

## **Doctoral Programme Description**

***Established by the Faculty Council/Education Committee: 25/01/2011***

*Revised: 26/09/2018*

### **The name of the programme in Swedish and translated into English**

*Also indicated whether the programme has any specialisations.*

Teknisk materialvetenskap (Materials Science and Engineering)

The subject has no specialisations.

### **Short description of subject area and contents**

*Indicate which third-cycle subjects are included in the programme. General syllabuses for the subjects included are attached to the programme description.*

Education within the third-cycle subjects in Materials Science and Engineering covers a broad spectrum, ranging from construction materials to functional materials. The different materials studied largely reflect the material needs of Swedish industry, with steel and carbide being the primary examples, but the education also comprises aluminium alloys, ceramics, magnetic materials, materials for information storage and nanomaterials. The contents focus on the properties, microstructures and manufacturing processes of the materials and the correlation between them, i.e between the properties and structures of the materials and between manufacturing processes and microstructures as well as atomic structures.

### **Programme organisation**

*Programme Council (indicate included functions, not individuals), Programme Coordinator, student representation, etc.*

The programme is managed by a programme director (DA) together with a programme council consisting of the management group of the Department of Materials Science and Engineering, which also includes the PhD candidate representative (PAD). The main task of the programme council is to continue developing and assuring the quality of third-cycle education. The doctoral programme is a permanent agenda item in the bi-weekly meetings of the management group held within the operational unit. In these meetings, DA gives an account of any current third-cycle education matters.

DA must meet KTH's requirements to act as a principal supervisor and should be an active researcher and principal supervisor. The programme is formally organised under ITM's Head of School and Director of Third Cycle Studies (FA), and to a large extent, it shares administrative processes with the other doctoral programmes at ITM. For this reason, DA is a member of the Postgraduate Education Committee (FU) at ITM.

### **Courses**

#### **Course selection**

*Describe the course selection for the programme, which subject areas must be covered and how a relevant course selection is ensured.*

The programme has several subject-specific courses, which relate to phase transformation, alloy theory, diffusion, process and materials modelling, thermodynamics, computational tools for materials science. Third-cycle courses given at other higher education institutions, national graduate schools or international networks can also be used. Courses are chosen to provide both basic and specialist competence within the doctoral student's specific research area.

## **Quality assurance and follow-up of the programme courses**

*Indicate how the programme courses are followed up and how their quality is assured.*

A course evaluation is carried out following the completion of each course. The course coordinator is responsible for ensuring that this is done. The course evaluation procedure follows KTH's procedure for first-cycle and second-cycle courses.

## **Support for goal attainment for each course, in addition to courses**

*Organised activities outside of courses, such as seminar series and workshops.*

The quality of education is systematically evaluated throughout the period of doctoral studies. We ensure that the doctoral students have principal supervisors (and assistant supervisors) who are experts within the doctoral student's research area, and who are able to maintain a stimulating research environment that contributes to the doctoral student's development. Regular meetings with supervisors, group seminars, project meetings and the possibility of participating in scientific conferences contribute to a healthy learning process, which is actively supported by the doctoral programme. The development of each doctoral student is followed up by DA twice per year. These follow-up meetings with the doctoral student's supervisor involve a discussion of how the third-cycle education is progressing. The current status of the student's research project, published articles, participation in conferences and completed courses are reviewed, all with a focus on the objectives set for the doctoral programme. There is also an opportunity to discuss any problems in the supervision.

In addition to internal work seminars within the unit and/or research group, each doctoral student must also present their research at least once per year. Participation in scientific conferences (at KTH, national or international) is a very important component of third-cycle education. Traditionally, the doctoral students will often be involved in collaborations and exchanges. The collaboration networks that have been established by the department help the doctoral students in both national and international collaborations. The doctoral students on the programme are encouraged to participate in ITM's annual doctoral student conference.

In preparation of completing their doctoral thesis, the doctoral student must present their results at a final seminar at least 6 months prior to the planned public defence (determined by the main supervisor). The final seminar is the part of the quality management process for the general syllabus and the aim is to ensure that the doctoral thesis is of a high academic quality.

Before the seminar, an independent external or internal quality manager will be appointed, who has at least the qualifications of a docent and who has not previously been involved in the doctoral student's work. The opponent is to review articles, conference articles, manuscripts, thesis drafts (if any) and other relevant material to be included in the thesis. The thesis is not required to be finished at this point. The quality manager will write a review with comments, recommendations and potentially with proposed changes for the material.

## **Description of continuous, systematic quality management**

*Describe regular evaluation and development activities.*

The administrative processes are evaluated at programme level once per year at the initiative of the programme director. The administrative processes that are in common with the other third-cycle programmes at ITM are evaluated once per year in the school's Postgraduate Education Committee. If necessary, the committee can also initiate a more comprehensive review of programme content and programme structure.