Functional Materials

Code: CHEM3034

Extent: 20–25 cr

Language: English

Professor in charge: Sami Franssila

Target group: Master's students

Application procedure: Open for all students of Aalto University.

Quotas and restrictions: Please note, that in some courses the number of participants can be limited. Then major students (Functional Materials) have the priority.

Prerequisites: While making your study plan, you should verify that you have the prerequisites needed for the courses.

Learning outcomes

After Functional Materials minor program student can:

1. Explain solid state structure and phenomena, including mechanical, electrical, magnetic, optical, thermal behaviour of metals, polymers, ceramics and composites
2. Evaluate material properties of metals, ceramics, polymers, composites, biomaterials and nanomaterials
3. Design new materials and predict their behaviour
4. Understand the engineering possibilities and limitations of new materials

Content and structure of the minor

For the minor (20–25 credits) all students have to take the same compulsory studies of 10 cr. Additionally the student needs to select 2–3 courses (10–15 cr) from Functional Materials major's courses. Please check the list below and major's content.

Structure of the minor

Code	Name	Credits	Period
Mandatory courses		10	
CHEM-E5100	Solid State Materials and Phenomena	5	I
CHEM-E5120	Interfaces and Nanomaterials	5	I
Elective courses		10-15	
Choose 2–3 courses from the list below			
CHEM-E2130	Polymer Properties	5	II
CHEM-E5105	Powder Metallurgy and Composites	5	I–II
CHEM-E5110	Metallic Materials	5	II
CHEM-E5130	Laboratory Course in Functional Materials	5	III–IV
CHEM-E5140	Materials Characterization, laboratory course	5	I–II
CHEM-E5115	Microfabrication	5	IV–V
CHEM-E5125	Thin Film Technology	5	III
CHEM-E5135	Biomimetic Materials and Technologies	5	IV–V

CHEM-E5145	Materials for Renewable Energy P	5	III–IV
CHEM-E5205	Advanced Functional Materials	5	I–II
CHEM-E5215	Materials for Nuclear Power Plants	5	III–IV
CHEM-E5225	Electron Microscopy P	5	I–II
CHEM-E4105	Nanochemistry and Nanoengineering	5	IV
CHEM-E4155	Solid State Chemistry	5	IV–V
CHEM-E4205	Crystallography Basics and Structural Characterization	5	I
CHEM-E4210	Molecular Thermodynamics	5	II
CHEM-E4215	Functional Inorganic Materials	5	II
CHEM-E8135	Microfluidics and BioMEMS	5	III–IV
PHYS-E0422	Soft Condensed Matter Physics	5	III–IV
PHYS-E0424	Nanophysics	5	I–II
PHYS-E0423	Surface Physics	5	III–IV
ELEC-E3140	Semiconductor Physics	5	I–II
ELEC-E8713	Materials & Microsystems Integration	5	I–II
ELEC-E8724	Biomaterial Science	5	I–II
MEC-E1070	Selection of Engineering Materials	5	I
MEC-E6002	Welding Technology and Design P	5	V
MEC-E6003	Materials Safety P	5	I
MEC-E6004	Non-destructive Testing P	5	II
MEC-E7002	Manufacturing Methods I	5	III–IV
MEC-E7006	Advanced Manufacturing	5	IV