Master‘s programme
Molecular Biotechnology

UNIVERSITÄT
HEIDELBERG
ZUKUNFT
SEIT 1386

Master Mobi

- in a nutshell –

May 2026

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Overview

120 ECTS, divided in:

- Modules in which assessments are undertaken as part of the course
  - 90 ECTS - 40% of the overall grade

- Master‘s thesis and colloquium
  - 30 ECTS – **each** 30% of the overall grade

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Structure of the programme

- **Special Aspects and Advanced Basics of Molecular Biotechnology - 16 ECTS**
  - MoBi4all - 1 ECTS
  - 15 Abstracts - 5 ECTS
  - introductory course - 10 ECTS
- **Major and Minor(s) - 56 ECTS**
  - seminars
  - lab practicals
- **Additional courses - 6 ECTS**
- **Project proposal - 12 ECTS**
- **Master‘s thesis and colloquium - 30 ECTS**

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Structure of the programme

Special Aspects & Advanced Basics of Molecular Biotechnology - 16 ECTS

- **MoBi4all**: participate 12x → **1 ECTS**
- write 15 **abstracts of scientific talks or presentations**: hear 45 talks/presentations → **5 ECTS**
- **introductory course**: compulsory: choice for external Master’s students Introductory course in biotechnology **or** bioinformatics; alternative lab practical for graduates of BSc Mobi → **10 ECTS**

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Major & Minor(s)
Four subjects

experimental

- Experimental Drug Research (EDR)
- Bioengineering & Synthetic Biology (BSB)

computational

- Data Science in Omics (DSO)
- Biomolecular Modelling (BMM)

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experimental subjects

Experimental Drug Research (EDR)

- experimentally driven program at the interface of molecular biology, chemistry, and biomedicine
- covers: drug target discovery and validation, design of new therapeutics based on small molecules, biologics, and gene- and cell-based therapies
- students learn to test and refine therapeutic concepts in cellular and organismal models, with core applications in cancer research, neurobiology, and infectious diseases

Bioengineering & Synthetic Biology (BSB)

- experimentally driven program centered on the rational design of new-to-nature biomolecules, biomolecular pathways, and synthetic cellular systems
- integrates a design–build–test–learn engineering paradigm with quantitative, biophysical characterization of engineered function and dynamics, supported by state-of-the-art measurement platforms
- includes computational data analysis and modeling to connect design choices with experimental outcomes

computational subjects

Data Science in Omics (DSO)

- covers advanced statistical and machine-learning applications for the analysis of high-throughput data in biology, such as omics (bulk, single-cell, spatial omics, including different modalities such as transcriptomics and proteomics) as well as high throughput imaging technologies
- will provide skills in data analysis, in the development of computational methods for processing and integration of multi-modal data, with applications in precision medicine and pharmaceutical research

Biomolecular Modelling (BMM)

- focus on the description and modelling of biological molecules, their dynamics and their interactions
- covers the areas of
  - structure and function prediction of protein
  - dynamical simulations of the interactions between different molecules such as protein and their ligands, with applications e.g. in drug design

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Major & minor(s)

two possible scenarios

1 major
1 minor
(1M1m)

- 3 – 6 seminars:
  - 12 ECTS in major
  - 4 ECTS in minor
- 3 - 4 free lab practicals
  - 2-3 (30 ECTS) in major
  - 1 (10 ECTS) in minor

1 major
2 minor
(1M2m)

- 4 – 7 seminars
  - 8 ECTS in major
  - je 4 ECTS in minors
- 3 - 4 free lab practicals
  - 1-2 (20 ECTS) in major
  - 1 (10 ECTS) in each minor

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Major & minor(s)

Four subjects

- Experimental Drug Research (EDR)
- Bioengineering & Synthetic Biology (BSB)
- Data Science in Omics (DSO)
- Biomolecular Modelling (BMM)

two possible scenarios

- 1 major
  1 minor (1M1m)
- 1 major
  2 minor (1M2m)

all combinations possible!

Chose each subject only once

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Major & minor(s) lab practicals

- duration: from 6 to 12 weeks
- plan and organize them entirely on your own
- apply for lab practicals
  - regarding your own fields of interest
  - worldwide
  - in a lab set up for this purpose

There is no list, where you can chose a lab placement without taking the initiative!

Major & minor(s)
Internships in industries

possible! …. but:

- The university does not sign any confidentiality agreement
- No black bars
- You must find an academic supervisor at IPMB

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Structure of the programme

Additional courses

→ 6 ECTS – no grade

- you might chose freely from different offers
- possibilities :
  - courses from other study programmes
  - courses from **heiSKILLS** (e.g. language classes)
  - organisation of the poster session
  - other options upon consultation

Structure of the programme

Project Proposal

→ 12 ECTS

3 parts:

1. theory (self-study)
2. lab practical and written assignment
3. presentation of your work in the lab

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Structure of the programme

Master‘s thesis → 28 ECTS

- must be undertaken in the major
- examiners from the A-side of the list of examiners
- duration: 6 month
- possibility of prolongation of 1 month
- earliest hand-in: 6 weeks before deadline

Colloquium → 2 ECTS

- reports have to be handed in 2 weeks prior to the colloquium at the academic office
- examiners have 4 weeks to write the report → takes place usually approx. 6 weeks after submission of the thesis
- 15 minutes each for:
  - presentation of the thesis
  - discussion based thematically on the presentation
  - questions regarding fundamental knowledge of the chosen courses of the master‘s programme

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Requirements for application

- bachelor's degree with above-average grades; degree should be in molecular biotechnology or other natural sciences (biology, physics, chemistry, mathematics, computer science with a focus on the life sciences) with at least 90 ECTS in biology and chemistry
- **German language skills: TestDaF level 4 or DSH level 2 (67%) - level C1**
- English language skills:
  - TOEFL - minimum 90 out of 120 or ITP 570 out of 677
  - IELTS - minimum 6.5
  - Cambridge Certificate in Advanced English (CAE)
  - high school or bachelor's degree from a US or British university
- Applicants from the People's Republic of China, India, and Vietnam with foreign educational qualifications from these countries should apply for the APS certificate at an early stage. This must be done by the end of the application deadline at the latest