

International Degree Course Industrial and Environmental Biology ISTAB (M.Sc.) Hochschule Bremen – University of Applied Sciences



Profile

The International Degree Course Industrial and Environmental Biology ISTAB (M.Sc.) will prepare successful applicants for a science oriented job in industry or in the public domain of nature conservation and related fields. ISTAB will also lay ground for those who wish to enrol in a PhD program. Industrial strain development, marine biotechnology, and/or ecology of aquatic and terrestrial systems represent the life science part of the program. Compulsory for every student will be a course in life science oriented mathematics. In January 2009 in a peer review process the concept of the ISTAB M.Sc. study program has been approved by the National Board of Accreditation. This process ensures the consistency of the curriculum with the demands of the national and international job markets. It also imposed a rigorous quality control system of the performance of the teachers and students in terms of a successful timely completion of the study program.

Organization and Prerequisites

The curriculum is divided into three semesters starting 1st of March with the summer term. Winter terms start 1st of September. Each semester consists of five modules. Depending on the subject each module comprises class and/or lab or field work. During one semester a student will earn 30 credit points corresponding to the European Credit Transfer System (ECTS).

A degree in biology (or related fields) equivalent to 210 ECTS is required for enrolment. Candidates with a degree equivalent to 180 ECTS can earn 30 ECTS during the fall semester with project work at ISTAB (and a final report, in English) at the University of Applied Sciences Bremen.

Teaching language is German* (and can be English upon demand), scientific literature will be almost exclusively in English. Applicants are expected to read and write in English, presentations will be in English. *requiring a C1 level in the European Reference Scheme

Programme

In the first semester students are introduced to advanced life science-oriented mathematics, which includes advanced statistics as well as model building. From the four following courses termed Industrial strain development, Marine Biotechnology, Aquatic Ecology, and Terrestrial Ecology at least two courses have to be selected. These courses will deal with the background and basic and advanced methods of microbial strain development in the context of Pharmaceutical and Industrial Biotechnology and with the development of bioconversion processes (including upstream and downstream processing) with the help of microalgae. On the other hand training is offered in aquatic ecology and river basin management ("European Water Framework Directive") as well as the

sustained land use in the context of the European Flora-Fauna-Habitat (“FFH”) legislation. Whereas the first two might include industrial excursions, the latter two might also include field trips.

Additional modules can be selected from biotechnology programs running at the Jacobs University Bremen and the Hochschule Bremerhaven or from other programs of the Hochschule Bremen.

For those who wish to broaden their knowledge in the English (French, Spanish, Portuguese and, of course German to name but a few) language(s) the University of Applied Sciences and cultural institutions of the respective countries in Bremen offer various possibilities for further studies.

The second semester is devoted to project work. Participating research labs (or external institutions like for example private companies) will offer projects which will be pursued at ISTAB (optionally project work can be carried out externally). The semester is divided up in five consecutive modules, where each module will be graded. The first teaching unit obliges the student to write a grant application for the project of his or her choice. This grant application will cover general knowledge in the field including original publications and patents, the state of the art methodology as well as a detailed outline of the planned experimental work. Included will also be a cost calculation.

The following modules turn to the identification and development of appropriate methodology, to the standardization (validation) of the intended methods, to the application of validated methods addressing the selected project, and, finally, to the writing of a scientific report and a scientific public presentation (in English).

The final semester is devoted to the Master Thesis, which, as an option, might enlarge the subject of the second (project) semester. Master thesis work ultimately is again presented in a scientific public presentation (in English).

ISTAB M.Sc. Curriculum

Semester	Modules				
1	Mathematics ¹	Industrial Strain Development ^{1,2}	Marine Biotechnology ^{1,2}	Aquatic Ecology ^{1,2}	Terrestrial Ecology ^{1,2}
2	Project I ³ : Grant Application	Project II ³ : Development of Methods	Project II ³ : Validation of Methods	Project IV ³ : Application of Methods	Project V ³ : Report and Presentation
3	Master Thesis	Master Thesis	Master Thesis	Master Thesis	Master Thesis

¹ Modules run in blocks; ² From these four units at least two have to be selected; in case where less than four have been selected, additional modules might be chosen from other programs of the University of Applied Sciences Bremen or from programs of the Jacobs University, the University of Applied Sciences Bremerhaven, or the University Bremen as long as they are compatible with the general organisation of the ISTAB M.Sc. program. The program will be discussed and validated with the student, it needs to be approved by the Examination Board of ISTAB; ³ Modules run consecutively.

Additional activities

Numerous extracurricular events like compact introductory courses given by colleagues from partner universities, mini symposia, seminars, participation in scientific meetings, visits of companies, exhibitions and science fairs, field trips etc. complement the ISTAB program.

For the Industrial Biology branch four persons from industry with a strong scientific background have been nominated constituting a Scientific Advisory Board. The yearly meeting of this Board is organized as a scientific mini symposium giving the students the opportunity to present their project work.

Furthermore a journal (*Bremen Journal of Undergraduate Research in Biotechnology*) has been created which is published online (www.biologie.hs-bremen.de). This journal presents results of project work, résumés of internship and thesis projects, reports of students which have graduated from ISTAB describing their work situation etc. This journal appears twice or three times a year as a project

of the second and final year's industrial biology students (ISTAB B.Sc.). Project work of the ISTAB Master program will be presented as well.

The Bremen Institute for Professional Training in Applied Life Sciences

The Bremen Institute for Professional Training in Applied Life Sciences will offer compact courses and seminars for extracurricular qualification in job-related skills like e.g. introductions to advanced project management or introductions to the concept of intellectual property (patents, licensing etc.).

A virtual company called *TiGer BioTec* has been created. Final year's students of the ISTAB bachelor program are collaborators of the R&D department of this company. As a final year's project the students will pursue a product evaluation / market study. Project work does closely resemble working conditions in biotech industry. A master's project might be pursued in the context of *TiGer*.

Partners

ISTAB has developed partnerships with a number of universities i.e. in France (Université Victor Ségalen Bordeaux 2, Bordeaux; Université d'Auvergne and Ecole Nationale Supérieure de Chimie Clermont-Ferrand, Clermont-Ferrand), in England (University of Salford, Salford/Manchester), in Brazil (Universidade Federal de Pernambuco, Recife), in the Netherlands (Rijksuniversiteit, Hanzehogeschool Groningen), in Spain (Universidad de Almería, Almería), in Ireland (Letterkenny Institute of Technology, Letterkenny) and, most recently in Sweden (University of Gothenborg, Gothenborg) and in Norway (Hedmark University, Elverum). Members of the ISTAB team have numerous contacts and partnerships with industry and universities/ research centres and governmental and non-governmental institutions inside and outside of Germany.

Hochschule Bremen – University of Applied Sciences

Neustadtswall 30, D-28199 Bremen, Germany

Phone: +49 (0)421-5905-0

Email: info@hs-bremen.de

Homepage: www.hs-bremen.de (registrar's and examinations office for course structure, study requirements, application procedure etc)

International Study Program Industrial and Environmental Biology ISTAB

Neustadtswall 27, D-28199 Bremen, Germany

A. Verwold (ISTAB secretary):

Phone: +49 (0)421-5905-4249 (mon, tues, wedn 09h00-13h00, thur 09h00-14h00)

ISTAB Homepage: www.biologie.hs-bremen.de

TiGer BioTec homepage: www.tiger.hs-bremen.de

Dr. Tilman Achstetter
Professor of Industrial Microbiology
Responsible for the ISTAB B.Sc.
and M.Sc. study programme
Phone: +49 (0)421-5905-4267
Email: tilman.achstetter@hs-bremen.de

Dr. habil. Gerd Klöck
Professor of Bioprocess Engineering
Phone: +49 (0)421-5905-4266
Email: gerd.kloeck@hs-bremen.de

Dr. Heiko Brunken
Professor of Zoology and Ecology
Phone: +49 (0)421-5905-4280
Email: heiko.brunken@hs-bremen.de

Dr. Dietmar Zacharias
Professor of Applied and Ecological Botany
Phone: +49 (0)421-5905-4269
Email: dietmar.zacharias@hs-bremen.de

