



# Programme syllabus

Master's Programme, Medical Biotechnology, 120 credits

Masterprogram, medicinsk bioteknologi

*120.0 credits*

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*Valid for students admitted to the education from autumn 14 (HT - Autumn term; VT - Spring term).*

This is a translation of the Swedish, legally binding, programme syllabus.

## Programme objectives

### Knowledge and understanding

After completing the *Medical Biotechnology* programme the students should:

- have knowledge and skills in biotechnology and chemistry with an emphasis on medical applications.
- be able to grasp information and communicate with experts in neighbouring subjects to biotechnology and chemistry, such as physics, biology and medicine.
- have knowledge about biological and chemical processes on a molecular-, cellular-, and organism level.
- have a deep understanding of current research and development in one area of medical biotechnology.
- have some knowledge about the biotechnological industry in Sweden and in other countries.

### Skills and abilities

After completing the *Medical Biotechnology* programme the students should have:

- a capacity to critically and systematically integrate knowledge and analyze, judge and use complex information of technical and scientific nature from various sources even when it is not complete.
- a capacity to analytically, independently and creatively identify, plan, execute and evaluate questions with adequate methods within a given timeframe and thereby contribute to the knowledge development.

- skills in the use of standard and advanced biotechnological methods and techniques on a level appropriate for continued studies as a doctoral student.
- skills in oral and written technical communication with both experts and non-experts of biotechnology and chemistry.

## **Ability to make judgements and adopt a standpoint**

After completing the *Medical Biotechnology* programme the students should be able to:

- critically evaluate existing and new technological advancements in biotechnology and apply them to develop improved or novel commodities for society.
- use biotechnological methods, products and processes in a responsible manner.
- understand the impact of biotechnological research and developments on a social, ethical and gender level.
- understand the implications of biotechnological developments in the context of a sustainable society.
- identify the need for additional knowledge and be responsible for his/her own knowledge development

For more information see “Local regulation for degrees at first and second cycle, local system of qualifications”

[http://intra.kth.se/regelverk/utbildning-forskning/grundutbildning/examina/1.27227?l=en\\_UK](http://intra.kth.se/regelverk/utbildning-forskning/grundutbildning/examina/1.27227?l=en_UK)

## **Extent and content of the programme**

*Medical biotechnology* is a two-year (120 credits) master programme, second cycle. The instruction language is entirely English. The programme consists of courses given by KTH, mainly by the School of Biotechnology.

## **Eligibility and selection**

### ***General admission requirements***

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

*Language requirements* – applicants must prove 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](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 *cell biology, biochemistry, microbiology and gene technology/molecular biology* corresponding to a total of at least 20 credits
- Courses in *chemistry* corresponding to at least 30 credits
- Basic knowledge in *mathematics, numerical analysis and computer science* to a total of at least 20 credits.

For more information, see Study at KTH, Master's programmes at KTH, "Admission requirements".

<http://www.kth.se/en/studies/programmes/master/admission>

### ***Selection process***

The selection process for the *Medical 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.

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/3-antagning-till-utbildningsprogram-pa-avancerad-niva-1.276218>

## **Implementation of the education**

### **Structure of the education**

The academic year at KTH consists of 40 weeks, divided into four study periods, where two or three courses are simultaneously studied. The nominal study pace is 60 credits each study year.

The mandatory courses comprise 38 credits during the first study year and 49.5 credits (of which the degree project, advanced level is 30 credits) during the second study year. The list of courses in appendix 1 contains a group of recommended courses from which the students must choose at least 17.5 credits.

### **Courses**

The programme is course-based. Lists of courses are included in [appendix 1](#).

Teaching and examination methods vary between courses. Commonly, 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 programme is concluded with a degree project, advanced level of 30 credits. To receive the degree "*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 credits.

### **Grading system**

Courses in the first and the second cycle are graded on a scale from A to F. A-E are passing grades, A is the highest grade. The grades pass (P) and fail (F) are used for courses under certain circumstances.

## **Conditions for participation in the programme**

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 study year, respectively. At least 45 credits have to be completed during the first study 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 study year. This study plan will include residual courses and appropriate courses for the upcoming year.

## **Recognition of previous academic studies**

The students have the right to transfer 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 credits is decided by the program director.

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

## **Studies abroad**

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

## **Degree project**

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. 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.

The degree project should normally be performed in the field of biotechnology. 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 student office.

Grading of the degree project is based on the listed evaluation criteria (see below) and some other aspects (see the course syllabus),

- 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:<https://intra.kth.se/regelverk/utbildning-forskning/grundutbildning/examensarbete/overgripande-riktlinjer-for-examensarbetskurser-gemensamma-mal-och-bedomningskriterier-1.551506>

## **Degree**

Master of Science (120 credits) - is obtained after completion of the Medical 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 credits, of which:

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

Within the programme, the mandatory and recommended courses must add up to at least 105 credits. The final credits can be chosen by the student but should be relevant to the professional role as an engineer.

Students must apply for the degree and are required to show proof of their basic degree (Bachelor or similar). To apply use the web service “Application for degrees” that is found in the personal menu.

### **Degree name**

*Master of Science (120 credits)*

*Teknologie masterexamen*

For more information see “Local regulation for degrees at first and second cycle, local system of qualifications”

[http://intra.kth.se/regelverk/utbildning-forskning/grundutbildning/examina/1.27227?l=en\\_UK](http://intra.kth.se/regelverk/utbildning-forskning/grundutbildning/examina/1.27227?l=en_UK)

[Appendix 1 - Course list](#)

[Appendix 2 - Programme syllabus descriptions](#)



# Appendix 1: Course list

Master's Programme, Medical Biotechnology, 120 credits (TMBIM),  
Programme syllabus for studies starting in autumn 2014

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## General courses

### Year 1

#### Mandatory courses (38.0 Credits)

Course code	Course name	Credits	Edu. level
<a href="#">AK2036</a>	<a href="#">Theory and Methodology of Science with Applications (Natural and Technological Science)</a>	7.5 hp	Second cycle
<a href="#">BB2160</a>	<a href="#">Structure Biology</a>	7.5 hp	Second cycle
<a href="#">BB2440</a>	<a href="#">Bioinformatics and Biostatistics</a>	7.0 hp	Second cycle
<a href="#">BB2470</a>	<a href="#">Genetics and Genomics</a>	10.0 hp	Second cycle
<a href="#">ME1003</a>	<a href="#">Industrial Management, Basic Course</a>	6.0 hp	First cycle

#### Recommended courses

Course code	Course name	Credits	Edu. level
<a href="#">BB1130</a>	<a href="#">Analysis and Purification of Biomolecules</a>	7.0 hp	First cycle
<a href="#">BB2020</a>	<a href="#">Molecular Enzymology</a>	7.5 hp	Second cycle
<a href="#">BB2280</a>	<a href="#">Molecular Modeling</a>	7.5 hp	Second cycle
<a href="#">BB2330</a>	<a href="#">Plant Biotechnology</a>	7.5 hp	Second cycle
<a href="#">BB2460</a>	<a href="#">Biocatalysis</a>	7.5 hp	Second cycle
<a href="#">BB2490</a>	<a href="#">Analysis of Data from High-throughput Molecular Biology Experiments</a>	7.5 hp	Second cycle
<a href="#">BB2530</a>	<a href="#">Micro and Nanotechnologies for Biotechnology</a>	6.0 hp	Second cycle
<a href="#">DD2404</a>	<a href="#">Applied Bioinformatics</a>	7.5 hp	Second cycle
<a href="#">KD2320</a>	<a href="#">Spectroscopic Tools for Chemistry</a>	9.0 hp	Second cycle
<a href="#">KD2410</a>	<a href="#">Imaging Tools of Chemistry</a>	6.0 hp	Second cycle
<a href="#">ME2824</a>	<a href="#">From Science to Business- Concepts in Biotechnology</a>	7.5 hp	Second cycle

## Supplementary information

Study year 1 consists of mandatory courses and recommended courses.

## Year 2

### Mandatory courses (49.5 Credits)

Course code	Course name	Credits	Edu. level
<a href="#">BB200X</a>	<a href="#">Degree Project in Biotechnology, Second Cycle</a>	30.0 hp	Second cycle
<a href="#">BB2170</a>	<a href="#">Drug Development</a>	6.0 hp	Second cycle
<a href="#">BB2290</a>	<a href="#">Molecular Biomedicine</a>	7.5 hp	Second cycle
<a href="#">BB2510</a>	<a href="#">Proteomics</a>	6.0 hp	Second cycle

### Recommended courses

Course code	Course name	Credits	Edu. level
<a href="#">AK2008</a>	<a href="#">Ethics of Biotechnology</a>	7.5 hp	Second cycle
<a href="#">BB2010</a>	<a href="#">Environmental Toxicology</a>	9.0 hp	Second cycle
<a href="#">BB2420</a>	<a href="#">Glycobiology and Carbohydrate Technology</a>	7.5 hp	Second cycle
<a href="#">KD2310</a>	<a href="#">Advanced Organic Chemistry</a>	7.5 hp	Second cycle
<a href="#">ME2016</a>	<a href="#">Project Management: Leadership and Control</a>	6.0 hp	Second cycle

## Supplementary information

**This is a preliminary list of courses for study year 2 for those who started the program 2014. There might be changes. Recommended courses may be cancelled if number of admitted students are less than minimum of places.**

Study year 2 consists of mandatory courses and recommended courses, and ends with a degree project, second level, 30 credits.



## Appendix 2: Specialisations

Master's Programme, Medical Biotechnology, 120 credits (TMBIM),  
Programme syllabus for studies starting in autumn 2014

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This programme has no specialisations.