



Utbildningsplan

En tillgänglighetsanpassad version av utbildningsplanen finns i Kurs- och programkatalogen.

Masterprogram, Industriell och miljöinriktad bioteknologi 120 hp

Master's Programme, Industrial and Environmental Biotechnology

Gäller för antagna till utbildningen fr o m HT11.

Utbildningens mål

Kunskap och förståelse

After completing the **Industrial and Environmental Biotechnology** programme the students should:

- be able to design central parts in bioprocesses both in the industrial and the environmental setting.
- understand and manage processes at both molecular-, cell and engineering level.
- have subject knowledge and understanding to a level which promotes a future career in the field of the programme including research education.
- be able to communicate with colleagues in the various subject areas of Biotechnology.
- have in-depth knowledge in a chosen Biotechnology subject area.
- understand the driving forces, organization and management of Swedish and International Biotech industry.

Färdigheter och förmågor

After completing the *Industrial and Environmental Biotechnology* programme the students should:

- be able to critically read and extract information from various sources, formulate conclusions and integrate this into the design work.
- know how to analytically and critically plan, execute and evaluate experiments.
- be able to use standard and advanced biotechnology methods and techniques.
- be skillful in technical communication both in oral and written form.

Värderingsförmåga och förhållningssätt

After completing the *Industrial and Environmental Biotechnology* programme the students should:

- be able to critically evaluate existing and new technology breakthroughs in the biotech society.
- use biotechnology methods, products and processes in a responsible way understanding its limitations and economic impact.
- understand the impact of biotechnology developments on social, ethical and gender level.
- understand the implications of Biotechnology development in the context of a sustainable society.

Utbildningens omfattning och innehåll

Industrial and Environmental Biotechnology is a two-year (120 higher education credits) master programme on the advanced level (second cycle). The instruction language is entirely in English. The programme consists of courses given by KTH.

Behörighet och urval

General admission requirements

A completed *Bachelor's degree* - corresponding to a Swedish Bachelor's degree (180 higher education credits), or equivalent academic qualifications from an internationally recognized university.

Language requirements – applicants must proof their proficiency in English, which is most commonly established through an internationally recognized test.

Documentation – for detailed information about list of required documents, see “Admission requirements and selection” http://www.kth.se/en/studies/programmes/master/admission?l=en_UK

Specific admission requirements

In addition to the general admission requirements, the programme requires:

- Courses in **biochemistry, microbiology and gene technology/molecular biology** with a total of at least 20 higher education credits
- Courses in **chemistry** for at least 30 higher education credits
- Basic knowledge in **mathematics, numerical analysis and computer science** with a total of at least 20 higher education credits.

For more information, see Study at KTH, Master’s programmes at KTH, “Admission requirements”.

http://www.kth.se/en/studies/programmes/master/programmes/biotechnology/industrialbio/industrial-and-environmental-biotechnology-application-and-admission-for-external-applicants-1.48684?l=en_UK

Selection process

The selection process for the **Industrial and Environmental Biotechnology** programme is based on a total evaluation of the following criteria: university, grade point average (GPA), courses relevant to the programme, motivation letter, relevant work experience, references and English proficiency.

If seats remain after admission based on the criteria mentioned above, the grade requirement in English will be reduced until the correct number of admitted students is reached.

Complete information on the eligibility requirements can be found in the local admission policy of KTH, see:

http://intra.kth.se/regelverk/utbildning-forskning/grundutbildning/antagning/antagning-till-master-och-magisterprogram-pa-avancerad-niva-med-undervisning-pa-engelska-1.27192?l=en_UK

Utbildningens genomförande

Utbildningens upplägg

The academic year at KTH has a duration of 40 weeks and is divided into four study periods, where two or three courses are simultaneously studied in each period. The nominal study pace is 60 higher education credits each academic year.

The mandatory courses comprise 43,5 higher education credits (international students 49,5) during the first academic year and 45 higher education credits (of which the degree project, second level is 30 higher education credits) during the second academic year. There is also a conditionally elective course (15 or 12 higher education credits) during the second year. The rest of the higher education

credits to reach 120 can freely be chosen by the student. The list of courses in appendix 1 contains a group of recommended courses which the students are encouraged to choose from.

Kurser

Utbildningen sker i kursform. Kurslistor finns i bilaga 1.

Teaching and examination methods vary between courses. During the first year, the concepts and theory of a subject is taught through lectures. Exercises, seminars and laboratory sessions aim to emphasize and deepen the understanding of the most important aspects of a subject. The second year is almost exclusively run in project format. The programme is concluded with a degree project, advanced level equivalent to 30 higher education credits. To receive a Master of Science (120 credits)

the students should have passing grades in all the mandatory and optional courses, which including the thesis will comprise 120 higher education credits.

Betygssystem

För kurser på KTH används en sjugradig målrelaterad betygsskala A-F som slutbetyg för kurser på grundnivå och avancerad nivå. A-E är godkända betyg med A som högsta betyg. Betygen godkänd (P) och underkänd (F) används som slutbetyg då särskilda skäl föreligger.

Villkor för deltagande i utbildningen

Students accepted to the programme will start the programme in the end of August when the registration also takes place and where the student must be present in person. The students are thereafter required to make a study registration and course selection for the coming term no later than November 15 and May 15 each academic year, respectively. At least 45 higher education credits have to be completed during the first academic year (including the re-examination period in August) in order for the student to be promoted to the second year of the programme.

Students who have not passed 45 credits in the first year must contact the programme coordinator for an individual study plan, otherwise the student will not be registered on any courses in the upcoming academic year. This study plan will include residual courses and appropriate courses for the upcoming year.

Tillgodoräknanden

The students have the right to transfer higher education credits from previous studies at universities in or outside of Sweden. The courses have to be at a level and include contents that agree with the goals of the programme. Transfer of higher education credits are decided by the director of undergraduate and Masters' studies.

For more information see:

http://intra.kth.se/regelverk/utbildning-forskning/grundutbildning/prestationer/policy-for-tillgodoraknande-av-hogskoleutbildning-inklusive-bedomning-av-reell-kompetens-1.27200?l=en_UK

Utlandsstudier

For information about studies abroad, contact the international coordinator at the School of Biotechnology.

Examensarbete

Students admitted to the programme are required to perform an individual study in the form of a degree project corresponding to 30 credits. The main portion of the studies must be completed before the start of the degree project, specifically those related to the mandatory courses of the programme. This means that at least 60 credits (of which 30 must be in the second cycle within the main field of study) have to be completed before the start of the degree project.

The purpose of the degree project is for the student to demonstrate the ability to perform an independent project, using skills obtained during the courses in the programme. It is the student's responsibility to find a suitable thesis project, with assistance from KTH.

Degree project, advanced level for the Degree of Master of Science, Biotechnology, can be performed in the following exam topics:

Biotechnology.

Other degree projects in related fields may also be allowed, but need approval by the Director of Undergraduate and Masters' studies at the School of Biotechnology.

For more information, contact the study advisor at the BIO students office.

Grading of the degree project is done by a seven step goal-related grading system (A to F), where A-E are passing grades and A is the highest. The grade is based on three evaluation criteria:

- the process of planning and performing the degree project within the given timeframe.
- the use of engineering approach and skills when performing the degree project.
- the oral and written presentation of the degree project.

More information on the KTH policy on the degree project can be found at:

<http://intra.kth.se/en/regelverk/utbildning-forskning/grundutbildning/examensarbete/overgripande-regler-och-riktlinjer-for-examensarbete-30-hogskolepoang-for-masterexamen-120-hogskolepoang-samt-betygssattning-av-examensarbete-1.27212>

Examen

Master of Science (120 credits) - is obtained after completion of the ***Industrial and Environmental Biotechnology*** programme. The programme is designed so that students, when they graduate, have fulfilled Swedish national requirements for a degree and have completed courses comprising 120 higher education credits, of which:

- at least 90 higher education credits are at second cycle, of which at least 60 higher education credits (including the 30 higher education credit degree project) are in-depth studies in the main field of the programme.

Students must apply for the degree at the student office and are required to show proof of their basic degree (Bachelor or similar).

Degree name

Master of Science (120 credits)

Teknologie masterexamen

Bilaga 1 - Kurslista

Bilaga 2 - Inriktningsbeskrivningar



Bilaga 1: Kurslista

Masterprogram, Industriell och miljöinriktad bioteknologi (TIMBM)

Gemensamma kurser

Årskurs 1

Obligatoriska kurser (43,5 Högskolepoäng)

Kurskod	Namn	Omfattning	Utbildningsnivå
AK2036	Vetenskapsteori och vetenskaplig metodik med tillämpningar (naturvetenskap)	7,5 hp	Avancerad nivå
BB2020	Molekylär enzymologi	7,5 hp	Avancerad nivå
BB2450	Cellfabriken	7,5 hp	Avancerad nivå
BB2460	Biokatalys	7,5 hp	Avancerad nivå
BB2480	Energi och miljö	7,5 hp	Avancerad nivå
ME1000	Industrial Management	6,0 hp	Grundnivå

Villkorligt valfria kurser

Kurskod	Namn	Omfattning	Utbildningsnivå
BB1120	Odlingsteknologi	6,0 hp	Grundnivå

Rekommenderade kurser

Kurskod	Namn	Omfattning	Utbildningsnivå
AK2008	Bioteknologins etik	7,5 hp	Avancerad nivå
BB2010	Miljötoxikologi	9,0 hp	Avancerad nivå
BB2160	Strukturbiologi	7,5 hp	Avancerad nivå
BB2170	Läkemedelsutveckling	6,0 hp	Avancerad nivå
BB2280	Molekylär modellering	7,5 hp	Avancerad nivå
BB2330	Växtbioteknik	7,5 hp	Avancerad nivå
BB2420	Glykobiologi och kolhydratsteknologi	7,5 hp	Avancerad nivå
KD2310	Organisk kemi, fortsättningskurs	7,5 hp	Avancerad nivå
KD2320	Spektroskopiska verktyg inom kemi	9,0 hp	Avancerad nivå
MJ2627	Miljöskyddsteknik, större kurs	9,0 hp	Avancerad nivå
MJ2629	Miljöskyddsteknik teorikurs	6,0 hp	Avancerad nivå
MJ2652	Miljökonsekvenser av tekniska system och processer	6,0 hp	Avancerad nivå

Kompletterande information

Årskurs 1 består av obligatoriska kurser samt rekommenderade kurser.

En av kurserna MJ2627 eller MJ2629 läses av de studenter antagna till civilingenjörsprogrammet i Bioteknik, som önskar läsa kursen MJ2624 i årskurs 2.

Internationella studenter läser kursen MJ2652 om de önskar läsa MJ2624 i årskurs 2

Årskurs 2

Obligatoriska kurser (45,0 Högskolepoäng)

Kurskod	Namn	Omfattning	Utbildningsnivå
BB203X	Examensarbete inom industriell bioteknologi, avancerad nivå	30,0 hp	Avancerad nivå
BB2520	Bioprocessdesign	15,0 hp	Avancerad nivå

Villkorligt valfria kurser

Kurskod	Namn	Omfattning	Utbildningsnivå
KE2320	Processdesign för industri och samhälle	15,0 hp	Avancerad nivå
MJ2682	Tillämpad miljösystemanalys	6,0 hp	Avancerad nivå

Rekommenderade kurser

Kurskod	Namn	Omfattning	Utbildningsnivå
AK2008	Bioteknologins etik	7,5 hp	Avancerad nivå
BB2010	Miljötoxikologi	9,0 hp	Avancerad nivå
BB2170	Läkemedelsutveckling	6,0 hp	Avancerad nivå
BB2280	Molekylär modellering	7,5 hp	Avancerad nivå
BB2420	Glykobiologi och kolhydratsteknologi	7,5 hp	Avancerad nivå
KD2310	Organisk kemi, fortsättningskurs	7,5 hp	Avancerad nivå
KD2320	Spektroskopiska verktyg inom kemi	9,0 hp	Avancerad nivå
MJ2624	Projektarbete i miljöskyddsteknik	6,0 hp	Avancerad nivå
MJ2635	Miljömodellering: Introduktion med applikationsexempel	6,0 hp	Avancerad nivå

Kompletterande information

Årskurs 2 består av obligatorisk kurser, villkorligt valfria och rekommenderade kurser, och avslutas med ett examensarbete på avancerad nivå.



Bilaga 2: Inriktningar

Masterprogram, Industriell och miljöinriktad bioteknologi (TIMBM)

Programmet har inga inriktningar.