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FY2018: Application Guidelines for The University of Tokyo World-leading Innovative Graduate Study (WINGS) Program Biomedical Engineering (BE) Course

[Program outline]

Biomedical engineering has two aspects as an applied science field that (1) provides the foundation for realizing new medical industry services and (2) embodies a basic research field for developing innovative methods for elucidating and manipulating new biological and biological phenomena. In this program, we develop advanced science and technology resources that promote advanced research and development / social implementation in one of these fields.

Personnel image to fostered in this program are as follows:

(1). PhDs capable of carrying out the development of new medical / biological related technology based on thorough academic expertise.

(2). Medical scientists and engineers capable of working collaboratively to perform advanced research and development.

(3). PhDs possessing a comprehensive understanding of regulations, standardization, and ethics concerning social implementation of research results in the healthcare field.

Examples of research fields studying in this course is include (1) Advanced molecular, material, and systems technology that enables intervention in life phenomena such as biocompatible materials such as molecular probes that contribute to sophistication of diagnosis and treatment, drug delivery systems for regenerative medicines, and tissue engineering; (2) Next-generation therapeutic devices including advanced molecular, material, and system engineering such as a surgical and rehabilitation robots, ultra-sensitive micro-chemical diagnostic devices, physiological monitoring systems with flexible electronics; and (3) Scientific research for evaluating efficacy and safety of novel medical technologies. Appropriate research fields within the WINGS-BE course are not limited to these areas. Other research that meets the purpose of this program can be accepted.

[Resources to be developed]

As technology advances in the medical systems fields, cooperation and fusion between disciplines is vital. This course will be structured around three key foci relating to human body information: (1) screening and detection processes, (2) symbiotic, and (3) regulation/control. The course will examine these topics in a way that the human body, molecules, and materials come together in mutually beneficial ways. In addition to implementing new and comprehensive biomedical engineering education, this course will hold practicums and provide educational opportunities in conjunction with the University of Tokyo Hospital that encompass a wide range of topics in the medical and engineering fields.

Through these studies, we will foster outstanding doctoral level individuals equipped with medical engineering skills suited to comprehensively address issues, and who will be able to further the creation of cutting-edge medical systems.

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[Requirements for enrolling in the WINGS-BE course]

To join the Biomedical Engineering (BE) course, you must be a graduate student belonging to either Master's program or a prospective student for 4-year Doctoral program of the following departments:

✓ **Graduate School of Medicine**

[April enrollment]

Graduate student who is in their 1st year of Doctoral coursework.
Prospective student who will be enrolled in a 4-year doctoral program in FY2018.

Department of Neuroscience, Department of Internal Medicine, Department of Surgical Sciences, Department of Reproductive, Department of Developmental and Aging Sciences, School of Public Health

✓ **Graduate School of Engineering**

[April Enrollment]

Graduate student who is in their 1st year of Master coursework.

[September Enrollment]

Graduate student who is in their 2nd year of Master coursework.

Department of Bioengineering, Department of Mechanical Engineering, Department of Electrical Engineering and Information Systems, Department of Precision Engineering, Department of Materials Engineering, Department of Applied Chemistry, Department of Chemical System Engineering, Department of Chemistry and Biotechnology, Department of Nuclear Engineering and Management

✓ **Graduate School of Pharmaceutical Sciences**

[April Enrollment]

Graduate student who is in their 1st year of Doctoral coursework.
Prospective student who will be enrolled in a 4-year doctoral program in FY2018.

[September Enrollment]

Graduate student who is in their 2nd year of Master coursework.

Department of Pharmaceutical Sciences, Department of Pharmacy

It is also necessary that you fulfill all of the requirements listed below:

1. Candidates must intend to obtain a doctorate in either the basic, applied, or their interdisciplinary field contributing to cutting edge of medical development system.
2. Candidates must have an interest in the relationship between society and industry of science and motivated to make a proactive effort to study these interactions.
3. Candidates must have the ambition to become a global leader as a "Knowledge Professional."
4. Candidates must have a thorough understanding of the goal of the WINGS-BE course, and of the requirement for completion, etc.

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5. Candidates must have the intention to either continue on from a Master's degree to take a Doctorate, or to enroll in a 4-year Doctoral program, in one of the Departments listed above. *
6. Candidates must apply for a Doctoral Course Students (DC) fellowship provided by the Japan Society for the Promotion of Science (JSPS), and must be able to maintain their enrollment on the GPLLI course after acceptance.
7. Candidates must consent that their Ph.D. diploma will note that they completed the WINGS-LS course.

*You may not enroll in the WINGS-BE course if you are planning to find business employment when you finish your Master's program.

**It is not acceptable to apply to more than one program, among WINGS programs and the Leading Graduate School Programs (application for only one program is acceptable).

[Features of the WINGS-BE course]

Multiple supervision system:

A secondary supervisor is assigned to each student in the course, in addition to his or her main supervisor in his/her department. Only WINGS-BE professors or any person equivalent to him/her can take on the role of the secondary supervisor.

[Curriculum]

It is recommended that master's and doctoral students complete the core curriculum in the specialty fields of their major before taking the educational curriculum of this continuing education coursework that will allow them to acquire a deeper understanding in the field of biomedical engineering. To prepare a Biomedical Engineering Common subject group, four subjects will offered: Higher Perspectives for Biomedical Engineering, Biomedical Engineering Social Implementation, Biomedical Engineering Exercise, and Biomedical Engineering Seminar. In addition, specialized lectures related to biomedical engineering in various fields are offered by relevant departments in the Graduate School of Engineering as elective courses for graduate studies to expand opportunities for cross-disciplinary learning. The relevant courses of this program are summarized in table 1.

[Completion requirements and Screening Examination for Biomechanical Engineering Excellent Graduate School]

In order to complete this course, independently of the credits required for completing the master/doctoral degree in the graduate program to which you belong, you should acquire an additional 6 units including a minimum of 2 credits from the Biomedical Engineering Common subject group and 2 elective credits to be offered in the major in other departments during 5 years of master/doctoral coursework. If you become a regular student, you may be obliged to participate in domestic and overseas internships, research, etc. which are currently under consideration and may be offered by the program in the future. There is also the possibility of requesting participation in intensive seminars held jointly by the program (At this stage it is assumed that it will be an activity after adopting this university course student).

The Screening Examination for Biomechanical Engineering Excellent Graduate School is carried out at the time of transition from the preliminary student to the regular student, and

evaluated mainly on the subject taking situation and the research plan. Also, at the end of the first year of doctoral coursework, an interim evaluation will take place focusing on the status of subject registration, program studies, and the research plan. Furthermore, after the completion of a subject-specific doctoral dissertation examination, a BE-specific examination will be administered in order to comprehensively evaluate research results, the status of the program application, self-evaluation, future aspirations, etc.

[Graduate School of Medicine]

In order to become a student of this course and to continue without interruption into the doctoral program, it is necessary to pass the qualifying examination. Additionally, in the doctoral program, if you obtain more than the predetermined credits in the certified subjects and pass the final examination unique to this program, a course completion certificate will be awarded upon satisfying the requirements of your major and passing the doctoral thesis examination.

Qualifying examination: it is conducted from the viewpoint of basic knowledge, expertise, and research results so far.

[Graduate School of Engineering]

The completion requirements of the master's program are the same as the general program, but in order to continue the course in the doctoral program, it is necessary to pass the qualifying examination. Additionally, in the doctoral program, if you obtain more than the predetermined credits in the certified subjects and pass the final examination unique to this program, a course completion certificate will be awarded upon satisfying the requirements of your major and passing the doctoral thesis examination.

Qualifying examination: the examination is based on the results of lectures, exercises, experiments, and practical training, in addition to proficiency in English, communication skills, leadership, as well as the ability to push forward research.

[Graduate School of Pharmacy]

In order to become a student of this course and to continue without interruption into the doctoral program, it is necessary to pass the qualifying examination. Additionally, in the doctoral program, if you obtain more than the predetermined credits in the certified subjects and pass the final examination unique to this program, a course completion certificate will be awarded after satisfying the requirements of your major, and passing the doctoral thesis examination.

Qualifying examination: the examination is based on the results of lectures, exercises, experiments, and practical training, in addition to proficiency in English, communication skills, leadership, as well as the ability to push forward research.

[Selection process and notification for the WINGS-BE course students]

Selection process and notification for the academic year 2018

Selection: Late-December, 2017 - January, 2018

Applicant information, entrance examination results, summer term transcript for the first year of Master's program, and interview responses will be screened by each department, preliminary

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to the selection by the WINGS-BE academic affairs committee. The results will be announced in early February 2018.

[Miscellaneous notes]

About the WINGS-BE incentive

1. WINGS-BE students will receive a monthly incentive of 80,000 or 180,000 yen, but there are some notes of caution. (The incentive should be subjected to the next budget implementation.) Please review carefully!

If you receive the WINGS-BE incentive, you may no longer be eligible to receive other financial aid such as scholarships. Students may not receive the WINGS-BE incentive in addition to the following categories:

i Students sponsored by the national government.
ii Students who have already been accepted as JSPS Research Fellows (DC).
iii Students already receiving scholarship loans from the Japan Student Services Organization (JASSO).
iv Foreign students already receiving either the Japanese Government (MEXT) Scholarship or the JASSO Honors Scholarship.
v Foreign students who are sponsored by their own governments.
vi Students already receiving scholarships from the University of Tokyo.

In addition, those receiving the WINGS-BE incentive will not be eligible for the incentive for the promotion of doctorate researchers of the University of Tokyo.

2. The WINGS-BE incentive counts as “sundry income”. Incentive recipients are asked to go to the local tax office each year and file taxes regarding the incentive of the previous year as “sundry income”.
3. To be eligible for the WINGS-BE grant, you must participate fully, and thus are not allowed to engage in part time employment.
4. To be eligible for the WINGS-BE incentive, you must participate in the course for a full year. If you fail to perform in your specialized field in your department or within a multidisciplinary program in the WINGS-BE course, the WINGS-BE incentive may be terminated. If you plan to study at other institutions, please provide detailed information regarding the name of the institution and the period of study.
5. When you study abroad for longer than three months while supported by another program, you may not receive the WINGS incentive during the period. Please consult your supervisor and WINGS-BE instructors beforehand.
6. You need to apply for a JSPS Research Fellowship DC every year in order to receive the WINGS-BE incentive. Please submit a copy of the JSPS application form immediately after you apply.
7. The names of all receivers of the WINGS-BE program are to be made public.

About the application,

8. Any application document not completed in full will not be accepted. The deadline cannot be extended.
9. Any changes in the application document cannot be permitted after the application procedure has been completed.

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10. In case of changes in the application procedure, WINGS/GPLLI office will notify applicants through the WINGS-BE website.
11. Personal information collected through your application (such as addresses, names, etc.), is used by the admissions committee for conducting the selective examination, announcement of successful applicants, entrance procedures, and other incidental business.
12. You may be deemed to have committed a dishonest act if you falsify or fabricate any information submitted in your application. In such cases, the result of the selective examination will be invalidated, even after enrolment.

[WINGS-BE course students who do not receive the monthly incentive]

- When a WINGS-BE student is accepted as a JSPS Research Fellow DC, they are strongly recommended to remain in the WINGS-BE course throughout their doctoral study, even while not receiving the WINGS-BE incentive. These students will be counted outside of the limitation on yearly student enrollments for the program.
- Students who do not wish to receive the incentive for reasons that may include conflicting fellowships or dependent exemption concerns may also apply for the WINGS-BE course. These students, too, when they pass the selection and become course students, will be counted outside of the limitation on yearly student enrollments for the program.

[Contact person]

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