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Tokyo Metropolitan University

Undergraduate Course of Biological Sciences



Outline of The Course

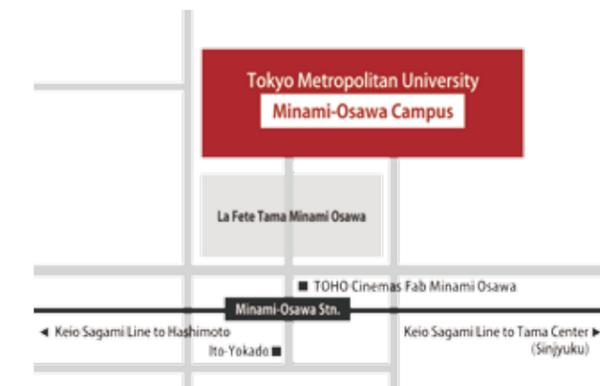
TMU Biological Sciences Department will offer a full undergraduate biology course taught entirely in English starting from April 2015.

You do not have to be able to speak or write Japanese to complete this course.

All the lectures and seminars are provided in both English and Japanese.

Credits obtained in Japanese curriculum can also be used to fulfill requirements for graduation.

- Molecular Neuroscience
- Developmental Programs
- Cellular Genetics
- Molecular Genetics
- Plant Hormone Mechanism
- Cellular Biochemistry
- Neurobiology
- Evolutionary Genetics
- Plant Photoregulation
- Environmental Microbiology
- Animal Ecology
- Plant Ecology
- Systematic Zoology
- Systematic Botany



Contact Information

Department of Biological Sciences
 Tokyo Metropolitan University
 Minami-Osawa 1-1 Hachioji, Tokyo 192-0397
 +81 42 677 2558
 bioeg@biol.se.tmu.ac.jp
<http://www.biol.se.tmu.ac.jp/global/>
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Full undergraduate biology program taught entirely in English from April 2015



Introduction

Starting from April 2015

Full undergraduate curriculum taught entirely in English

TMU Biological Sciences Department will offer a full undergraduate biology course taught entirely in English starting from April 2015. You do not have to be able to speak or write Japanese to complete this course. All the lectures and seminars are provided in both English and Japanese. Credits obtained by taking lectures provided in Japanese can also be used to fulfill requirements for graduation.

Biology courses will include taxonomy, ecology, physiology, genetics, developmental biology, cell biology, molecular biology, and biochemistry. The subjects of these lectures will include organisms ranging from microorganisms, plants and animals. A variety of humanities courses will also be provided in English.

Unique courses are provided to promote creative thinking. Students are also encouraged to participate in undergraduate research programs in their freshman and sophomore years. This program allows the students to gain first-hand experience in biological research of their choice on their own initiative.

We expect this course to be 5 to 10 students large each year, and contain international students and Japanese students who have studied overseas or are fluent in English.



Becoming a Better Researcher!



Department Chair:
Prof. Jun-ichi Kato

In our department, we aim to study a wide range of fields of basic biology. Advances in these fields are extremely rapid and results from the fields quickly make way into practical application in medical sciences, agriculture and environmental sciences. Under this circumstance, call for personnel with firm understanding of basic science and excellent research capability is higher than ever. Application of the results from basic science requires a wide range of knowledge, good experimental technique and an innovation mindset. In order to nurture these abilities, we have designed our curriculum to cover a wide range of life forms, from microbes to plants and animals. With our curriculum, each student will study these life forms from the molecular to cellular/individual level, and also the environment and the ecosystems they inhabit. We aim to nurture independent thinking through Independent Research program and also emphasize the importance of communicative skills.

Admission & Tuition

For details contact Professor Katsumi Matsuura by E-mail : matsuura-katsumi@tmu.ac.jp

Admission for April 2015

Applicants who do not understand Japanese can take the entrance examination in English.

You must be non- Japanese citizen who have completed or are expected to have completed the 12 years of education, or equivalent, outside Japan, by March 31 2015.

First Selection

Examination for Japanese University Admission for International Students (EJU) will be used for the first selection. You have to take the following examination for the admission for April 2015.

Compulsory subjects are mathematics (course 2) and science (two of physics, chemistry, or biology) in English. Japanese is also included in the compulsory subject for 2015, but has little weight in our evaluation. It will be used to see only if you understand any Japanese.

The total number of students in the biology course will be 40 to 50, including the students in the English course (5 to 10 students).

Second Selection

Application: early January, 2015

Examination: late February, 2015
Compulsory subjects are English, mathematics, and one subject from physics, chemistry, biology, or earth science. Although these exams are in Japanese, they hardly affect the evaluation. It will be used to see only if you understand any Japanese.

Interview: early March, 2015

The interview will be in English, and include oral examination of English, mathematics, and sciences.

Result announcement: mid-March, 2015

Applicants who understand some Japanese, and use English more fluently, can take other special examinations depending on their educational background. Please contact us for details.

Applicants fluent in Japanese can take the general and other examinations intended for Japanese applicants. Application to take the curriculum in English will be after the admission.

Tuition and Fee

Registration: 282,000 JPY

Tuition: 520,800 JPY

Tuition Reduction

Majority of our privately financed international students in the past have been offered tuition reduction.

TMU ranks 7th among Japanese Universities in the Times Higher Education World University Rankings 2014-2015.

The Times Ranking is based on indicators in teaching, research, citations, industry income, and international outlook.

The ranking of 2014-15 demonstrates our high international reputation.



A View of Our Classroom



Laboratory Course in General Biology

Introductory courses designed to help you choose your research field.



Field Practice of Plant Taxonomy

Experience field work with professional researchers.



Independent Research Course in Biology

Let's turn your questions into valid scientific research.

Come to Study with Us



Eri Sakurai
4th year student

When I was a 3rd year student of this course, I participated in the international competition of synthetic biology, named "iGEM" with my team mates. This is because I wanted to make use of genetic and the molecular biological knowledge that I learned by classes and to do a lot of biological experiments. It was unforgettable experience for me. In this course, you can learn what you want to learn to your heart content.



Sawa Arai
4th year student

The reason I entered this course was that I wanted to study the ecology of bacteria. In many classes and experimental courses, I have discussed various biological phenomena with classmates. Our department of biological sciences has a relaxed atmosphere in which students can study and develop themselves together.

After Graduation

After Finishing Undergraduate School

On average, 70%~90% of our alumni proceed to a master's degree.

Other students find employment in public and private sectors. The following is an excerpt from the list of career path of our alumni.

- Private sectors
Food and Beverage Industry, Biochemical and Pharmaceutical Industry, Manufacturing Industry, and Learning Support Organizations

- Public Sectors
Ministry of Environment, Forestry Agency

After Finishing Master's Program

After obtaining a master's degree, many students proceed to the doctoral program while others find employment. Many students stay in our department for their Ph.D degree, while other students join Ph.D programs in other universities such as The University of Tokyo and University of Lausanne.

Career paths of International students

Some of our previous international student alumni returned to their own countries and have found positions in local universities. Other students have remained in Japan and started their own venture companies. With our new English course, we expect that career paths of our international students' alumni will broaden. Studying biology in English should increase chances for the alumni to find Biology-related jobs in multinational organizations and public sectors.

New Professors



Prof. Shawn E. McGlynn

2001-2005
Montana State University, Chemistry
2006-2010
Graduate school of Montana State University, Biochemistry
2010-2014
Postdoctoral Scholar at California Institute of Technology

I'm interested in understanding the mechanisms of biological processes and their history on the planet. I am curious how life works today, and how it started.

My research involves protein evolution and biochemistry, and researching microbial relationships as they exist in the natural environment.

Originally I'm from Montana, in the U.S.A.



Prof. Kanae Ando

1996-2001
Graduate school of the University of Tokyo, Pharmaceutical Sciences
2001-2006
Postdoctoral fellow at Cold Spring Harbor Laboratory
2006-2014
Assistant Professor at Thomas Jefferson University

Are you amazed by the beauty of living creatures and eager to understand them? TMU biological science course provides you the instruction, research experience, and mentoring to help your expedition to discover how life works. Come on board with us to a fascinating journey into biology!

My research goals are to understand the molecular basis of brain functions and to provide fundamental insights into eventual cures for neurological diseases.

Characteristics of Our Teaching Staff

Our teaching staffs are highly experienced in teaching and conducting research in English. Many have studied and/or worked in non-Japanese laboratories.

Therefore, we are fully capable of providing our course in both Japanese and English.

We have also enlarged our staff. A native English-speaking staff and a Japanese staff who has a long experience teaching biology in United States have joined our department in 2014.

Professors & Research Fields

| | | | |
|-------------------|---|------------------|---|
| Toshiro Aigaki | Genetics, Molecular Biology, Genome Science | Shigeki Ehira | Molecular Genetics, Molecular Physiology, Microbial Genome Science |
| Naoki Kachi | Plant Ecology, Preservation Ecology, Island Ecosystem | Takashi Okamoto | Plant Developmental Biology, Molecular Cell Biology of Plants |
| Junichi Kato | Molecular Genetics, Bacterial Genome, Bacterial Cell-growth | Yoko Kakugawa | Plant Systematics, Evolutionary Biology, Plant Speciation |
| Akeo Kadota | Plant Physiology, Plant Photoresponse, Cytoskeleton | Takeshi Kanegae | Molecular Cell Biology of Plants, Response to Light Environment |
| Hiroyuki Kawahara | Cell Biology, Biochemistry, Cell Growth and Differentiation | Makoto Kurokawa | Neurobiology, Nervous Control of Behavior |
| Koichiro Tamura | Evolutionary Genetics, Genome Science, Bioinformatics | Takaomi Sakai | Neurogenetics, Molecular Genetics of Learning and Memory |
| Fumio Hayashi | Animal Ecology, Animal Behavior, Evolutionary Ecology | Takashi Sugawara | Plant Systematics, Ecology of Flowers |
| Shinichi Hisanaga | Neurobiochemistry, Cell Biology, Signal Transduction | Junichiro Suzuki | Plant Ecology, Population Ecology, Community Ecology |
| Katsumi Matsuura | Environmental Microbiology, Microbial Ecology, Photosynthesis | Aya Takahashi | Evolutionary Genetics, Speciation, Population Genetics |
| Noriaki Murakami | Plant Systematics, Evolutionary Biology, Plant Speciation | Shin Haruta | Environmental Microbiology, Microbial Ecosystem, Applied Microbiology |
| Katsuyuki Eguchi | Animal Taxonomy, Taxonomy of Ants, Biogeography | Kimiko Fukuda | Development Biology, Molecular Mechanisms of Gastrointestinal Tract Development |

Features of Our Curriculum

Our curriculum is highly experience-oriented, so almost half of our program is allocated to experiments and practical training inside and outside the laboratory.

Through the curriculum, we aim to nurture "Skills and knowledge for studying nature", which is highly beneficial even when applied to activities outside research. Practical training and research in marine spots and fields are also conducted mainly during the summer.



Independent Research for freshman program, which starts in the first year, most strongly reflects the special features of our curriculum. Unlike the Graduate Research in the senior year, the topic of research is not limited to topics studied in your professors' lab.

Students learn how to turn their own ideas and interest into a valid research question. Students learn to organize research groups, plan how the research should be carried out, conduct the actual research and present their achievements, with assistance of academic advisors.

Through this program, we encourage students to gain first-hand experience in biological research and to learn the fundamental skills required to study and understand natural organisms.

Interactive Education in a Small Class



The size of the English course class will be five to ten students each year.

We will take advantage of the small class size and will conduct our lecture in an interactive manner.

Studying in English (or in Both Languages)



Students can take all 124 credits required for graduation in English. This includes the coursework necessary for graduation.

All seminars and lectures are provided in both English and Japanese. The choice of language can be based on the students' interest and language skill. Students can switch from one language to another from a new semester.

Advantages of a Cross-Cultural Classroom

Studying in our classroom will be a cross-cultural experience.

We have learned from experience that studying with your peers who have different views, ideas and opinions is the best way to study any subject matter. Our professors will assist students of both languages to overcome the lingual difficulties and cultural differences.

What We Look For



- Applicants who are very interested in biology and aspire to gain a profound knowledge of living organisms.
- Applicants who are very interested in experiments, observations, and research.
- Applicants who have mastered the basics of English, chemistry, physics, and mathematics.



Syllabus & Course

The following is an example of the lectures and seminars that will be provided in English.

A variety of humanities courses will also be provided in English and can be included in the 124 credits required for graduation.

Model Curriculum

| Year 1 | Year 2 |
|--|---|
| Basic subjects: Freshman seminar / Information Literacy / English | |
| General Subjects: Human Biology and other biological subjects, Japanese Language and other humanity subjects | |
| Laboratory Course in Elementary Biology | Laboratory Course in General Biology |
| General Biology / General Taxonomy / General Physiology / General Genetics / General Biochemistry | General Developmental Biology / General Ecology / Genetics / Cell Biology / Biochemistry / Neuroscience / Evolutionary Biology / Developmental Biology / Special lecture in Biology |
| Independent Research Course in Biology | Independent Research Course in Biology |
| Year 3 | Year 4 |
| Biochemistry / Molecular Biology / Cell Biology / Genome Science / Biodiversity / Special Lecture in Biology | Graduate Research in Biology |
| Laboratory Course in Taxonomy / Laboratory Course in Evolutionary Biology / Laboratory Course in Genetics / Laboratory Course in Molecular Biology / Laboratory Course in Physiology / Laboratory Course in Neuroscience / Laboratory Course in Biochemistry / Laboratory Course in Cell Biology / Laboratory Course in Developmental Biology / Laboratory Course in Ecology | |
| Field Practice of Plant Taxonomy / Field Practice of Animal Taxonomy / Field Work in Ecology / Marine Biology Course (General Biology) / Marine Biology Course (Physiology & Developmental Biology) / Internship in Biology | |
| Special lecture in Biology / Laboratory Course for Radio Isotope in Biology | |

Syllabus Example

Subject : Cell Biology

Course objectives :

To provide students with core concepts and definitions in cell biology. Students will learn cellular structure and functions of each organelle, and how information flows in the cell.

Course format and materials :

Didactic lectures. Vocabulary and short-problem based quizzes lasting about 10 minutes will be given at the beginning of class.

Textbook :

Alberts, et al., Molecular Biology of the Cell, 5th Edition.

Grade :

Class Attendance/ Participation 20%, Homework 20%, Quizzes 15%, Mid-term exam 20%, Final exam 25%

| | |
|---|---|
| 1 Principles of cellular organization | 9 Signaling I: Receptors |
| 2 Membrane structure: lipids and proteins | 10 Signaling II: Second messengers |
| 3 Membrane Transport | 11 Cytoskeletal structure and function |
| 4 Endocytosis and membrane recycling | 12 Mitochondrial structure and function |
| 5 Protein sorting and vesicular trafficking | 13 Signaling and adhesion molecules |
| 6 Protein turnover: proteasomes and lysosomes | 14 Review and team problem solving |
| 7 Review and team problem solving | 15 Final exam |
| 8 Mid-term exam | |

15 lectures / semester