Organic Synthesis and Medicinal Chemistry, Master's Programme

120 credits

Organic Synthesis/Medicinal Chemistry,

masterprogram

6MKOS

Valid from: 2017 Spring semester

Determined by
Faculty Board of Institute of Technology

Date determined
2017-01-25

Purpose

The Master's programme in Organic Synthesis / Medicinal Chemistry aims to provide students with the knowledge, skills and attitudes required for the profession or for postgraduate studies in the field. The programme meets both national and international needs in organic synthesis / medicinal chemistry, and needs from universities, industry and society in general. The training is based on a related Bachelor's programme and intends to give a deeper understanding in the field and a foundation for postgraduate studies in organic synthesis / medicinal chemistry.

The graduates leaving the Master's programme in Organic Synthesis / Medicinal Chemistry shall:

- be well prepared for advanced scientific communication with different target groups
- be able to contribute to the sustainable development of society
- be well prepared for both postgraduate studies and for the national and international labour market.

Aim

Mathematical, scientifical and technical knowledge ans reasoning
Graduates from the programme in Organic Synthesis / Medicinal Chemistry will demonstrate knowledge and understanding in the field of organic synthesis chemistry / medicinal chemistry including a broad knowledge of the area as well as considerable in-depth knowledge in certain parts of the area. The graduates will also have comprehensive knowledge of current research in the field. The graduates from the Master's programme in Organic Synthesis/Medicinal Chemistry shall on an advanced level:

- have a thorough knowledge of organic synthesis chemistry
- have knowledge of experimental methods in organic synthesis
- have experience in applying modern techniques for analysis of organic compounds, both quantitatively and qualitatively
- have knowledge of structure-function relationships between drugs and target molecules such as enzymes, receptors and nucleic acids
- have the ability to draw conclusions about how organic molecules can be modified for greater potential by studying the structure-function relationships
- have the ability to assimilate the scientific literature in the field
- be familiar with modern research in organic synthesis.

Personal and professional skills and attributes
Students graduated from the Master's programme in Organic Synthesis/Medicinal Chemistry have achieved the individual and professional skills and attitudes which are demanded for being able to critically and systematically integrate knowledge and to analyze, judge and handle complex issues even with limited information. The graduates shall also be aware of and take responsibility for their own work or post graduate studies with respect to work ethics, responsibility and

reliability. Graduates from the programme shall be able to make relevant judgements regarding scientifical, social and ethical aspects of their professional areas.

Interpersonal skills: Teamwork and communication
Students graduated from the Master's programme in Organic Synthesis/Medicinal Chemistry shall be able to collaborate with other people. This requires the ability of active participation in a project with clear roles and well defined responsibilities and tasks. The graduates can also initiate, plan, lead and evaluate large projects. The graduates shall have good skills in written and oral communication. The graduates can present information, problems and solutions in a structured way with relevant techniques both written and orally, in different languages (preferably Swedish and English) to different target groups.

Conceiving, desiging, implementing and operating scientific projects in the enterprise and social context
Students graduated from the Master's programme in Organic Synthesis/Medicinal Chemistry shall have knowledge about the natural scientist and the natural science in the society both from a historical and a contemporary perspective. The graduates shall also have an understanding of social and economic conditions in the related area and related research area. They shall be competent in initiating, working in and leading advanced development projects with accepted methods. The graduates shall also have skills in planning, implementing and present their work. The graduates have a comprehension of how research results can be transformed into industrial use and commercial business.

Content

The Master's programmme consists primarily of courses in organic synthesis and medicinal chemistry at advanced level. These are complemented with other courses at advanced level, such as protein science. The programme ends with a thesis that can be performed at a company or university. The thesis may be a good introduction to further studies at postgraduate level.

Teaching and working methods

The programme comprises four semesters and leads to a Master of Science in Chemsitry. The teaching language is English. The range of courses is found in the curriculum. Normally the content of the programme is presented at lectures, laboratory work and seminars. Some extensive projects or assignments are parts of the courses and will be reported orally and/or in writing. Laboratory work and seminars are compulsory.

The Master thesis is mainly performed during the second year and comprises 30, 45 or 60 högskolepoäng (equivalent to ECTS credits). This means that the student may choose a less extensive master thesis and combine this with further course studies in other related areas, or more in-depth courses in the same field. Courses not included in the curriculum must be approved by the Program Board after consultation with the Study Counselor.

Entry requirements

- Bachelor's degree with a major in the field of chemistry or chemical biology
- 15 ECTS credits in organic chemistry and 12 ECTS credits in biochemistry
- English corresponding to the level of English in Swedish upper secondary education (English 6/B)

Degree thesis

The thesis should be based on the high quality scientific content and carried out in close contact with the research groups involved in the programme and in the area of the profile chosen by the students. The thesis should be written and presented in English. If possible, the work should be presented orally at the minisymposium arranged by the Division of Chemistry and all students are supposed to be present. In this case, the requirement of prior attendance at final thesis seminars is disregarded.

To be qualified to conduct a degree project of 60 ECTS credits, the student must be admitted to the master's programme and have completed at least 30 ECTS credits from courses within the programme, of which 24 ECTS credits must be at the advanced (graduate) level within the main field of study.

To be qualified to conduct a degree project of 45 ECTS credits, the student must be admitted to the master's programme and have completed at least 35 ECTS credits from courses within the programme, of which 24 ECTS credits must be at the advanced (graduate) level within the main field of study.

To be qualified to conduct a degree project of 30 ECTS credits, the student must be admitted to the master's programme and have completed at least 60 ECTS credits from courses within the programme, of which 30 ECTS credits must be at the advanced (graduate) level within the main field of study.

Degree requirements

The programme leads to a "Master of Science (120 credits) in Chemistry", in Swedish "Naturvetenskaplig masterexamen Kemi".

The requirements are the following:

- a Bachelor's degree as specified in the entrance requirements.
- course requirements for a total of 120 ECTS credits from courses from the curriculum of the programme (including thesis work).
- passed the requirements for all compulsory courses.
- courses on advancement level A (advanced) 90 ECTS credits including:
    - at least 30 ECTS credits courses from the major subject, Chemistry.
    - at least 30 ECTS credits Master's Thesis in the major subject Chemistry.
- a Master's thesis presented and passed as per Linköping Institute of Technology degree regulations.

Courses overlapping each other regarding contents are not allowed to be included in the degree. Courses used for the Bachelor's degree can never be included in the Master's degree.

Entrance requirements

See general rules and regulations for master programmes at LiTH.

Degree in Swedish

Naturvetenskaplig masterexamen Kemi

Degree in English

Master of Science (120 credits) in Chemistry

Common rules

See also common rules.

Curriculum

Semester 1 (Autumn 2017)

Course code	Course name	Credits	Level	Timetable module	ECV
Period 1					
NKED16	Organic Chemistry	15	A1X	1/2/3/4	C
Period 2					
NKED13	Organic Synthesis	9	A1X	3/4	C
NKED14	Physical-Organic Chemistry	6	A1X	1/2	C

Semester 2 (Spring 2018)

Course code	Course name	Credits	Level	Timetable module	ECV
Period 1					
NKED15	Protein Chemistry	12	A1X	1/2	C
TFKE54	Preparation of Proteins	3	A1X	3	C
Period 2					
NKED20	Drug discovery and Pharmaceutical Development	6	A1X	2	C
NKED21	Project Medicinal Chemistry	3	A1X	3	C
NKED82	Biomolecular Design	6	A1X	1	C

Semester 3 (Autumn 2018)

Course code	Course name	Credits	Level	Timetable module	ECV
Period 1					
TQXX60	Degree project - Master’s Thesis	60*	A1X	-	C/E
Period 2					
TQXX40	Degree project - Master’s Thesis	45*	A1X	-	C/E
TQXX60	Degree project - Master’s Thesis	60*	A1X	-	C/E

Semester 4 (Spring 2019)

Course code	Course name	Credits	Level	Timetable module	ECV
Period 1					
TQXX30	Degree project - Master's Thesis	30*	A1X	-	C/E
TQXX40	Degree project - Master's Thesis	45*	A1X	-	C/E
TQXX60	Degree project - Master's Thesis	60*	A1X	-	C/E
Period 2					
TQXX30	Degree project - Master's Thesis	30*	A1X	-	C/E
TQXX40	Degree project - Master's Thesis	45*	A1X	-	C/E
TQXX60	Degree project - Master's Thesis	60*	A1X	-	C/E

ECV = Elective / Compulsory /Voluntary
*The course is divided into several semesters and/or periods