Chemistry

Study plan for third-cycle subject

*The subject plan was approved by Fakultetsnämnden (Faculty Board) November 30, 2010. Valid from Spring 11.*

**Subject title**

Chemistry (Kemi)

**Subject description and programme outcomes**

**Scientific field**

There are joint provisions and guidelines for postgraduate studies at KTH in the regulatory framework for KTH’s postgraduate education. This syllabus for postgraduate studies in the subject chemistry supplements the common provisions and guidelines with the following subject-specific instructions.

**Description of possible specialisation**

The subject has no specialisations.

**Specification of how the programme outcomes are to be achieved**

Research and postgraduate studies in the subject of chemistry at KTH are purely scientific in their basis, however, through their environment there is a clear link to engineering science. This means that activity is formally divided into the traditional educational subjects, but special attention is paid to interdisciplinary cooperation between these subjects and with other disciplines represented at KTH.

The goal of the postgraduate studies in chemistry is to provide the student with sound knowledge in the subject area and the ability to conduct independent research, development and investigative work within different areas of society.

The goal of the doctoral degree is furthermore to give the student the ability to critically and independently initiate, plan and manage such work.

This means that upon completion of the education postgraduates should be able to:

1. Describe and explain the theories and empirical results within their area of specialization
2. Formulate concrete research issues in the field of chemistry.
3. Use scientific methods and develop new knowledge through their own scientific studies.
4. Critically analyze and evaluate the applied methods and results from both their own scientific studies and those of others.
5. Present and discuss research results in the scientific community.
6. Present research in a pedagogical manner outside the scientific community and in educational contexts.
7. Assess the ethical aspects of research in the field of chemistry and act based on these
8. Describe the conditions and mechanisms for financing research.

**Current research**

Research and education at postgraduate level at the Department of Chemistry is conducted within six departments:

Analytical, Physical, Organic, Inorganic and Nuclear Chemistry, as well as Surface and Corrosion science. The basic chemistry subjects at KTH form the basis of the broad system-oriented chemical engineering and technology education in both graduate education and research/postgraduate studies. Collaboration/integration between fundamental and technology-oriented subjects is the technical faculties' unique strength over other faculties. They also form the basis for the training of researchers with sound knowledge in one of the fundamental chemistry subjects with expansion and grounding of these skills in other subjects and in chemical engineering and technology.

**Programme structure**

Postgraduate studies consist of coursework and a thesis. The course stages may comprise lectures, literature studies and problem-solving as well as active participation in seminars, provided that a clear examination stage is included. Courses can be studied within the department or in collaboration with other Swedish or foreign research institutions.

Postgraduate studies are conducted under the management of a main supervisor, together with one or more deputy supervisors, in accordance with an individual syllabus approved by the Director of Postgraduate Studies. The individual syllabus of the student should be adjusted to the prior knowledge and the focus of the thesis. The postgraduate's progress is to be assessed at least once a year in connection with revision of the individual syllabus which is drawn up by the student and main supervisor.

As a part of the education active participation in research seminars at the department is required.

Postgraduates are to present their results at research seminars, preferably on a number of occasions during the study period. Postgraduates are also to participate in national and international conferences within the discipline.

**Compulsory and recommended courses**

The licentiate degree consists of coursework consisting of 30 credits and a thesis of 90 credits which gives a total of 120 credits. The doctoral degree consists of coursework consisting of 60 credits and a thesis of 180 credits which gives a total of 240 credits.
The coursework for both the licentiate and doctoral degree consists of a compulsory course in Research Ethics, as well as optional courses. Due to the broad nature of the subject Chemistry, no courses other than the Research Ethics course are compulsory.

For postgraduates who attend classes, the course Basic Communication and Teaching (LH200V, 3 credits) or equivalent is compulsory. The courses should be studied in accordance with the agreement between the student and the main supervisor, which is made in the individual syllabus.

**Compulsory courses**

Research Ethics (F3B5219), 1.5 credits

**Recommended courses**

It is recommended that postgraduates study a general course in Philosophy of Science and Research Methodology, as well as advanced and doctoral courses with a specialization which corresponds to the specialization of the research project.

Courses suitable for postgraduate studies can be selected from a list on the School of Chemical Science and Engineering's website, "http://www.kth.se/che/internt/doktorandsida/doktorandkurser". If preferable, courses can also be selected from the range at other institutes of higher education, for example, Stockholm University and Karolinska Institutet.

**Optional courses**

Optional courses suitable for postgraduate studies may, for example, be selected from the list at the School of Chemical Science and Engineering's website, "http://www.kth.se/che/internt/doktorandsida/doktorandkurser". If preferable, courses can also be selected from the range at other institutes of higher education, for example, Stockholm University and Karolinska Institutet.

Courses from other disciplines may be included depending on the specialization of the thesis.

Following agreement with the main supervisor, credits can be awarded in the individual syllabus for courses completed at graduate level. For credit transfer, the provisions of KTH's Degree Ordinance for postgraduate degrees are to be observed. For doctoral degrees, at least 60% of the total coursework is to be at postgraduate level; for licentiate degrees, at least 50%. Furthermore, in accordance with the Degree Ordinance, courses at graduate level in the scientific area of technology are not considered part of doctoral and licentiate degrees. For education at graduate and advanced levels up to 240 credits, credit transfer is not permitted. Credit transfer cannot be made for courses which are required for special eligibility for postgraduate education.

Additional course stages which the main supervisor and student jointly consider important for the thesis work may also be included in the coursework of the licentiate and doctoral degrees. Such accredited activities can take the form of individual literature courses with clear degree stages. Credit transfer for such activities requires a prior agreement between the subject representative and student with credits established in the individual syllabus. Other activities which provide credits may include a maximum of 7.5 credits for the licentiate degree and 15 credits for the doctoral degree.

**Thesis**
The thesis is a compulsory part of postgraduate education. The aim of this part of the education is that the student develops the ability to make independent contributions to the research. Development of the capacity for scientific cooperation, within and outside of their own field, is normally also part of the thesis.

The thesis shall contain new research findings which the student has developed independently or in cooperation with others. The main scientific results should meet the quality requirements for publication in internationally recognized journals with referee systems. It should be possible to distinguish one postgraduate's contribution to the texts comprised by the thesis from the other authors involved.

The thesis should normally be written in English. It should be designed as a compilation of scientific articles but in special cases it can be presented as a monograph thesis. In the former case there should be a specific written summary. Irrespective of whether the thesis is intended to be a monograph thesis or a compilation thesis the aim during the postgraduate studies should be international publication of the achieved results. Licentiate essay work should contain scientific material corresponding to at least two articles eligible for publication in internationally recognized journals with peer review. Ordinarily, a doctoral thesis contains scientific material corresponding to at least four such articles for guidance. The pre-assessment and the grading board are responsible, however, for ensuring that the thesis meets the quality standards.

The doctoral thesis is normally based on the licentiate thesis.

**Entry requirements and selection**

**General and special admission requirements and prior knowledge**

In accordance with Chapter 7, Section 39 of the Higher Education Ordinance a person has basic eligibility for third level education if he or she

1. has taken a second level qualification,
2. has completed course requirements of at least 240 higher education credits, including at least 60 higher education credits at second level, or
3. has acquired essentially corresponding knowledge in some other way in Sweden or abroad.

The faculty board may permit an exemption from the requirement of basic eligibility in the case of an individual applicant, if there are special grounds.

**Selection rules and procedures**

Admission to postgraduate studies is decided by the Dean at the School of Chemical Science and Engineering, following preparation by the main supervisor and, where appropriate, by the Director of Postgraduate Studies (during assessment of eligibility to study).

In addition to the assessment of eligibility, the applicant's level of knowledge, maturity and ability to independently review and critically analyze form the basis of selection. Past academic performance for courses of an in-depth nature in academic education at basic and second level and the independent scientific work are central in this assessment. The applicants are interviewed by the main supervisor in order to obtain a comprehensive basis for the decision. Contact is usually made with former lecturers of
the applicant. Selection among applicants for postgraduate studies is done by the main supervisor in connection with admission.

**The programme’s degrees and examinations**

**Degree of Licentiate and Degree of Doctor (PhD)**

The licentiate degree consists of coursework consisting of 30 credits and a thesis of 90 credits. The thesis should be presented and defended in accordance with KTH's general regulations.

The doctoral degree consists of coursework consisting of 60 credits and a thesis of 180 credits. The thesis should be presented and defended in accordance with KTH's general regulations. Courses and thesis work included in the licentiate degree may also be credited in a doctoral degree.

**The programme’s examinations**

The courses at postgraduate level should include a written or verbal knowledge test. The structure of the examination should, in each case, be such that the examiner can ascertain that the student has assimilated all the course content.