

MOLECULAR BIOSCIENCES AND BIOTECHNOLOGY STUDENT HANDBOOK

**Department of Molecular Biosciences and Bioengineering
College of Tropical Agriculture and Human Resources
University of Hawai`i at Mānoa, Honolulu, HI**

Updated 6/13/2018

**CTAHR Academic Advising
Gilmore Hall, First Floor
E-mail: ctahradv@hawaii.edu
Advising Appointments: <https://ctahradv.youcanbook.me>**

Overview

Molecular Biosciences and Biotechnology (MBB) is an interdisciplinary Bachelor of Science program designed to educate students in the exciting, expanding field of biotechnology, which promises to be the predominant science of the early 21st century.

Students have the option to take a wide array of elective courses to match their studies to their interests. For their senior capstone project, students may choose their own topic, such as biotechnology, environmental and microbial biotechnology, plant biotechnology, insect and pathogen biotechnology, and aquaculture and bioreactor biotechnology.

Graduates pursue careers in pharmaceutical research, genetic testing, aquaculture, bioremediation, plant biotechnology, plant pathogens, molecular diagnostics, and forensics.

Welcome

The cutting-edge tools of molecular biology, genetics, cell biology, tissue culture, and biochemistry are transforming the environmental, medical, and agricultural sciences. In the field of biotechnology, these bioscience tools are harnessed to make products and solve problems faced by society. The biotechnology program emphasizes developing a strong foundation in the molecular and biochemical principles underpinning living cells (animals, microbes, and plants). The program combines hands-on laboratory research with courses covering various facets of molecular, cellular, and organismal biosciences (outlined below). The program facilitates excellence in biotechnology education by involving undergraduate students in rich interactions with faculty in both the classroom and research laboratories.

MBB graduates have excellent job prospects upon graduation. Graduates are amply prepared to enter graduate studies in the biological, environmental, medical, and agricultural sciences and are profession-ready for job opportunities in industry (biomedical, health-care diagnostics, pharmaceutical, forensics, agricultural, environmental, and biotechnological) and in governmental research. Students who plan to enter medical, dental, or related professional schools are advised to confer with their faculty adviser to enroll in the proper MBB electives for these programs. With additional courses in education, the BS degree in MBB also qualifies graduates to teach at the elementary, middle, and high school levels.

The MBBE faculty have a commitment to and passion for teaching, combined with renowned research expertise in their chosen disciplines. The faculty provide independent research experiences for undergraduate students (as MBBE 499), and many have well-funded research programs utilizing state-of-the-art equipment and techniques. On-campus research facilities that students can use to enhance their education and research experience include the Biological Electron Microscope Facility; the Greenwood Molecular Biology Facility; and the Center for Advanced Studies in Genomics, Proteomics and Bioinformatics.

Student Learning Outcomes

1. Understand fundamental core science concepts and have the ability to apply their knowledge in the field of biotechnology.
2. Have the knowledge and core sets of skills that span across basic Sciences and biotechnology, and Mathematics portions of (STEM) education.
3. Understand and be able to identify ethical issues and social impacts associated with biotechnology, and practice ethical standards of integrity honesty, and fairness in scientific practices and professional conduct.
4. Can communicate orally and in writing in clear, well-organized manner that effectively informs and clarifies scientific principles and lab techniques to others.
5. Are able to solve problems using hypothesis development and experimental methods on biological systems.
6. Are well prepared for employment in the critically important and dynamic biotechnology industry.

Admission

New students who apply to the University of Hawai'i at Mānoa (UHM) as first-year students or transfer students may apply directly to the program by specifying Molecular Biosciences and Biotechnology (MBB) as their major on their application form. Please visit the Office of Admissions website for details about applying: <http://manoa.hawaii.edu/admissions/>

Students who have taken courses at another university or community college outside of the University of Hawai'i system must arrange to have their official transcripts sent to the UH-Mānoa Admissions Office for evaluation of transfer credits. Courses not meeting the university core requirements, but are acceptable academically, will be transferred and counted as elective credits.

Transfer students can check the "Transfer Credit Database" created by the UH Admissions Office to see how your courses transfer to UHM, <http://www.hawaii.edu/transferredatabase/>.

Students wishing to transfer from another UHM program must submit the CTAHR (College of Tropical Agriculture and Human Resources) College and Curriculum Transfer Request form. The request form is available from CTAHR advisors located on the first floor of Gilmore Hall. Schedule an appointment with an academic advisor to discuss transfer into MBB and have the paperwork processed. You may schedule an appointment at <https://ctahradv.youcanbook.me/>. Status as a MBB major is not official until all necessary paperwork has been completed and processed. Students are encouraged to apply to the program within the first month of any given semester to allow adequate time to process their transfers prior to registration for classes.

All CTAHR students are required to meet with an academic advisor every semester to plan their curriculum and to ensure they are making satisfactory progress towards graduation.

Degree Requirements

The MBB program sheet and four year plan can be found at the following link: <http://manoa.hawaii.edu/ovcaa/programsheets/>. Please scroll down the page to the College of Tropical Agriculture and Human Resources.

Accepted students who have set up their UH username and password may also find their requirements on their STAR GPS Registration page. Log onto your STAR Account by visiting: <https://www.star.hawaii.edu/>.

Registration

Students register for courses online through [STAR GPS Registration](#). STAR GPS Registration is an easy-to-navigate registration system that shows courses students need to graduate in a timely manner and allows students to personalize their academic plan to fit their unique college experience. STAR GPS Registration allows students to do the following:

- Register for classes that count directly into their degree/credential so they don't go off track
- A visual calendar of the classes students are choosing and how they fit together
- Direct integration of students' class schedule into their Google calendar
- Easily switch classes using the add/drop options
- Search for classes at any UH campus
- View transcript

For help about STAR, students can meet with an academic advisor or visit the help website: <https://www.star.hawaii.edu/help/#/>. Registration dates and times are published on the Registration Timetable: <http://myuhinfo.hawaii.edu/object/uhmtimetable.html>

Useful Websites for Students Entering into the University of Hawai'i

University of Hawai'i Home page <http://www.hawaii.edu>

All information for students covering how to apply, academic calendar, financial aid, catalog, transfer credit search, new database, on-campus activities, housing (dorms), parking, etc.

UH Mānoa General Catalog <http://www.catalog.hawaii.edu/>

UH Academic Calendar <http://www.hawaii.edu/academics/calendar>

My UH Services <http://myuh.hawaii.edu>

MyUH Services is a mobile-optimized, one stop shop for UH business tasks, form, apps and more. It includes one-click access to services customized for students, faculty and staff across our 10-campus system.

STAR <http://www.star.hawaii.edu>

STAR for students is the online degree tracking system for UH. You can view your degree requirements, register for classes, search for scholarships, and view your transcripts through STAR.

College of Tropical Agriculture and Human Resources' Home Page <http://www.ctahr.hawaii.edu>

Select "Academic and Student Affairs" will open all the programs up for students interested in all that CTAHR has to offer for Undergrad and Graduate Programs, financial aid/scholarship information, course requirements and information on who we are, Department, Faculty and Staff as well as publications and research projects.

College of Tropical Agriculture and Human Resources Academic Advisors

<https://ctahradv.youcanbook.me/>

Use this website to make an appointment with our academic advisors. Advisors can assist you with developing a degree plan and making sure you're taking the appropriate classes for graduation. Meeting with an academic advisor is mandatory every semester.

Molecular Biosciences and Biotechnology Program

<http://www.ctahr.hawaii.edu/site/MBB.aspx>

This web site provides information on the MBB program as well as faculty information and their specialty areas.

General Education – UH Core requirements and class listings:

<http://www.catalog.hawaii.edu/corerequirements/coreRequirements.html>

Transfer of Credits, Admissions – <http://www.hawaii.edu/transferdatabase/>

This web site shows information on residency requirements and how your credits transfer into UH Mānoa.

Student Academic Support Services

Access to student academic support services is important to ensure your success while a student at the University of Hawai'i. Below is a listing of some of these services that can also be found in the University of Hawai'i catalog (<http://www.catalog.hawaii.edu/undergrad-ed/undergrad4.html>).

Office of Civic and Community Engagement offers UH Manoa students and community agencies the opportunity to participate in a partnership of volunteer service.

First Year Programs ease the transition of new students into the academic and social communities at UH Manoa. First-Year Programs provide the opportunity to develop personal relationships with faculty and other students, enhance active involvement in the educational process, and build connections to UH Manoa.

International Student Services provides assistance to international students who come from more than countries to study at UH. Students are advised and helped to adjust to the local and U.S. cultures. Website: <https://www.hawaii.edu/issmanoa/>.

Kokua Program (Disability Access Services) provides disability access services to students with documented physical and/or mental disabilities. Services include alternative media production, counseling, early registration, note-taking, sign language interpreting, technology access, testing accommodations and campus transportation. Website: <https://www.hawaii.edu/kokua/>.

Learning Assistance Center provides tutoring, workshops, Supplemental Instruction (SI), and one-on-one appointments in which students learn appropriate study strategies and problem solving skills to achieve their academic goals.

Mānoa Advising Center serves as an advising office for exploratory students who have not yet declared a major.

New Student Orientation Program offers information sessions for first-time students and transfer students.

Student Success Center in Sinclair Library offers students a welcoming and convivial place to study and to learn, and provides them the information and skills they need to be successful in their academic career and beyond. The center provides seating that facilitates collaborative learning, is open long hours, and permits students to bring their own snacks, all in a space that has natural light and air.

Student Support Services is a federally funded program that provides academic advising and planning, special courses, financial aid advice, graduate and professional school advising, tutoring, mentoring, and academic enrichment activities to program students enrolled at UH Mānoa.

Mānoa Writing Center provides free services to equip students with appropriate writing skills so they can become better and more confident writers. Website: <https://sites.google.com/a/hawaii.edu/writingcenter/home>.

Do not hesitate to discuss your needs with your academic degree advisor who can help refer you to the appropriate resource.

MBBE Course Descriptions

Viewable online at: <http://www.catalog.hawaii.edu/courses/departments/mbbe.htm>

MBBE 304 Biotechnology: Science and Ethical Issues (3) Introduction to the concepts, goals, ethical issues and consequences of biotechnology using real-life case studies of GMOs, cloning, DNA fingerprinting, gene therapy and genetical engineering. Pre: BIOL 171 or consent. (Cross-listed as BIOL 304)

MBBE 375 Essential Biochemistry (3) Introduction to basic concepts of cellular biochemistry and metabolic pathways as applied to nutritional, medicinal and environmental biochemistry. A-F only. Pre: CHEM 152 or CHEM 272 or BIOC 341, or consent.

MBBE 401 Molecular Biotechnology (3) General principles, applications, and recent advances of the rapidly growing science of biotechnology. Topics include impact of biotechnology on medicine, animal sciences, environment, agriculture, forensics, and economic and socio-ethical issues. Pre: C (not C-) or better in BIOL 275 or consent. (Cross-listed as BIOL 401) **DB**

MBBE 402 Principles of Biochemistry (4) Molecular basis of living processes in bacteria, plants and animals; emphasis on metabolism of carbohydrates, lipids, proteins and nucleic acids. Pre: C (not C-) or better in BIOL 275/275L, CHEM 272 and CHEM 273; or consent. (Cross-listed as BIOL 402) **DB**

MBBE 402L Principles of Biochemistry Lab (2) (1 Lec, 1 3-hr Lab) Principle techniques of biochemical laboratory. A-F only. Pre: 402 (or concurrent), BIOL 402 (or concurrent). **DY**

MBBE 405 Marine Functional Ecology and Biotechnology (3) Marine functional genomics, biodiversity of marine natural habitats, marine microbial communities and their ecological functions, interactions of marine microbes and their host, climate change and marine biodiversity, marine biotechnology. A-F only. Pre: OCN 201 or MICR 130, or consent. (Spring only) (Cross-listed as OCN 403)

MBBE 408 Molecular Cellular Biology II (3) Cell structure and function. Structure, chemistry, and functions of organelles and macromolecules. Pre: C (not C-) or better in BIOL 407; or consent. (Cross-listed as BIOL 408 and MCB 408) **DB**

MBBE 412 Environmental Biochemistry (3) Biochemical and chemical principles of occurrence, distribution, biotic and abiotic conversion, fate, and impact of synthetic and natural molecules in the environment. Important pollutants will be used as case studies to illustrate the principles. A-F only. Pre: CHEM 152 or CHEM 272, and CHEM 162 or CHEM 171; or consent. **DB**

MBBE 461 Biotechnology for Teachers (3) Principles, methods, classical examples, recent development, benefits and concerns of modern biotechnology. Pre: BIOL 304 or equivalent.

MBBE 483 Introduction to Bioinformatics Topics for Biologists (3) Focuses on the use of computational tools and approaches to analyze the enormous amount of biological data (DNA, RNA, protein) available today. A-F only. Pre: BIOL 171 (or equivalent), or consent. (Once a year) (Cross-listed as BIOL 483)

MBBE 491 Special Topics in MBBE (V) Study and discussion of special topics and problems in molecular biosciences and bioengineering. Pre: consent.

MBBE 499 Directed Research (V) Supervised individual instruction in laboratory research problems in biochemistry, molecular and cellular biology, genomics, and genetics. Repeatable 3 times or up to 16 credits. Limited to qualified undergraduate students. A-F only.