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Master of Science in Bioinformatics • Freie Universität Berlin • Berlin ............................................................ 2
## Master's degree

### Master of Science in Bioinformatics

Freie Universität Berlin • Berlin

### Overview

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<tr>
<th><strong>Degree</strong></th>
<th>Master of Science in Bioinformatics</th>
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<tbody>
<tr>
<td><strong>In cooperation with</strong></td>
<td>Joint programme of the Berlin University Alliance offered by Freie Universität and Charité – Universitätsmedizin. In cooperation with:</td>
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<tr>
<td></td>
<td>• Max-Planck-Institut für molekulare Genetik (MPIMG)</td>
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<td></td>
<td>• Zuse-Institut Berlin (ZIB)</td>
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<tr>
<td></td>
<td>• Max-Delbrück-Centrum für molekulare Medizin (MDC)</td>
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<td></td>
<td>• Robert Koch-Institut (RKI)</td>
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<td></td>
<td>• Leibniz-Institut für Gewässerökologie und Binnenfischerei (IGB)</td>
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<tr>
<th><strong>Teaching language</strong></th>
<th>English</th>
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<tr>
<th><strong>Languages</strong></th>
<th>Courses are held in English.</th>
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<tr>
<th><strong>Programme duration</strong></th>
<th>4 semesters</th>
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<table>
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<tr>
<th><strong>Beginning</strong></th>
<th>Winter semester</th>
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<tr>
<th><strong>Application deadline</strong></th>
<th>Applications for our Master's programme in Bioinformatics (consecutive Master's programme) are usually accepted from mid of April until end of May each year. The dates may change. Please find more information here.</th>
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<tr>
<th><strong>Tuition fees per semester in EUR</strong></th>
<th>None</th>
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<tr>
<th><strong>Combined Master’s degree / PhD programme</strong></th>
<th>No</th>
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<tr>
<th><strong>Joint degree / double degree programme</strong></th>
<th>No</th>
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<tr>
<th><strong>Description/content</strong></th>
<th>Bioinformatics research in medicine and the life sciences is increasingly based on analysis and interpretation of biological mass data. The use of computers, combined with accurate mathematical models and efficient algorithms, is indispensable in this process. Building on the knowledge gained in a Bachelor’s degree programme in bioinformatics, this programme offers advanced education in the corresponding subfields of mathematics, computer science, biology, and translational bioinformatics. The programme is jointly conducted by the Department of Mathematics and Computer Science, the Department of Biology, Chemistry and Pharmacy and the Charité Medical School. It offers both in-depth theoretical courses and applied training in bioinformatics. This gives students the necessary knowledge and skills to identify relevant biological issues, develop appropriate mathematical or computational solutions to</th>
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approach them, and interpret the results correctly in a biological or biomedical context.

The following focus areas are offered to students:

**Complex Systems**
Advanced techniques for modelling, simulation, and analysis of complex networks and dynamic processes pave the way for understanding systems ranging from molecular interaction networks to ecosystems.

**Data Science**
This specialisation puts the data in the centre. State-of-the-art analysis and knowledge extraction techniques from modern statistics and machine learning will be explored and applied to realistic data sets. Consequences of the data generation process and topics pertaining to big data will also be considered.

**Advanced Algorithms**
The emphasis lies on advanced algorithms for bioinformatics analyses. This includes methods to generate search indices for very large sequencing data, efficient protein and RNA analysis, and the necessary computer science foundations to analyse and develop novel and efficient algorithms.

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**Course Details**

**Course organisation**

**Basic studies (30 credit points = CP)**
Three basic modules, 6 CP each, must be done within the first semester. All three modules consist of a lecture and an exercise/tutorial. These modules strengthen and deepen the methodological basics and prepare the students for the focus areas and optional courses.

- **Foundations in Computer Science**
- **Foundations in Mathematics and Statistics**
- **Foundations in Bio-Medicine**

In addition, there is an introductory module provided (12 CP). This introductory module consists of a lecture series and a seminar:

- **Introduction to Focus Areas**: This introduces three profile areas (Advanced Algorithms, Complex Systems and Data Science) and should support the basis of decision-making for the student’s own profile area.

**Profile area (30 CP)**
Starting in the second semester, students choose a profile area. Each profile area consists of the following:

- one **Focus Area** (15 CP)
- Module: **Research Internship** (10 CP)
- Module: **Ethics and Policy Questions** (5 CP)

The following modules are compulsory in the respective focus area:

- **Complex Systems**: Module: Complex Systems in Bioinformatics (10 CP); Module: Complex Systems in Biomedical Applications (5 CP)
- **Data Science**: Module: Data Science in the Life Sciences (15 CP)
- **Advanced Algorithms**: Module: Advanced Algorithms for Bioinformatics (10 CP); Module: Methods in Life Sciences (5 CP)

**Elective area (30 CP)**
In the elective area, profile modules and elective modules are offered. Modules from the list of optional modules can be chosen freely with the following restrictions:

- Profile modules of at least 10 LP from the chosen profile area (Focus Area) must be
At least one V-module must be chosen and completed.
- At least one practical module must be selected and completed.

**Master’s thesis with accompanying colloquium (30 CP)**

The Master’s thesis is usually written in the fourth semester. The processing time is 23 weeks. During this time, the students should give a 30-minute presentation on the progress of their work.

The [Online Studies Selection Guide (OSA) for the Bioinformatics Master's programme](https://www.osa.de) gives a comprehensive insight into the study programme.

Further information can also be found on the [programme website](https://www.osa.de).

### Costs / Funding

<table>
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<th>A Diploma supplement will be issued</th>
<th>Yes</th>
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<tr>
<td>Integrated internships</td>
<td>No additional internship is necessary.</td>
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<tr>
<td>Course-specific, integrated German language courses</td>
<td>No</td>
</tr>
<tr>
<td>Course-specific, integrated English language courses</td>
<td>No</td>
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**Tuition fees per semester in EUR**

None

**Semester contribution**

In total, the semester contribution amounts to 312.89 EUR. It includes a fee of 198.80 EUR for the transportation ticket contribution. This allows you to use public transportation in Berlin for free. Other costs covered by the semester contribution are a 50 EUR enrolment fee, a 54.09 EUR semester contribution to the student support service ("studierendenWERK Berlin"), a 8.80 EUR contribution to the student union and a 1.20 EUR contribution to the Semester Ticket office.

**Costs of living**

Compared to other European countries, the cost of living in Germany is quite reasonable. The prices for food, accommodation, clothing, cultural events, etc. are basically in line with the EU average. You will need around 950 EUR each month to cover your living expenses. The largest expense is your monthly rent.

| Funding opportunities within the university | No |

### Requirements / Registration

**Academic admission requirements**

Summary of the Admission Regulations

(All information is subject to confirmation by the Senate Administration of Berlin.)
Detailed information for prospective students can be found here

First Degree
You need to have a university degree (Bachelor’s or equivalent), either from Germany or an equivalent foreign degree, in a higher education programme comprising at least six semesters that qualifies to practice a profession.

Computer Science, Bioinformatics & Programming Skills (25 CP)
You need at least 25 credits in computer science modules. Out of these, at least 10 credits need to be in modules in which you acquired knowledge in an imperative programming language, such as C/C++, Java or Python, and at least 10 credits in the area of algorithms.

Mathematics/Statistics (25 CP)
You need at least 25 credits in mathematical modules. Out of these, at least 10 credits need to be in the area of linear algebra or analysis and at least 10 credits in the area of statistics.

Biology/Chemistry/Biochemistry (25 CP)
You need at least 25 credits in this area. Out of these, at least 10 credits need to be in the area of biochemistry, molecular biology and genetics

If you are an applicant who has not received the university degree in Germany, you should apply to Freie Universität Berlin via uni-assist. Uni-assist will check your documents and forward them to the respective university. Before you apply, please read our homepage concerning application procedures, admission requirements and fees. [http://www.fu-berlin.de/en/studium/bewerbung/master/index.html](http://www.fu-berlin.de/en/studium/bewerbung/master/index.html) and [http://www.fu-berlin.de/en/studium/international/studium_fu/index.html](http://www.fu-berlin.de/en/studium/international/studium_fu/index.html)

For all inquiries about the application process, admission, enrolment, orientation at Freie Universität Berlin, etc., please contact the Student Services Centre: Info-Service@fu-berlin.de

Student Services Center

<table>
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<tr>
<th>Language requirements</th>
<th>Proof of English language skills (level B2 CEFR or equivalent) is required.</th>
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<td>Applications for our Master’s programme in Bioinformatics (consecutive Master’s programme) are usually accepted from <a href="http://www.fu-berlin.de/en/studium/bewerbung/master/index.html">mid of April until end of May</a> each year. The dates may change. Please find more information here.</td>
</tr>
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</table>
| Submit application to | Freie Universität Berlin  
c/o uni-assist e.V.  
11507 Berlin  
Germany |

Services

Possibility of finding part-time employment
There are many ways to earn money while you study. For example, you can work as a waiter, academic assistant or private tutor. Knowledge of German will improve your chances of finding a part-time job. Please be aware of the legal regulations.

Student services at the universities and the local representative of the "Bundesagentur für Arbeit" (Federal Employment Agency) can provide information about jobs for students. When searching, look at online job boards, adverts in local newspapers and notice boards on campus.

| Accommodation | You have the option to stay in a public/private student dormitory or in a private (shared) |
Contact

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Fachbereich Mathematik und Informatik

Prof Dr Alexander Bockmayr

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14195 Berlin

bioinf@math.fu-berlin.de


Ulrike Seyferth

Tel. +49

Email

https://www.facebook.com/freieuniversitaetberlin/

https://twitter.com/fu_berlin

https://www.linkedin.com/school/freie-universitat-berlin/

https://www.instagram.com/fu_berlin/

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