Marine Biotechnology - master

120 credits

Tromsø

The programme description has been approved by the board of The Faculty of Biosciences, Fisheries and Economics in December 2017.
<table>
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<tr>
<th>Study programme name</th>
<th>Marine Biotechnology - master</th>
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<tr>
<td>Obtained degree</td>
<td>Master of Science in Marine Biotechnology</td>
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<tr>
<td>Target group</td>
<td>The program aims at students with a background in science with special focus on biotechnology, and with interests in working with molecules, peptides or enzymes from e.g. marine organisms.</td>
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</table>
| Admission requirements, required prerequisite knowledge, recommended prerequisite knowledge | Admission to the MSc in Marine Biotechnology requires a bachelor's degree in biotechnology, marine biotechnology or equivalent education. An average grade of equivalent to C or better in the Norwegian grading system is required. **Required background in Biotechnology:**  
  - In-depth specialization at the 2000 level (2nd-3rd year) in the following subjects;  
    chemistry, biochemistry, microbiology, molecular biology, methods in molecular biology and biotechnology (min. 10 credits in each subject).  
  - The in-depth specialization must amount to 80 credits in total.  
  - Lack of in-depth specialization in one of these 2000 topics can be compensated by a strong background in one or more of the other topics.  

**Formal admission requirements - Master's level.**

Are you an international applicant? Read more here.

We have 15 places available each year. Upon admission, applicants are ranked by average grade on subjects included in the in-depth specialisation from the bachelor degree.

| Certificate of good conduct | - |
| Academic content and description of the study programme | **Objectives, content and organization**  
The purpose is to educate candidates in modern biotechnological expertise, with particular emphasis on use of marine resources, bioactive compounds, gene products and marine rest raw materials. You will qualify for careers in fields such as marine value creation, innovation and research.

A good marine biotechnologist must have a broad base of knowledge and skills in basic molecular biology, chemistry and techniques and processes that use marine micro-organisms, plant and animal cells, or parts of these, to manufacture, develop or modify commercially useful products. On successful completion of |
In preparation for your study we encourage you to do the following:

**iKomp - information literacy:** The course is an online course that aims to make you better equipped to deal with the demands and expectations you are met with at universities and colleges when it comes to learning and academic integrity. Check the website: [iKomp](#).

There will be a mandatory introductory part with themes like:

- How to do science
- How to be a master student in biotechnology
- Writing a master theses/what we expecct from a master's thesis
- Plagiarism / iKomp
- Searching for literature / Munin
- EndNote/Using references databases and how to use them in Word
- Preparation for laboratory work
- Web page for Master students at NCFS

The **first semester** consists of compulsory courses. See the menu "Programme structure" for course details.

In the **second semester** the student has various subject choices. Alternatively, this semester may be used for an exchange visit.

The master's thesis (60 credits/ECTS) is written during the **third and fourth semesters** and is based on supervised experimental work. it is also possible to start the Master's thesis in the second semester (10 Credits and combine it with one elective course (10 Credits) in the third semester.

**HMS-0501 (web-module), HMS-0502 (first aid, practical course), HMS-0504 (web-module),** the compulsory safety course for laboratory work, must be taken by all students who carry out lab work. The compulsory parts of this multi-module course are taken online. The first aid part requires physical attendance. Students must fulfill the compulsory online modules as soon as the semester starts to have access to the laboratory wings. There are no credits for this course.
### Table: programme structure

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<tr>
<th>Semester</th>
<th>10 credits</th>
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</table>
| Semester 1  
*Autumn, starts around 10 August* | BIO-3610 Industrial Biotechnology | BIO-3612 Marine bioprospecting and bioactive compounds | BIO-3615 Quantitative Microbial Biotechnology I |
| Semester 2  
*This semester you can also go abroad* | Elective course | Elective course | BIO-3901 Master’s Thesis (10 ECTS) |
| Semester 3  
*If you were abroad in 2nd semester: BIO-3901* | Elective course if you were abroad in 2nd semester: BIO-3901 | BIO-3901 Master’s Thesis (20 ECTS) | |
| Semester 4 | BIO-3901 Master’s Thesis (30 ECTS) | | |

### The study programme’s Learning Outcome

On completion of the course, the candidate is expected to have achieved the following learning outcomes:

#### Knowledge:

- advanced knowledge about processes for use of molecules with unique characteristics
- knowledge that can be applied to solve specific tasks in industry and public administration
- understanding our ethical responsibility for sustainable resource utilization, industrial practice and innovation
- knowledge of scientific theory and experience in applying scientific methodology

#### Skills:

- advanced skills in genetic, biotechnological and molecular biological techniques
- multidisciplinary skills that enable students to combine different disciplines so that they can analyse and solve a wide range of technical problems
- proficiency in working individually and as a member of a team
- a completed research project in marine biotechnology

#### General competence:

- a general understanding of the importance of natural resource-based industries and the challenges and opportunities involved
- qualifications for admission to PhD programmes in biotechnology and related specialist fields
- advanced knowledge of current R&D issues and the related commercial potential, especially in marine biotechnology
- in-depth awareness of the biochemical, cellular and genetic basis of life
- a thorough understanding of natural marine resources as the basis for developing food, biochemical and bioactive and medicinal components

| The study programme's relevance | The job opportunities are many and varied. With skills and qualifications in marine biotechnology, you will be sought after locally, nationally and internationally. The Norwegian Government's High North strategy highlights marine biotechnology as one of the most important disciplines for the future of the economy. The field is growing rapidly and highly qualified candidates are in demand. Your Master degree has equipped you with sound expertise in biology and chemistry, which will provide you with opportunities in biotechnological industries, in fields such as production of seafood and other foodstuffs, and laboratory-based specialisations. With an MSc in Marine Biotechnology you can also become a product developer, principal engineer, researcher, company manager, entrepreneur or public administrator. The course qualifies students for management-level jobs in the expanding and innovative commercial biotechnology sector. Our graduated students work as PhD's at the University, teachers, and in different companies like: Colifast, Pharmaq, Mowi, Nofima, Ayanda, GenØk, Nordic Pharma Inc, Akvaplan-Niva, TosLab and ArcticZymes. |
| Work scope and learning activities | The study programme is delivered using a variety of teaching methods, depending on the subject. The teaching plan may include lectures, seminars, laboratory work, working in teams, fieldwork and industrial visits - or preferably a combination. For some of the subjects, specific work requirements may have to be met prior to exam entry. There may be compulsory requirements to submit reports and assignments and attend teaching seminars. |
| Examination and assessment | Some subjects in the study programme are marked on a pass/fail basis, while for others the graded scale of marks from A to E |
(passed) and F (failed) may be used. The individual course description specifies the marking system used.

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<th>For master's theses/ independent work in master's degrees</th>
<th>Individual tutoring is provided for the master's thesis by the department's scientific staff.</th>
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<td>Language of instruction and examination</td>
<td>The language of instruction is in English and all of the syllabus material is in English. Examination questions will be given in English, but may be answered either in English or a Scandinavian language.</td>
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<tr>
<td>Internationalisation and student exchange</td>
<td>A one-semester stay abroad may be included as part of the curriculum in the second semester. Such stays can provide you with professionally valuable technical, linguistic and cultural experiences, as well as lifelong memories!</td>
</tr>
<tr>
<td>Supervised professional training</td>
<td>Individual tutoring is provided for the master's thesis by the department's scientific staff.</td>
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| Administrative responsibility and academic responsibility | Administrative responsibility: The board of The Faculty of Biosciences, Fisheries and Economics.  
Academic responsibility: The study program board at the Norwegian College of Fishery Science. |
| Quality assurance                                         | The study program is evaluated annually by the student representatives, the teachers, program coordinator and program director (Study program board).  
The subjects included in the study program are evaluated at least one time during a three-year period. Subject evaluation consists of student and teachers evaluation. |
| Other regulations                                         | For access to laboratory wings the HMS-0501 and HMS-0504 (both web-based modules) must be fulfilled as soon as possible during the first semester. |