laboratory work a written lab report (1.5 credits)

Forms of Study

Lectures, seminar and laboratory work

The seminar and laboratory work are mandatory.

Grades

The Swedish grades U, 3, 4, 5.

Laboratory work and seminar U-G.

The grading scale U, 3, 4 and 5 is used for the written exam.

The grade on the written exam determine the final grade for the course.

Prerequisites

Basic qualifications for university studies at undergraduate level as well as completed studies of at least 90 hec within: energy and environmental technology; mechanical, chemical or civil engineering; or physics, or equivalent knowledge.

Subject:

Materials Technology

Group of Subjects:

Materials Technology

Disciplinary Domain:

Technology, 100%

This course can be included in the following main field(s) of study:

1. Materials Technology

Progression Indicator within (each) main field of study:

1. G2F

Approved:

Approved 22 May 2019

Valid from 12 July 2019