



## Programme syllabus

Faculty Board of Science and Engineering

School of Natural Sciences

Kemi, masterprogram, 120 högskolepoäng

Chemistry, Master Programme, 120 credits

### **Level**

Second Level

### **Date of Ratification**

Approved by Organisational Committee 2009-09-15

The programme syllabus is valid from autumn semester 2010

### **Prerequisites**

General entry requirements for second-cycle studies and specific entry requirements:

- 90 credits in Chemistry or the equivalent
- English B/6 or the equivalent.

### **Description of Programme**

The Master's programme in Chemistry aims to develop students' knowledge within chemistry in order to equip the student with the tools for a career in the chemistry sector or research education.

Chemistry plays a continuing and pivotal role in the development of society. Areas such as environmental science and the food industry are heavily dependent upon chemistry and chemists. The chemical industry, which includes biotechnology, pulp and paper, and pharmaceutical industries, accounts for 10% of Sweden's GDP.

### **Objectives**

Knowledge and understanding

For a Degree of Master (Two Years) students must

- demonstrate knowledge and understanding in their main field of study, including both broad knowledge in the field and substantially deeper knowledge of certain parts of the field, together with deeper insight into current research and development work; and
- demonstrate deeper methodological knowledge in their main field of study.

Skills and abilities

For a Degree of Master (Two Years) students must

- demonstrate an ability to critically and systematically integrate knowledge and to

analyse, assess and deal with complex phenomena, issues and situations, even when limited information is available;

- demonstrate an ability to critically, independently and creatively identify and formulate issues and to plan and, using appropriate methods, carry out advanced tasks within specified time limits, so as to contribute to the development of knowledge and to evaluate this work;
- demonstrate an ability to clearly present and discuss their conclusions and the knowledge and arguments behind them, in dialogue with different groups, orally and in writing, in national and international contexts; and
- demonstrate the skill required to participate in research and development work or to work independently in other advanced contexts.

#### Judgement and approach

For a Degree of Master (Two Years) students must

- demonstrate an ability to make assessments in their main field of study, taking into account relevant scientific, social and ethical aspects, and demonstrate an awareness of ethical aspects of research and development work;
- demonstrate insight into the potential and limitations of science, its role in society and people's responsibility for how it is used; and
- demonstrate an ability to identify their need of further knowledge and to take responsibility for developing their knowledge.

#### ***Programme specific objectives***

After completion of the programme, the student should be able to:

- identify and describe problems related to complex questions in chemistry
- independently perform chemical laboratory work
- independently assess, apply and communicate methodologies used in chemistry
- independently analyse and apply scientific principles and theories from within chemistry
- undertake independent appraisals of research ethical issues
- independently plan, perform, evaluate and present research undertakings
- seek information in the scientific literature, critically appraise research results and present the results of research in both written and oral forms, after due diligence concerning copyright issues.

## Content

### *Organisation*

The programme is offered by the School of Natural Sciences. The programme director and programme advisory board support the running and continued development of the programme. Each student will follow an individual curriculum, which is approved by the programme director after consultation with the student. The individual curriculum should include the courses planned within the programme and detail any planned international exchange activities.

### *Programme overview*

The degree programme's structure and content are designed so that the student can develop advanced knowledge within the field of Chemistry. Normally the studies should be undertaken on a full-time basis, though some possibilities for part-time studies can potentially be accommodated following discussion and eventual approval by the program coordinator.

The formal teaching activities include both campus studies (including lectures, seminars, demonstrations, practical exercises, projects, study visits etc) and some web-based activities. The normal language of instruction is English, though all courses can be given in Swedish if only Swedish speaking students are participating.

The first course (Research Methodology, 15 higher education credits) aims to provide the student with a further development and refinement of the tools necessary for advanced studies, e.g. informatics, philosophy of science, research ethics, presentation technique, statistics, literature searching, GLP, and how one performs chemical research in a safe manner (laboratory safety).

This first 15 credit course is followed by a series of three or four 15 higher education credits (45 or 60 credits) in advanced Chemistry within sectors of this discipline where Linnaeus University has well documented experience in research and research education. These three or four 15 credit courses aim to provide the student with advanced knowledge and understanding, and further training in methodologies and experience of independent work within the field of Chemistry. Furthermore, the possibility exists to study other courses offered by Linnaeus University as part of this 45 or 60 credit course series. It is also possible to study courses at other universities.

The degree programme concludes with an independent study within the field of Chemistry corresponding to either 60 or 45 credits (depending upon the number of course derived credits previously obtained). The chemistry-oriented examination project should be conducted under the guidance of either an academic research group, or in industry. The project should also prepare the student for possible future studies at PhD level.

### *Programme Courses*

All courses are obligatory, but courses with equivalent content may be included, after approval by the director of undergraduate and advanced studies or alternatively the programme director.

#### Year 1

Research Methodology 15 higher education credits, A1N

Advanced Chemistry block 1 15 higher education credits \*, A1N

Advanced Chemistry block 2 15 higher education credits \*, A1F

Advanced Chemistry block 3 15 higher education credits \*, A1F

#### Year 2

Advanced Chemistry block 4 15 higher education credits \*, A1F

Degree Project 45 higher education credits \*, A2E

or:

Year 1 as above, and year 2

Degree Project 60 higher education credits \*, A2E

\*course within the subject area of Chemistry

#### Work experience and community contacts

The programme's relevance for the chemical sector and industry and society in general is conveyed through the participation of sector and industrial representatives in the

programme advisory board, and through the possibility of performing degree project work outside of Linnaeus University.

#### *Foreign studies*

The possibility for undertaking aspects of the degree programme, either courses or degree project, at a foreign university exists as long as individual courses have a comparable content.

#### *Scope of the programme*

Sustainable development – the influence of laboratory work on the environment is an important aspect of the programme.

Internationalisation – the participation of foreign staff in the teaching of various aspects of the teaching is also of central importance in the programme.

### Quality Development

The continuous evaluation of the programme is undertaken after each course by students and teaching staff. The results of the course evaluations are available through the School administration. Feedback to students takes place through the presentation of the previous evaluation at the start of a course.

Strategic questions concerning the degree programme's structure and content are handled by the programme advisory board.

### Degree Certificate

After successful completion of programme studies, where the completed studies correspond to the requirements as prescribed by the relevant Swedish Higher Education Ordinances and the additional specific requirements made by Linnaeus University, the student may apply for award of the degree. Students that have satisfactorily fulfilled the requirements for the Chemistry Master programme can apply for the following degree.

Filosofie masterexamen

Huvudområdet: Kemi

*Master of Science (120 credits)*

*Main Field of Study: Chemistry*

Degree certification is in both Swedish and English. A diploma supplement (in English) accompanies the diploma.