

Course Number	06037
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2006 「The International Priority Graduate Programs (PGP)」

~Advanced Graduate Courses for International Students~

【1. Profile of the University】

①University Department	Graduate School of Engineering, Osaka University		
②President	MIYAHARA, Hideo		
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④Contact	Division	Advanced Science and Biotechnology, Professor	
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⑤Web-Address	http://www.bio.eng.osaka-u.ac.jp, http://www.mls.eng.osaka-u.ac.jp		
⑥Enrollment (only GraduateSchool)	689 (include MEXT's Scholarship Students: 238)		

【2. Outline of the Course】

①Course	International Program of Frontier Biotechnology
②Degree	Master and Doctor degrees (5 years)
③Graduate Course, Department	Division of Advanced Science and Biotechnology, Grad. Sch. of Engineering
	(Address) 2-1 Yamadaoka, Suita, Osaka 565-0871, Japan
④Collaboration (Universities, Graduate courses, Departments)	Osaka University, International Center of Biotechnology Osaka University, Graduate School of Information Science and Technology, Department of Bioinformatic Engineering Osaka University, The Institute of Scientific and Industrial Research
⑤Quota	12-13 (include MEXT's Scholarship Students: 10) (include Japanese : 0)
⑥Faculties	50 (Full-time(only for this course): 33 Full-time(at the department offering this course): 15 Part-time: 2)
⑦Representative of the Course	Job Title: Dean of Graduate School of Engineering. Professor
	Name TOYODA, Masao

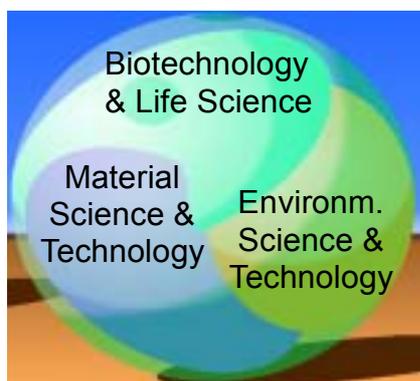
### 【3. Contents of the Course】

#### Outline of the program

The Graduate School of Engineering at Osaka University offers a special degree program for Frontier Biotechnology taught in English. The aim of this program is to expose young scientists to state-of-the-art research skills and in-depth knowledge of advanced biology, chemistry and physics to harness the potential of biotechnology. The program encompasses both Master and Doctor Courses, while emphasizing research that directly benefits society and the environment. Students are expected to enroll in these courses sequentially in order to obtain both a master's and doctoral degree.

#### Important features

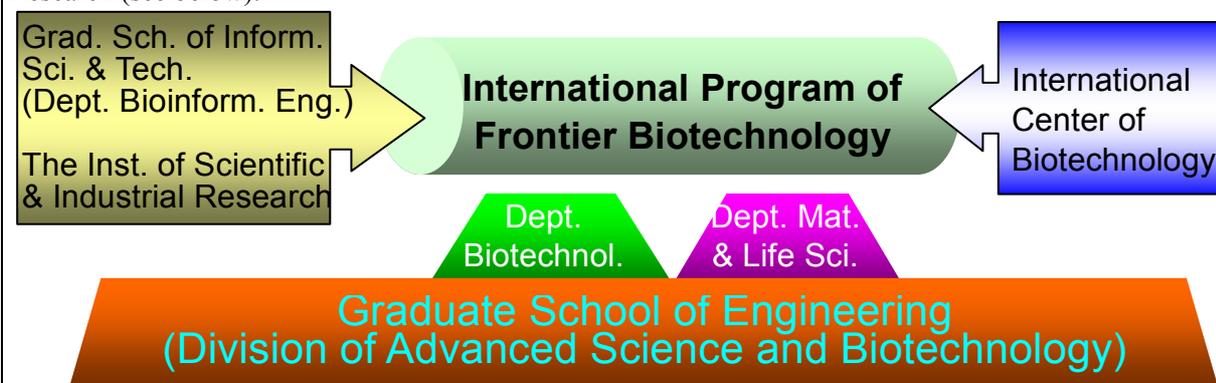
- 1) The program admits ten foreign students sponsored by the Japanese Government (Monbukagakusho) and a few foreign students not sponsored by the Japanese Government, and instruct them in a unified master's and doctoral courses. Upon completion of these courses, the students will obtain the Degrees of Master and Doctor of Engineering.
- 2) English will be used in all lectures, other instructions and research related activities.
- 3) Through Master Course, the students will acquire solid background in frontier biotechnology, which is an interdisciplinary field encompassing biology, chemistry, and physics. They will also acquire state-of-the-art skills and in-depth knowledge of frontier biotechnology. By taking Research Exercises in Special Topics in Master Course, they build up critical ability to design and execute research. Research Exercises in Special Topics are designed to prepare students to be research engineers with the ability to conceive innovative ideas by synthesizing knowledge from different disciplines and the skills of devising research plans of realizing the ideas. In these exercises each student chooses one of the ten majors, and a second project from a different major. The ten majors are a) Cell Biology, b) Molecular genetics, c) Molecular Microbiology, d) Molecular Biotechnology, e) Molecular Biophysics, f) Biochemical Engineering, g) Symbiotic Engineering, h) Metabolic Engineering, i) Physical Chemistry for Life Science, and j) Molecular Chemistry.
- 4) Through Doctor Course, the students will build up an ability to propose an original research plan independently as a scientist and reach original and brilliant research achievement. During this course, the student will devote to the Special Research while also expanding their knowledge by taking the Courses of Frontier Biotechnology Exercise and Frontier Biotechnology Seminar. In this course, the students will take Frontier Research Proposal Course. This Course is designed to prepare students to be a research scientist with the ability to propose an original research plan independently, so that they can complete their doctoral theses. In the course, each student proposes a research plan in a different field from his own, makes a presentation, and discuss with professors, associated professors, assistant professors and doctor course students of the related field from diversified/multiple perspectives.
- 5) The program promotes internalization of Japanese students by offering lectures conducted in English, for which both foreign and Japanese students can attend.
- 6) The program enhances an English language ability of foreign and Japanese students by offering on-line lectures given by native English speaker.
- 7) The program enhances a Japanese language ability of foreign students by offering lectures on Engineering conducted in Japanese, such that they can make a research presentation, and ask and answer questions in Japanese. Therefore, this program increases an opportunity of foreign students to get a job in Japan.
- 8) This program instructs the students in cooperation with other fostering international research programs and academic exchange programs, including Post-Graduate International Training Course of UNESCO in Biotechnology, Promotion of Science and Technology in Asia, Initiatives for Attractive Education in Graduate School, Establishment of self-reliant research environment for young scientist (Tenure Track).



- Unified Master and Doctor Courses
- Lectures, exercises and seminars in English
- Lectures on an interdisciplinary field
- On-line lectures given by native English speaker
- Promotion of internalization of Japanese students
- Japanese lectures on engineering
- Cooperation with other international programs

### Education and Teaching System

All staffs in the Division of Advanced Science and Biotechnology are responsible for education and research training of the students involved in this program. This Division consists of Department of Material and Life Science (8 laboratories) and Department of Biotechnology (7 laboratories and 5 cooperative areas). Five cooperative areas include International Center of Biotechnology, Department of Bioinformatic Engineering at Graduate School of Information Science and Technology, and The Institute of Scientific and Industrial Research (see below).



Life science is the most premature field in Natural Sciences and is rapidly progressing in the 21st century. Chemistry and physics are also steadily advanced in the 21st century and their contribution to industrial development is spectacular. The Division of Advanced Science and Biotechnology provides a wide spectrum of advanced research and educational opportunities in newly developing interdisciplinary research field, frontier biotechnology, in which biotechnology, life science, environmental science, and material science are merged, to develop a new generation of scientists with a global view and a new concept for science and technology. This division is best suited to carry out the International Program of Frontier biotechnology, because this Division has so far greatly contributed to the development of biotechnology as a domestic base in the Engineering field.

### Subscription and Selection

The Graduate School of Engineering at Osaka University will prepare an application form, in which the purpose and outline of the program, the number of the students admitted, application requirements, application procedures, selection process, program start date, requirements for completion of the course and the degree to be obtained, and deliver to the universities, colleges, and institutes in the related field around the world. The Graduate School of Engineering will select successful candidates from the applicants by reviewing the application materials and documents submitted by the applicants. An interview and academic examination will be conducted if necessary. These candidates will be recommended to Monbukagakusho for final selection.

### Plan after Program

Students usually go back to their own countries, are employed as a scientist by the universities, institutes, and companies, and contribute to the development of the science and industry in the biotechnology field. The students can also find a job in Japan, because they acquire an ability to make research presentation and discussion in Japanese. Therefore, this program fosters foreign students who contributes to the development of science and industry in Japan.

### Notes

Two new research organizations, each of which crosses a number of different faculties, schools, and departments, have been established in Osaka University since 2005. They are "Frontier Industrial Biotechnology", which pursues to engineer life phenomenon and applies it for industrial purposes, and "Frontier Life Science and Advanced technology", which pursues to develop a new technology surpassing biological functions. The Division of Advanced Science and Biotechnology is the core institute of these organizations. The International Program of Frontier Biotechnology will be supported by these organizations, especially in research. In addition, a new international education program has started in the Division of Advanced Science and Biotechnology under the support of Monbukagakusho (Initiatives for Attractive Education in Graduate Schools). In cooperation with this program, The International Program of Frontier Biotechnology offers excellent educational opportunities.