

Master's Programme in Protein Science

120 credits

Masterprogram i Protein Science

6MPRO

Valid from: 2019 Spring semester

Determined by

Board of Studies for Chemistry, Biology
and Biotechnology

Date determined

Purpose

The Master's programme "Protein Science" aims to provide students with the knowledge, skills and attitudes required for professional or postgraduate studies in the field of protein science. The programme meets both national and international needs in the field, and needs from universities, industry and society in general. The programme is based on a related bachelor program and intends to give a deeper understanding in the field and for postgraduate studies in the field. This will mean that students from the Master's programme "Protein Science" will:

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

Aim

Mathematical, scientific and technical knowledge and reasoning

Students from the program in protein science will demonstrate knowledge and understanding in the field of protein science 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 programme in protein science shall on an advanced level possess:

- in-depth subject knowledge in protein science, biomolecular design and structural biology
- a thorough knowledge of experimental methods for protein studies and biomolecular structure-function relationships and ability to apply this knowledge
- advanced knowledge in structural biology methods to understand, apply and question the results in the field
- ability to master key concepts and theories of biomolecular interactions and reaction mechanisms
- a good knowledge of methods and strategies for global, quantitative and comparative protein analysis
- a good knowledge of concepts, methods and theories used in the rational use of biomolecular design, with particular emphasis on evolutionary and combinatorial methods for the "protein engineering"
- ability to use modern software to analyze results in protein science and structural biology
- ability to critically assimilate the advanced literature in protein science
- familiarity with modern research in the field

Personal and professional skills and attributes

Students graduated from the master programme in Protein Science 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 able to assume responsibility for their own work or post graduate studies with respect to work ethics, responsibility and reliability. Students 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 programme in Protein Science 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 students shall have good skills in written and oral communication. The students 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, designing, implementing and operating scientific projects in the enterprise and social context

Students graduated from the master programme in Protein Science 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 students 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 programme consists of courses in the borderland between chemistry and biology at advanced level. These courses focus on proteins and other biomolecules and methods to study them. Several courses are elective which gives the student the freedom to design his own Master's programme and there is scope to supplement the protein courses with courses from other disciplines such as mathematics, biology, physics, medicine or economics. The programme ends with a thesis that can be performed at a company or university. The thesis may be a good introduction to further study at postgraduate level.

Teaching and working methods

The Master's programme includes two years of full time study and leads to Master of Science degree (120 credits) in Chemical biology. Courses within the programme are shown in the curriculum. Most courses are organized so that the theoretical content is discussed in lectures and seminars. Additionally extensive laboratory work is included in the courses. The results are normally reported written and/or oral. Participation in lectures and exercises are, in most cases voluntarily while the laboratory and organized seminars are mandatory. The literature is often in English and some courses are taught in English.

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 Programme Board after consultation with the Study Counselor.

There are two alternative curriculums, presented as two profiles:

- "Internal" is for students with a Bachelor's degree in Chemical biology from Linköping University and other students with knowledge comparable with the learning outcomes from TFKE37 Biological Measurements, TFKE38 Gene Technology, TFKE39 Project Course; Chemical Biology and NKED15 Protein Chemistry.
- "External" is for students that fulfil the specific admission requirements to the programme, but do not hold knowledge comparable to the learning outcomes from TFKE37, TFKE38, TFKE39 and NKED15.

Entry requirements

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. 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 Chemical Biology", in Swedish "Naturvetenskaplig masterexamen Kemisk biologi".

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, or after special decision from the programme board, and 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.
 - at least 30 ECTS credits Master's Thesis in the major subject.
- 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 i Kemisk biologi, 120 hp

Degree in English

Master of Science in Chemical Biology, 120 credits

Common rules

See also general regulations.

Curriculum

Semester 1 (Autumn 2019)

Specialisation: External

Course code	Course name	Credits	Level	Timetable module	ECV
Period 1					
TFKE37	Biological Measurements	6	G2X	1/2/3	C
TFKE38	Gene Technology	3	G2X	1/2/3	C
TFKE60	Project Course, Chemical Biology	6*	G2X	1/2/3	C
TFTB45	Bioinformatics	3	G2F	4	E
Period 2					
TFKE35	Biostructural Technologies	6	A1X	2	C
TFKE60	Project Course, Chemical Biology	6*	G2X	1	C
NVFA09	Pharmacology	6	G2X	3	E
TFKE30	Analytical Chemistry	6	G1X	4	E

Specialisation: Internal

Course code	Course name	Credits	Level	Timetable module	ECV
Period 1					
TFKE33	Life Scientific Research Review	6*	A1X	4	C
TFKE57	Proteomics	6	A1X	3	C
TVMB26	Molecular Virology	6	A1X	1	C
Period 2					
TFKE33	Life Scientific Research Review	6*	A1X	4	C
TFKE35	Biostructural Technologies	6	A1X	2	C
TFKE48	Biomolecular Disease Processes	6	A1X	1	C

Semester 2 (Spring 2020)

Specialisation: External

Course code	Course name	Credits	Level	Timetable module	ECV
Period 1					
NKED15	Protein Chemistry	12	A1X	1/3	C
TFKE54	Preparation of Proteins	3	A1X	2	E
TFKE58	Applied Structural Biology	6*	A1X	2	E
Period 2					
NKED82	Biomolecular Design	6	A1X	1	C
NKED20	Drug Discovery and Pharmaceutical Development	6	A1N	2	E
TEAE01	Industrial Economics, Basic Course	6	G1X	2	E
TFKE58	Applied Structural Biology	6*	A1X	4	E
TGTU95	Philosophy of Science and Technology	6	G1F	4	E

Specialisation: Internal

Course code	Course name	Credits	Level	Timetable module	ECV
Period 1					
NBID64	Molecular Physiology and Cell Signaling Mechanisms	6	A1N	2	C
NDAB02	Statistics; Theory and Application in Biology	6*	G1X	1	E
TAMS11	Probability and Statistics, First Course	6	G2F	1	E
TFKE58	Applied Structural Biology	6*	A1X	2	E
TGTU94	Technology and Ethics	6	G1F	1	E
TVCB11	Cellbiological Methodology	6	G2X	1/4	E
Period 2					
NKED82	Biomolecular Design	6	A1X	1	C
NDAB02	Statistics; Theory and Application in Biology	6*	G1X	3	E
NKED20	Drug Discovery and Pharmaceutical Development	6	A1N	2	E
TEAE01	Industrial Economics, Basic Course	6	G1X	2	E
TFKE58	Applied Structural Biology	6*	A1X	4	E
TGTU95	Philosophy of Science and Technology	6	G1F	4	E

Semester 3 (Autumn 2020)

Specialisation: External

Course code	Course name	Credits	Level	Timetable module	ECV
Period 1					
TFKE33	Life Scientific Research Review	6*	A1X	4	C
TFKE57	Proteomics	6	A1X	3	C
TVMB26	Molecular Virology	6	A1X	1	C
TKMJ24	Environmental Engineering	6	G1N	1	E
Period 2					
TFKE33	Life Scientific Research Review	6*	A1X	4	C
TFKE48	Biomolecular Disease Processes	6	A1X	1	C
TVCB13	Stem Cell Engineering	6	A1X	3	E

Specialisation: Internal

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 2021)

Specialisation: External

Course code	Course name	Credits	Level	Timetable module	ECV
Period 1					
TQXX30	Degree project - Master's Thesis	30*	A1X	-	C
Period 2					
TQXX30	Degree project - Master's Thesis	30*	A1X	-	C

Specialisation: Internal

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

Common rules

Structure and organisation of study programmes

The contents and design of the programmes are to be continuously revised such that new knowledge is integrated into courses and specialisations. Within one programme, several study specialisations or profiles may be available. The identities of the study specialisations or profiles and the regulations governing how these may be selected are given in the syllabus and curriculum for the particular field of study and programmes.

The structure and organisation of the programmes are to follow specified criteria that are summarised in the syllabus for each programme.

- The syllabus defines the aims of the study programme.
- The curriculum, which constitutes one part of the syllabus for the field of study, gives details of the terms in which the various courses have been timetabled, and their scheduling through the academic year.
- The course syllabus specifies, among other things, the aim and contents of the course, and the prior knowledge that a student must have in order to be able to benefit from the course.

Qualification requirements

The qualification requirements specified in the Higher Education Ordinance 2007 apply to students admitted after 1 July 2007. A student who has completed components of a programme after 1 July 2007 has the right to be assessed with respect to the qualification requirements specified by the Higher Education Ordinance 2007. In addition, local regulations laid down by the faculty boards and university board apply, see http://styrdokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva/Examina.

Higher Education Act Chapter 1, Section 8:

First-cycle courses and study programmes are to develop:

- the ability to make independent and critical assessments
- the ability to identify, formulate and solve problems autonomously, and
- the preparedness to deal with changes in working life.

In addition to knowledge and skills in their field of study, students shall develop the ability to:

- gather and interpret information at a scholarly level
- stay abreast of the development of knowledge, and
- communicate their knowledge to others, including those who lack specialist knowledge in the field.

Qualifications within a study programme

Qualification requirements that are specific to a study programme are given in the syllabus for that programme.

Matriculation and postponement of matriculation

A person who has been accepted for a study programme is to start their studies (matriculate) in the term that is specified in the decision about admission. The date and location of the compulsory matriculation procedure will be communicated to those admitted to the first term of the programme.

At any one admission occasion, it is possible to be admitted to only one place on a study programme. A student who has been granted a place on a study programme and who is offered and accepts a place on another study programme during a supplementary round of admission will lose the place offered for the first study programme.

Regulations concerning postponement of matriculation have been laid down in the admission regulations for Linköping University,
<http://styrdokument.liu.se/Regelsamling/VisaBeslut/622645>.

A person who has been granted postponement must present to the admitting authority, before the term in which the studies are to be started and before the date of application, a renewed registration for the programme and a copy of the decision granting postponement.

Admission to a later part of a programme

Admission to a part of a study programme is used here to refer to admission with the purpose of completing the programme and taking a degree. Admission to a later part of a programme may take place only if sufficient resources and space on the programme are available. Furthermore, the applicant must satisfy the entry requirements for the relevant term of the programme, as specified in
http://styrdokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva/Tekniska_fakulteten.

Interruption in studies

Notification of an interruption in studies is to be made through the Student Portal. If such a notification is not made and if the student does not register for the first term during which the interruption is to take place, the interruption will be considered to be a withdrawal. An interruption in studies must cover a complete term, and notification of interruptions can be given for a maximum of two consecutive terms. Notification of resumption of studies is to take place at the term registration for the term that follows the interruption. If the student does not register at the term registration, this will be regarded as withdrawal from studies.

A student who is taking an interruption in studies may during this period retake examinations if he or she has re-registered for the most recent study term of the programme. A student who wishes to take another course during the interruption in studies must apply for this separately. The student is responsible that

registration for courses is carried out at the correct times in preparation for the resumption of studies.

Withdrawal from a study programme

A student who wishes to withdraw from a study programme must notify the study guidance counsellor. A student who leaves the studies without giving notification of an interruption in study and who fails to register for the immediately subsequent term is considered to have withdrawn. A student who has withdrawn may return to the study programme if a vacancy is available that is not required for students returning after an interruption in study, and not required for students who are changing their location of study and/or study programme.

Courses within a study programme

The curriculum for the various years of a study programme specify which courses are compulsory (o), elective (v) and voluntary (f). If a student wishes to study a different combination than the one specified in the curriculum, an application must be made to the board of studies.

Voluntary courses

The course specified as voluntary (labelled with "f") in the programme syllabus are assessed solely as voluntary courses, and credits from these may not contribute to the requirements for a degree.

Courses from another study programme

Courses that are elective courses in another study programme may be included as elective courses in a degree, if the board of studies so decides. If such a decision is not taken, such courses are regarded as voluntary courses.

When selecting a course from another programme, the admission requirements specified in the course syllabus must be satisfied.

Admission is granted to the extent that resources allow, provided that places are available on the course.

Students taking a master's programme in engineering

Students taking a master's programme in engineering can take courses given in Term 7 and later terms of the programme from all engineering master's programmes. Admission to courses at advanced level requires the possession of at least 150 credits within the programme to which the student has been admitted.

Students taking a Bachelor of Science (Engineering)

Student taking Bachelor of Science (Engineering) degrees may take courses specified in the programme syllabuses of all Bachelor of Science (Engineering) programmes.

Students taking a Bachelor of Science

Student taking Bachelor of Science degrees may take courses specified in the programme syllabuses of all Bachelor of Science programmes.

Third-cycle courses

The credits from third-cycle courses may be included as elective courses in a degree, if the board of studies so decides. If such a decision is not taken, such courses are regarded as voluntary courses.

Students taking a master's programme in engineering

It is possible for students taking master's programmes in engineering to take certain third-cycle courses. It is, however, required in this case that the student has achieved master's level (i.e. year 4 or 5 of the study programme). Information can be obtained from the relevant director of advanced studies.

Students on Master's programmes

It is possible for students taking master's programmes to take certain third-cycle courses. Information can be obtained from the relevant director of advanced studies.

Registration for programme courses

Registration for courses that are given as part of a study programme must be made during the specified period, which has been preliminarily set to 1-10 April for the autumn term, and 1-10 October for the spring term. Information about course registration is published on a webpage, sent to students by email, and disseminated at scheduled information meetings.

Registration for programme courses as single-subject courses

Admission to a programme course as a single-subject subject course may take place only if sufficient resources and space on the course are available. Furthermore, the applicant must satisfy the entry requirements for the relevant course.

In the event of a scarcity of resources, the board of LiTH can decide to limit the possibilities of taking courses that are part of a programme as freestanding courses.

Timetabling

Courses are timetabled after a decision has been made concerning the assignment of the course to a timetable module. A central timetable is not drawn up for courses with fewer than five participants. Most project courses do not have a central timetable.

Study planning

Students who require support in planning their continued studies can contact the study guidance counsellor of the programme. Study planning involves the student and the study guidance counsellor together drawing up an individual plan for studies during the subsequent term. The individual plan may allow the student to deviate from the general curriculum.

Completed first-cycle courses are a precondition for successful studies at more advanced levels. For this reason, study planning is based on giving priority to courses from earlier years of study that have not been completed. If further capacity is available, new courses may be taken.

Study planning takes place on a regular basis if the student:

- does not satisfy the requirements for progression to later terms. In order for a student to be able to participate in courses from later years in such cases, a decision of exemption is required.
- does not satisfy the requirements for starting a degree project.

Other situations in which study planning may be required:

- A student has fallen behind during the early part of a study programme and has failed to complete several courses.
- A student has not satisfied the entry requirements for a degree project before term 6 of an engineering degree.
- A student has applied for admission to a later part of a programme.
- Studies have been carried out abroad.
- A study programme is to be resumed after an interruption.

In these cases the study guidance counsellor supports the student in planning the continued studies, also in situations in which the student can register for the relevant courses without the need for a special decision for the continued studies.

Part of education abroad

Students can exchange study at LiTH for study at an institute of higher education abroad, and/or work on a degree project abroad.

In the event that study (courses) at LiTH are exchanged for study abroad, the relevant board of studies (faculty programme director) is responsible for a decision about an individual study plan, which is to be drawn up in advance, and about the final course approval and its inclusion in the qualification requirements. For this reason, students who plan to participate in an exchange should contact the faculty programme director (or equivalent) at the Dean's Office of the Institute of Technology.

Regulations for entry requirements, ranking and nomination for study abroad through LiTH's exchange agreements and for the compulsory study abroad period within Ii (Industrial Engineering and Management – International) and Yi (Applied Physics and Electrical Engineering – International) can be found at:

http://styrdokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund_och_avancerad_niva/Tekniska_fakulteten.

Course syllabus

A syllabus has been established for each course. The syllabus specifies the aim and contents of the course, and the prior knowledge that a student must have in order to be able to benefit from the course.

Timetabling

Courses are timetabled after a decision has been made for this course concerning its assignment to a timetable module. A central timetable is not drawn up for courses with fewer than five participants. Most project courses do not have a central timetable.

Interrupting a course

The vice-chancellor's decision concerning regulations for registration, deregistration and reporting results (Dnr LiU-2015-01241) states that interruptions in study are to be recorded in Ladok. Thus, all students who do not participate in a course for which they have registered must record the interruption, such that the registration on the course can be removed. Deregistration from a course is carried out using a web-based form: www.lith.liu.se/for-studenter/kurskomplettering?l=sv.

Cancelled courses

Courses with few participants (fewer than 10) may be cancelled or organised in a manner that differs from that stated in the course syllabus. The board of studies is to deliberate and decide whether a course is to be cancelled or changed from the course syllabus.

Regulations relating to examinations and examiners

Details are given in a decision in the university's rule book:
<http://styrdokument.liu.se/Regelsamling/VisaBeslut/622678>.

Forms of examination

Examination

Written and oral examinations are held at least three times a year: once immediately after the end of the course, once in August, and once (usually) in one of the re-examination periods. Examinations held at other times are to follow a decision of the board of studies.

Principles for examination scheduling for courses that follow the study periods:

- courses given in VT1 are examined for the first time in March, with re-examination in June and August
- courses given in VT2 are examined for the first time in May, with re-examination in August and October
- courses given in HT1 are examined for the first time in October, with re-examination in January and August
- courses given in HT2 are examined for the first time in January, with re-examination at Easter and in August.

The examination schedule is based on the structure of timetable modules, but there may be deviations from this, mainly in the case of courses that are studied and examined for several programmes and in lower grades (i.e. 1 and 2).

- Examinations for courses that the board of studies has decided are to be held in alternate years are held only three times during the year in which the course is given.
- Examinations for courses that are cancelled or rescheduled such that they are not given in one or several years are held three times during the year that immediately follows the course, with examination scheduling that corresponds to the scheduling that was in force before the course was cancelled or rescheduled.
- If teaching is no longer given for a course, three examination occurrences are held during the immediately subsequent year, while examinations are at the same time held for any replacement course that is given, or alternatively in association with other re-examination opportunities. Furthermore, an examination is held on one further occasion during the next subsequent year, unless the board of studies determines otherwise.
- If a course is given during several periods of the year (for programmes, or on different occasions for different programmes) the board or boards of studies determine together the scheduling and frequency of re-examination occasions.

Registration for examination

In order to take an examination, a student must register in advance at the Student Portal during the registration period, which opens 30 days before the date of the examination and closes 10 days before it. Candidates are informed of the location of the examination by email, four days in advance. Students who have not registered for an examination run the risk of being refused admittance to the examination, if space is not available.

Symbols used in the examination registration system:

** denotes that the examination is being given for the penultimate time.

* denotes that the examination is being given for the last time.

Code of conduct for students during examinations

Details are given in a decision in the university's rule book:
<http://stydokument.liu.se/Regelsamling/VisaBeslut/622682>.

Retakes for higher grade

Students at the Institute of Technology at LiU have the right to retake written examinations and computer-based examinations in an attempt to achieve a higher grade. This is valid for all examination components with code "TEN" and "DAT". The same right may not be exercised for other examination components, unless otherwise specified in the course syllabus.

Retakes of other forms of examination

Regulations concerning retakes of other forms of examination than written examinations and computer-based examinations are given in the LiU regulations for examinations and examiners,
<http://styrdokument.liu.se/Regelsamling/VisaBeslut/622678>.

Plagiarism

For examinations that involve the writing of reports, in cases in which it can be assumed that the student has had access to other sources (such as during project work, writing essays, etc.), the material submitted must be prepared in accordance with principles for acceptable practice when referring to sources (references or quotations for which the source is specified) when the text, images, ideas, data, etc. of other people are used. It is also to be made clear whether the author has reused his or her own text, images, ideas, data, etc. from previous examinations.

A failure to specify such sources may be regarded as attempted deception during examination.

Attempts to cheat

In the event of a suspected attempt by a student to cheat during an examination, or when study performance is to be assessed as specified in Chapter 10 of the Higher Education Ordinance, the examiner is to report this to the disciplinary board of the university. Possible consequences for the student are suspension from study and a formal warning. More information is available at <https://www.student.liu.se/studenttjanster/lagar-regler-rattigheter?l=sv>.

Grades

The grades that are preferably to be used are Fail (U), Pass (3), Pass not without distinction (4) and Pass with distinction (5). Courses under the auspices of the faculty board of the Faculty of Science and Engineering (Institute of Technology) are to be given special attention in this regard.

1. Grades U, 3, 4, 5 are to be awarded for courses that have written examinations.
2. Grades Fail (U) and Pass (G) may be awarded for courses with a large degree of practical components such as laboratory work, project work and group work.

Examination components

1. Grades U, 3, 4, 5 are to be awarded for written examinations (TEN).

2. Grades Fail (U) and Pass (G) are to be used for undergraduate projects and other independent work.
3. Examination components for which the grades Fail (U) and Pass (G) may be awarded are laboratory work (LAB), project work (PRA), preparatory written examination (KTR), oral examination (MUN), computer-based examination (DAT), home assignment (HEM), and assignment (UPG).
4. Students receive grades either Fail (U) or Pass (G) for other examination components in which the examination criteria are satisfied principally through active attendance such as other examination (ANN), tutorial group (BAS) or examination item (MOM).

The examination results for a student are reported at the relevant department.

Regulations (apply to LiU in its entirety)

The university is a government agency whose operations are regulated by legislation and ordinances, which include the Higher Education Act and the Higher Education Ordinance. In addition to legislation and ordinances, operations are subject to several policy documents. The Linköping University rule book collects currently valid decisions of a regulatory nature taken by the university board, the vice-chancellor and faculty/department boards.

LiU's rule book for education at first-cycle and second-cycle levels is available at http://styrdokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund_och_avancerad_niva.

Degree project for Master's Degree in Engineering 300 credits, Master of Science (Two years), Master of Philosophy (Two years), Master of Science (One year), and master's degrees without prefix

General provisions for the degree project are given here. A specific board of studies may have supplementary regulations that are specific for a study programme. These are specified, where relevant, in the syllabus for the field of education and/or the degree project. Information and links to course syllabuses, registration, reflection documents, etc. can be found at www.lith.liu.se/examensarbete/examensarbete?l=sv.

General provisions

To be awarded a Master's Degree in Engineering 300 credits, Master of Science (Two years), Master of Philosophy (Two years), Master of Science (One year), or master's degree without prefix a student must carry out an approved degree project. The components of the degree project are described in the relevant course syllabus.

Aim

The aim of the degree project is described in the relevant course syllabus,

www.lith.liu.se/examensarbete/examensarbete?l=sv. Links to respective course syllabus can be found under the heading "Utbildningarna" (Civilingenjörsutbildning (i.e. Master of Science in Engineering) or Masterutbildning (i.e. Master of Science)).

Extent

Requirements for the extent of the degree project for each type of degree are given in the syllabus of the study programme.

Locations for a degree project

The work is carried out in the form of:

- an internal degree project located at one of the participating departments at LiU
- an external degree project located at a company, government agency, or other organisation in Sweden or abroad, that an examiner has assessed is able to manage a degree project that satisfies the requirements, or
- a degree project within an exchange agreement in association with study abroad, whereby all study results are to be credited to the student by the relevant board of studies.

The main subject areas that are permitted within each study programme are described in the programme syllabus. Any individual subjects that may be relevant to the main subject area are to be determined by the relevant board of studies.

The examiner for a degree project within a certain subject area are determined by the board of studies that is responsible for general degrees within the main subject area. An up-to-date list is given at <http://www.lith.liu.se/examensarbete/examensarbete?l=sv>.

Degree projects within agreements relating to study abroad

During study abroad that takes place within the framework of an agreement, the provisions of the host institute relating to degree projects are applied. The student is to consult the board of studies and together ensure that the proposed degree project is carried out in a main subject area that is permitted within the study programme. Approved main subject areas for degree projects are specified in the syllabus for the relevant programme.

A certificate confirming that the degree project has been approved and a copy of the degree project thesis (in PDF format) are to be submitted to the relevant board of studies.

Selection of degree project

A degree project is to be selected in consultation with an examiner, who is also responsible that the specialisation, extent and level of the project satisfy the requirements specified in the course syllabus.

In cases in which issues relating to work-related copyright, patenting or remuneration may arise, provisions governing these should be established in

advance. A student working on a degree project may sign a confidentiality agreement in order to obtain access to confidential information necessary for the degree project. The supervisor and examiner, however, determine whether they are prepared to sign a confidentiality agreement, and thus the confidential information must not normally be of such nature that it is necessary to supervise or grade the work. The complete degree project thesis is to be published during the grading procedure, unless special circumstances prevent this. If any part of the thesis should not be published, this must be approved in advance by the examiner and the relevant head of department. Note that final decisions relating to confidentiality are taken by an administrative court.

Commencement of a degree project

Requirements that must be satisfied before a degree project can be started are given in the currently valid course syllabus, which can be obtained at www.lith.liu.se/examensarbete/examensarbete?l=sv.

Notification of a degree project is to be carried out when the degree project starts, at www.lith.liu.se/for-studenter/anmalan-till-exjobb?l=sv. Registration of the degree project is to take place before work commences, after the student has registered for the term.

Before the start of the degree project, the examiner is to ensure that the student satisfies the conditions for commencement of the degree project within the relevant main subject area. Support in this can be obtained from the study guidance counsellor, who checks the general requirements for starting the degree project.

The student is also to notify the relevant department of the start of the degree project.

Degree projects in collaboration with another student

In cases in which two students carry out a degree project together, the contribution of each student is to be specified. The extent of the work is to correspond to the extent of two individual projects. The examiner is to ensure that each student has contributed in a satisfactory manner to the work, and that each student satisfies the requirements for achieving a Pass grade for the degree project.

Degree projects carried out in collaboration between more than two students are not permitted.

Examiners

The examiner is to be employed at LiU as professor, associate professor, senior lecturer, research fellow, lecturer, research assistant, or postdoc (including guest and adjunct teachers), or is to have been appointed docent at LiU. He or she must have the expertise required to examine the degree project within the relevant main subject area, and must be appointed by the the board of studies. The examiner is to:

- ensure before the start of the degree project that the student satisfies the conditions for commencement of the degree project within the relevant main subject area. The study guidance counsellor is to check whether the commencement criteria are satisfied and inform the examiner of this
- check whether special admission requirements (where relevant) are satisfied, for example that the student can demonstrate a certain degree of in-depth knowledge within the field relevant for the degree project
- determine the specialisation and principal work of the degree project, based on an assessment of whether the degree project will result in the learning outcomes of the course syllabus being satisfied
- pass/fail the planning report
- pass/fail the mid-way assessment
- be responsible that the supervisor or supervisors carry out their duties
- before the presentation, check that the student has registered for the degree project
- approve the work for presentation
- before the presentation, check that the proposed opponent satisfies the conditions for commencement of the degree project and has attended three thesis presentations
- pass/fail the presentation and the opposition to it
- approve a concluding reflection document
- ensure that a degree project that has been passed satisfies the learning outcomes of the course syllabus and other requirements, and award a grade to the degree project (either G = Pass, or U = Fail).

Supervisors

A student working on a degree project is to have access to an internal supervisor at the department at which the degree project has been registered. The internal supervisor is to have a degree that corresponds at least to the level of the degree project to be supervised. The internal supervisor may, in exceptional circumstances, be the same individual as the examiner. A decision of whether to allow this in a particular case is to be made by the relevant board of studies before the degree project is started.

The supervisor is to ensure that the student obtains help with:

- expert support in general questions related to methods, specialist knowledge of the subject, and writing the thesis
- problem formulation, and setting the limits of the work
- scheduling and planning work, and selection of appropriate methods.

If the degree project is being carried out outside of LiTH, an external supervisor from the commissioner is to be appointed.

Planning report

During the first weeks of the degree project, the student is to draw up a planning report that contains:

- a preliminary title of the degree project

- a preliminary statement of the research question, against the background of a literature search
- a preliminary description of the approach to be taken
- planned literature foundation
- a schedule for the execution of the degree project, including suggested dates for the mid-way assessment and presentation.

Formulation of the research question is to be bounded, realistic and viewed from a perspective of societal or commercial benefit. The term "societal" is to be understood here to include universities and university colleges.

Mid-way assessment

Approximately half-way through the degree project, the student is to describe to the examiner at a mid-way assessment how the work is progressing relative to the planning report. The supervisor should also participate. The form of the mid-way assessment may be anything from an oral presentation to a public seminar. The conclusion of the mid-way assessment may be one of three possibilities:

1. The work has been carried out essentially as planned, and can continue as planned. The mid-way assessment has been passed.
2. The work has been carried out with certain deviations from the planning report. It is, however, believed that it will be possible to complete the work with minor adjustments to the formulation of the research question, approach and/or schedule. The mid-way assessment has been passed.
3. The work has deviated from the planning report in a significant manner, and there is a risk that a Pass grade cannot be given. The mid-way assessment has been failed. A new planning report must be drawn up and a new mid-way assessment carried out.

Reporting

Both oral and written reports of the degree project are to be made, in Swedish or English. For the international Master's programmes, both the oral and written examination should be made in English. The board of studies can allow the reporting to be carried out in another language than Swedish or English.

The oral presentation is to take place in public, unless there are special grounds that this should not be done. The written report is to be in the form of a professionally produced degree project thesis. The presentation and thesis are to follow the instructions given below.

Presentation

The oral presentation is to take place when the examiner considers that the work has been completed and is ready to be presented. The presentation is to take place at LiTH at a time when other students can attend. This means that the presentation can take place on a date that the student has agreed with the examiner, normally between the re-examination period in August and midsummer, and after the student has attended three thesis presentations.

The oral presentation is to describe the background to the problem that has been

studied, describe the methods used, and present the results and conclusions. The presentation is to be at a level suitable for everyone present, not just for specialists. After the oral presentation, the student is to counter any criticism that the opponent may raise, and allow other participants to pose questions. The presentation and the opposition are to be approved by the examiner. When any required adjustments of the thesis have been made, the reflection document has been approved, and the student has functioned as an opponent for another degree project, the degree project is reported as a passed course and the credits can be used to satisfy the requirements for a qualification.

Degree project thesis

The written degree project report is to be professionally written and comprehensive, and it is to demonstrate a scientific approach. The report must be prepared in accordance with principles for acceptable practice when referring to sources (references or quotations for which the source is specified) when the text, images, ideas, data, etc., of other people are used. It is also to be made clear whether the author has reused his or her own text, images, ideas, data, etc. from previous examinations, such as undergraduate work, project reports, etc. (This is sometimes known as "self-plagiarism".) A failure to specify such sources may be regarded as attempted deception during examination.

The contents are to be easy to understand, and the way in which material is presented is important. It must describe the background to the project and the formulation of the research question. The choice of approach is to be clearly explained, and the thesis should make clear the coupling between the results and the conclusions. Commonly accepted scientific methods are to be used for processing the results. The discussion is to be comprehensive, and demonstrate that the student masters analytical thought processes. The thesis is to demonstrate good mastery of the literature in the field, and include an abstract. Theses that are principally written in Swedish should contain a summary in English. A publication-ready manuscript and a reflection document covering the work undertaken are to be submitted to the examiner within 10 days after the oral presentation. The examiner may grant an exemption from this requirement. If final versions of the required documents are not submitted as stipulated, the examiner may determine that the presentation is to be rescheduled.

The Faculty of Science and Engineering (Institute of Technology) at Linköping University recommends that degree project theses be published.

Opposition

An oral opposition is to be carried out either before or after the student presents his or her thesis. The opponent must satisfy the same requirements for the number and level of credits gained as those of the student's degree project. The opponent must also have attended three thesis presentations as a member of the audience. Acting as an opponent during the thesis presentation of another student is subject to points-based assessment as described in the course syllabus.

The opponent is to:

- discuss and comment on the selection of methods, results and (where relevant) data processing, conclusions, possible alternative solutions and conclusions, and the management of literature
- comment on the general arrangement of the degree project thesis and related, formal aspects of style, and comment on the oral presentation technique
- illuminate the strengths and weaknesses of the thesis.

The duration of the opposition should be approximately the same as that of the presentation, and it is to include a discussion in which the student presenting the thesis replies to and comments on the criticism raised by the opponent.

Unless otherwise agreed, at least one week before the presentation the opponent is to present in writing to the examiner the important issues that will be discussed, and the structure of the opposition that will be taken. The opponent and the examiner discuss the structure that the opponent has drawn up.

In a normal case, the number of opponents will be the same as the number of respondents. In exceptional cases, the examiner may decide that this is not to be the case.

Attendance at presentations

A student is to attend presentations of degree project theses as described in the course syllabus. The presentations attended must be at the same level or a higher level than the degree project of the student.

It is advantageous that one of the presentations attended is a licenciate degree seminar or a doctoral disputation. The student is responsible for ensuring that a certification of attendance at the presentation is obtained and passed to the departmental administrator for registration in Ladok. Attendance at such presentations is a component of the degree work that is subject to points-based assessment.

The occasions on which a student attends presentations are to be completed before the student presents the degree project thesis. The course syllabus for the degree project describes the scheduling of the attendance at presentations.

Reflection document

A document reflecting on the work that has been carried out is to be submitted to the examiner within 10 working days of the oral presentation. Instructions for preparing a reflection document can be reached through www.lith.liu.se/examensarbete/examensarbete?l=sv.

Grades

The degree project is graded as either Pass or Fail. In order for a student to obtain a pass grade for the degree project, all components must be completed and be awarded a pass grade.

Right to obtain supervision

It is expected that the student complete and pass a degree project within specified time limits. The department is required to provide supervision for a maximum of 18 months after the student has registered the degree project in Ladok. The examiner may grant additional supervision after this period in special cases. If the examiner determines that supervision is to be ended, the degree project is to be awarded a Fail grade.

If the degree project is awarded a Fail grade for the reason described above or for any other reason, the student is to be directed towards carrying out a further degree project.

Quality assurance

The relevant board of studies has overall responsibility for the quality of study programmes. This responsibility covers also degree projects. Quality assurance is to be carried out as determined by the faculty board.

Exemptions

If special circumstances apply, a board of studies may grant exemptions from the regulations specified above. The oral opposition, for example, may be replaced by an extensive written opposition, if the board of studies approves this

- for international students for whom special circumstances apply
- for other students for whom all other components of the qualification have been satisfied, the degree project thesis has been submitted, and special circumstances apply.

Written opposition may be carried out in one of the following ways:

- The student presents a written opposition to a degree project thesis that has been written by another student, whose examiner subsequently examines the opposition.
- The student's examiner requests that the student prepare a written opposition to a degree project thesis that has previously been examined by an examiner.

If written opposition is used, it is not necessary that the student prepare an introductory statement describing the structure.

The board of studies must approve that opposition may take place in written form, before it is carried out.