Engineering Biology, M Sc in Engineering

300 credits

Civilingenjör i teknisk biologi

6CTBI

Valid from: 2017 Spring semester

Determined by
Board of Studies for Chemistry, Biology and Biotechnology

Date determined
2017-01-25

Entry requirements

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Degree in Swedish

Civilingenjör 300 hp och Teknologie master 120 hp

Curriculum

Semester 1 (Autumn 2017)

Course code	Course name	Credits	Level	Timetable module	ECV
Period 0					
NKEA02	General Chemistry 1	6*	G1X	-	C
TATA68	Foundation Course in Mathematics	6*	G1X	-	C
Period 1					
NKEA02	General Chemistry 1	6*	G1X	1/2	C
NKEA04	General Chemistry 2	6	G1X	1/2	C
TATA68	Foundation Course in Mathematics	6*	G1X	3	C
Period 2					
NKEA06	Organic Chemistry 1	6	G1X	1/3	C
NKEA08	Biochemistry 1	6	G1X	2/4	C

Semester 2 (Spring 2018)

Course code	Course name	Credits	Level	Timetable module	ECV
Period 1					
NBIA25	Cell Biology	6	G1F	1/2	C
TATA41	Calculus in One Variable 1	6	G1F	4	C
TFYA46	Engineering Project	6*	G1X	3	C
TGTU35	Introduction to University Studies	2*	G1X	-	V
Period 2					
NBIA23	Microbiology	6	G1F	3/4	C
TATA42	Calculus in One Variable 2	6	G1F	2	C
TFYA46	Engineering Project	6*	G1X	1	C
TGTU35	Introduction to University Studies	2*	G1X	-	V

Semester 3 (Autumn 2018)

Course code	Course name	Credits	Level	Timetable module	ECV
Period 1					
TATA16	Linear Algebra	6*	G1N	4	C
TDDD87	Programming and Problem Solving	6	G1X	2	C
TSTE92	Electric Circuits	6	G1X	1	C
Period 2					
NBIB45	Principles in Physiology and Ethics	6	G1F	1	C
TATA16	Linear Algebra	6*	G1N	3	C
TFYA16	Engineering Mechanics	6	G1X	4	C

Semester 4 (Spring 2019)

Course code	Course name	Credits	Level	Timetable module	ECV
Period 1					
TAMS28	Mathematical Statistics, First Course	6	G2X	4	C
TATA83	Calculus, several variables	6	G1F	1	C
TFYY55	Physics	6*	G2X	2	C
Period 2					
TDDD74	Databases for Bioinformatics	6	G2X	4	C
TFKE36	Biochemistry 2	6	G2X	1/2	C
TFYY55	Physics	6*	G2X	3	C
TPTE06	Industrial Placement	6	G1X	-	E

Semester 5 (Autumn 2019)

Course code	Course name	Credits	Level	Timetable module	ECV
Period 1					
TFYA35	Molecular Physics	6	G2X	4	C
TSBB14	Signal and Image Processing	6*	G2X	3	C
TVMB17	Immunobiology and Immunological Techniques	6	G2X	1/2	C
Period 2					
TSBB14	Signal and Image Processing	6*	G2X	3	C
TSRT23	Automatic Control	6	G2X	4	C
TVCB14	Molecular Genetics and Gene Technology	6	G2X	1/2	C

Semester 6 (Spring 2020)

Course code	Course name	Credits	Level	Timetable module	ECV
Period 1					
TBMT19	Models in System Biology	2	G2F	2	C
TBMT33	System Biology and Modelling, Bachelor Project	16*	G2E	2	C
TFMT14	Measurement Technology	6	G2X	3	C
TVCB11	Cellbiological Methodology	6	G2X	1/4	C
Period 2					
TBMT33	System Biology and Modelling, Bachelor Project	16*	G2E	2/3/4	C

Semester 7 (Autumn 2020)

Specialisation: Devices and Materials in Biomedicine

Course code	Course name	Credits	Level	Timetable module	ECV
Period 1					
TFYA47	Surfaces and Interfaces	6	A1N	2	C
TFYA98	Materials and Nanotechnology	6*	A1N	4	C
TANA21	Scientific Computing	6	G1F	3	C/E
TAOP88	Engineering Optimization	6	G2F	1	C/E
TATM38	Mathematical Models in Biology	6	A1N	3	C/E
TBMT57	Biomedical Optics	6	A1F	1	E
TEAE01	Industrial Economics, Basic Course	6	G1X	2	E
TGTU91	Oral and Written Communication	6	G1F	2	E
THFR05	Communicative French	6*	G1X	4	E
THSP05	Spanish	6*	G1X	4	E
THTY05	German	6*	G1X	4	E
Period 2					
TAMS41	Statistical Modelling with Regression Methods	6	A1N	3	C
TFYA98	Materials and Nanotechnology	6*	A1N	1	C
TBMI04	eHealth: Aims and Applications	6	G2F	2/4	C/E
TFYA30	Supramolecular Chemistry	6	A1N	2	C/E
THFR05	Communicative French	6*	G1X	4	E
THSP05	Spanish	6*	G1X	4	E
THTY05	German	6*	G1X	4	E
TMMS31	Biomechanical Modelling of Tissues and Systems	6	A1N	4	E

Specialisation: Industrial biotechnology and production

Course code	Course name	Credits	Level	Timetable module	ECV
Period 1					
TANA21	Scientific Computing	6	G1F	3	E
TAOP88	Engineering Optimization	6	G2F	1	E
TATM38	Mathematical Models in Biology	6	A1N	3	E
TEAE01	Industrial Economics, Basic Course	6	G1X	2	E
TGTU91	Oral and Written Communication	6	G1F	2	E
THEN18	English	6*	G1X	4	E
THFR05	Communicative French	6*	G1X	4	E
THSP05	Spanish	6*	G1X	4	E
THTY05	German	6*	G1X	4	E
TKMJ31	Biofuels for Transportation	6	A1N	1	E
Period 2					
TAMS41	Statistical Modelling with Regression Methods	6	A1N	3	C
TFYA32	Industrial Biotechnology	6	A1X	1	C
TFKE30	Analytical Chemistry	6	G1X	4	E
THEN18	English	6*	G1X	4	E
THFR05	Communicative French	6*	G1X	4	E
THSP05	Spanish	6*	G1X	4	E
THTY05	German	6*	G1X	4	E
TMMS31	Biomechanical Modelling of Tissues and Systems	6	A1N	4	E

Semester 8 (Spring 2021)

Specialisation: Devices and Materials in Biomedicine

Course code	Course name	Credits	Level	Timetable module	ECV
Period 1					
TFTB34	Biosensor Technology	6	A1N	3	C
TFTB35	Surface Science	6	A1F	1	C
TFTB43	Materials in Medicine (CDIO-Project)	6*	A1F	2	C/E
TBMI26	Neural Networks and Learning Systems	6	A1N	2	E
TDDE10	Object Oriented Programming in Java	6	G2F	1	E
TFYA85	Alternative Energy Sources and their Applications	6	G2X	4	E
TGTU94	Technology and Ethics	6	G1F	1	E
THEN18	English	6*	G1X	4	E
TMQU46	Quality Management	6	G2X	4	E
TSRT07	Industrial Control Systems	6	A1N	2	E
Period 2					
TFTB38	Imaging and Ubiquitous Biosensing	6	A1F	1	C
TEIO95	eHealth: Innovation and Entrepreneurship	6	G2F	2/4	C/E
TFTB43	Materials in Medicine (CDIO-Project)	6*	A1F	2	C/E
TBME08	Biomedical Modeling and Simulation	6	A1N	3	E
TFMT19	Chemical Sensor Systems	6	A1X	4	E
TGTU95	Philosophy of Science and Technology	6	G1F	4	E
THEN18	English	6*	G1X	4	E

Specialisation: Industrial biotechnology and production

Course code	Course name	Credits	Level	Timetable module	ECV
Period 1					
TFTB32	Design of Biotechnical Process and Production Systems, Project Course	6*	A1X	1	C
TMMT03	Biotechnical Production Systems	6	A1X	3	C
TMQU46	Quality Management	6	G2X	4	C
TBMI26	Neural Networks and Learning Systems	6	A1N	2	E
TDDE10	Object Oriented Programming in Java	6	G2F	1	E
TFYA85	Alternative Energy Sources and their Applications	6	G2X	4	E
TGTU94	Technology and Ethics	6	G1F	1	E
TKMJ15	Environmental Management Strategies	6	G1F	3	E
TSRT07	Industrial Control Systems	6	A1N	2	E
Period 2					
NKED20	Drug Discovery and Pharmaceutical Development	6	A1N	2	C
TFTB32	Design of Biotechnical Process and Production Systems, Project Course	6*	A1X	1	C
TFTB39	Biotechnology Manufacturing	6	A1X	3/4	C
TGTU95	Philosophy of Science and Technology	6	G1F	4	E

Semester 9 (Autumn 2021)

Specialisation: Devices and Materials in Biomedicine

Course code	Course name	Credits	Level	Timetable module	ECV
Period 1					
TFTB48	Biomedical Materials	6	A1F	1	C
TAMS81	Experimental Design	6	A1F	4	C/E
TBMI28	eHealth Project	12*	A1F	2/4	C/E
TEIO94	Entrepreneurship and Idea Development	6*	G2X	3	C/E
TSRT92	Modelling and Learning for Dynamical Systems	6	A1X	3	C/E
TDDE18	Programming C++	6*	G2F	2	E
TEAE01	Industrial Economics, Basic Course	6	G1X	2	E
TFTB46	Advanced Bioinformatics	6	A1X	2	E
TFYA43	Nanotechnology	6	G2X	3	E
TMQU03	Quality Management and Engineering	6	G2X	2	E
Period 2					
TFTB33	Microsystems and Nanobiology	6	A1X	3	C
TBMI28	eHealth Project	12*	A1F	-	C/E
TEIO94	Entrepreneurship and Idea Development	6*	G2X	4	C/E
TBMT01	Biomedical Signal Processing	6	A1F	1	E
TDDE18	Programming C++	6*	G2F	1	E
TFKE30	Analytical Chemistry	6	G1X	4	E
TFYA32	Industrial Biotechnology	6	A1X	1	E
TFYA37	Soft Condensed Matter Physics	6	A1X	1	E
TGTU04	Leadership	6	G2X	2	E
TGTU49	History of Technology	6	G1F	3	E
TKMJ24	Environmental Engineering	6	G1N	1	E
TVCB13	Stem Cell Engineering	6	A1X	3	E

Specialisation: Industrial biotechnology and production

Course code	Course name	Credits	Level	Timetable module	ECV
Period 1					
TAMS81	Experimental Design	6	A1F	4	C
TEIO94	Entrepreneurship and Idea Development	6*	G2X	3	C
TBMT57	Biomedical Optics	6	A1F	1	E
TDDE18	Programming C++	6*	G2F	2	E
TEAE01	Industrial Economics, Basic Course	6	G1X	2	E
TEIO90	Innovation Management	6	A1X	2	E
TFTB46	Advanced Bioinformatics	6	A1X	2	E
TFYA47	Surfaces and Interfaces	6	A1N	2	E
TRTE18	The Biogas Process	6	A1N	1	E
TSRT92	Modelling and Learning for Dynamical Systems	6	A1X	3	E
TVMB26	Molecular Virology	6	A1X	1	E
Period 2					
TEIO94	Entrepreneurship and Idea Development	6*	G2X	4	C
TAOP61	Optimization of Realistic Complex Systems	6	A1N	3	E
TBMT01	Biomedical Signal Processing	6	A1F	1	E
TDDE18	Programming C++	6*	G2F	1	E
TGTU04	Leadership	6	G2X	2	E
TGTU49	History of Technology	6	G1F	3	E
TKMJ24	Environmental Engineering	6	G1N	1	E
TMQU12	Lean Production	6	A1X	2	E
TVCB13	Stem Cell Engineering	6	A1X	3	E

Semester 10 (Spring 2022)

Specialisation: Devices and Materials in Biomedicine

Course code	Course name	Credits	Level	Timetable module	ECV
Period 1					
TQXX33	Degree project - Master's Thesis	30*	A1X	-	C
Period 2					
TQXX33	Degree project - Master's Thesis	30*	A1X	-	C

Specialisation: Industrial biotechnology and production

Course code	Course name	Credits	Level	Timetable module	ECV
Period 1					
TQXX33	Degree project - Master's Thesis	30*	A1X	-	C
Period 2					
TQXX33	Degree project - Master's Thesis	30*	A1X	-	C

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/VisaBeslut/622693.

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.

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.

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.

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.

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.

Timetabling

Courses are timetabled after a decision has been made concerning the assignment of the course to a study period. 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 are specified in: http://styrdokument.liu.se/Regelsamling/VisaBeslut/622362. Special regulations apply for the compulsory study abroad within Ii (Industrial Engineering and Management – International) and Yi (Applied Physics and Electrical Engineering – International).

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.