

On the Establishment of a Graduate School of Engineering  
Doctor Course Inter-Departmental Education Program “Mechanical Systems Innovation” (GMSI)

GMSI Program Leader  
Mamoru MITSUISHI

## 1. Goal

By continuing the educational programming of the Global COE Program “Mechanical Systems Innovation” – the aim of which was to develop creative human resources to be future global leaders – we establish a series of lectures and academic exercises for the study of frontier technical areas. The elucidation and control of nanoscale and microscale phenomena will make possible the creation of innovative systems exhibiting groundbreaking, never-before-seen performance.

The core courses Engineering Literacy I, II, and III will cultivate skills in communication, information and ethics, and Engineering Competency I, II, and III will cultivate proficiency in leadership, problem setting /resolution/execution, responsibility, sense of duty, etc.

By cultivating literacy and competency in addition to fundamental attainment and specialized knowledge, our goal is to train tough, internationally competitive young leaders who will be able to lead in both academic and industrial aspects of their respective fields. We seek students from all engineering fields, not limited just to one specific field of study, to participate in this newly implemented inter-departmental graduate program. Those who meet the program requirements will be awarded a certificate of completion.

This program will not provide any RA salary, but participation in this program may be taken into consideration during selection and evaluation of other financial support programs, such as the UT Graduate School of Engineering’s Doctoral Student Special Incentives Program (SEUT Fellowship A,B), “卓越した大学院拠点形成支援補助金事業”, etc. (may not apply to all departments.)

## 2. Educational Program Instructors

- Mechanical Engineering: Mamoru Mitsuishi, Yoichiro Matsumoto, Shigehiko Kaneko, Shigeo Maruyama, Chisachi Kato, Masayuki Nakao, Yoshihiro Suda
- Aeronautics and Astronautics: Shinji Suzuki, Nobuo Takeda, Shin-ichi Nakasuka, Shinsuke Sakai
- Technology Management for Innovation: Kazuro Kageyama
- Systems Innovation: Shinobu Yoshimura, Toyohisa Fujita
- Precision Engineering: Tadatomo Suga, Kiyoshi Takamasu
- Materials Engineering: Yuichi Ikuhara, Toshihiko Koseki, Satoshi Watanabe
- Applied Chemistry: Takehiko Kitamori
- Chemical System Engineering: Yukio Yamaguchi, Tatsuya Okubo

## 3. Contact (registration or enquiry)

Students who wish to participate in the program should contact the office below after obtaining permission from

your advisor. Details regarding registration will be sent at this time.

The University of Tokyo Department of Mechanical Engineering

GMSI Program Office (Engineering Building 2 Room 203)

TEL 03-5841-0696 E-mail: [gmsi-office@pcil.t.u-tokyo.ac.jp](mailto:gmsi-office@pcil.t.u-tokyo.ac.jp)

<http://gmsi.t.u-tokyo.ac.jp>

#### 4. Educational Program

A minimum of 12 credits must be obtained from the following course list (at least 4 credits of which must be from core courses). Completion will be contingent on validation of the content of the student's research by the program faculty council.

Course Number	Program	Primary Instructor(s)	Description / Overview	Date/Time/Place
All Eng. 3799-149 core course	Engineering Literacy I (1 cr.)	Prof. Maruyama (Mech.) Prof. Okubo (Chem.) Prof. Yokono (GMSI)	Topics related to innovation management. Should be taken before Engineering Competency I – III.	Summer Semester Thurs. 13:00-14:40 Eng. Lecture Rm. 212 In parallel with Advanced Technology Special Lecture I
All Eng. 3799-150 core course	Engineering Literacy II (1 cr.)	Prof. Maruyama (Mech.) Prof. Okubo (Chem.) Prof. Yokono (GMSI)	Intellectual property management and ethics. Should be taken before Engineering Competency I – III.	Winter Semester Thurs. 14:50-16:30 Eng. Lecture Rm. 223
All Eng. 3799-151 core course	Engineering Literacy III (1 cr.)	Prof. Suzuki (Aero.) Prof. Koseki (Mater.) Prof. Morimura (IIIEE)	English communication. Includes presentation at international conference. Should be taken before Engineering Competency I – III.	Intensive (TBD)
All Eng. 3799-146 core course	Engineering Competency I (2 cr.)	Prof. Kaneko (Mech.) Prof. Yokono (GMSI) Prof. Mitsuishi (Mech.)	Project Based Learning to cultivate leadership skills needed to actively engage in industry and academia.	Winter Semester Thurs. 16:40-18:20 Eng. Lecture Rm. 222
All Eng. 3799-147 core course	Engineering Competency II (2 cr.)	Prof. Suga (Precision) Prof. Takamasu (Precision) Prof. Yokono (GMSI)	Approximately 2-6 month investigation of at least one topic through collaborative research or a domestic/international internship.	Intensive (TBD)
All Eng. 3799-148 core course	Engineering Competency III (2 cr.)	Prof. Watanabe (Mater.) Prof. Yokono (GMSI) Prof. Mitsuishi (Mech.)	English-only camp where Japanese and international participants discuss and exchange ideas on various engineering-related research topics.	Intensive (TBD)
Mech. 3722-125 elective	Extended Nanospace Laboratory "Multiscale Calculation" (2 cr.)	Prof. Kaneko (Mech.) Prof. Maruyama (Mech.) Prof. Mitsuishi (Mech.)	Exercises on applications in extended nanospace. Can choose between molecular dynamics simulation or MEMS fabrication.	Summer Semester Thurs. 16:40-18:20 Eng. Lecture Rm. 222
Mech. 3722-118 elective	Basic Theory of Extended Nanospace	Prof. Maruyama (Mech.)	Molecular dynamics and fundamental theory of the extended nanospace	Winter Semester Tue. 13:00-14:40 Eng. Lecture Rm. 222
Appl. Chem. TBD elective	Nano/Micro Devices (2 cr.) * Intensive Advanced applied chemistry	Prof. Kitamori (Appl. Chem.)	Realization of devices based on fundamentals of extended nanospace	Intensive (TBD)
Precision 3729-041 elective	Nano/Micro Mechanical Systems (2 cr.)	Prof. Takamasu (Precision)	Synthesis of innovative mechanical systems through integration of nano/micro devices, with real-world examples	Winter Semester Tue. 14:50-16:30 Eng. Lecture Rm. 146
Mech. 3722-117 elective	Nano/Micro Medical Systems (2 cr.)	Prof. Matsumoto (Mech.) Prof. Mitsuishi (Mech.)	Gene therapy, ultrasonic diagnostics and treatment, etc. Fundamentals and realization of nano/micro systems.	Summer Semester Thurs. 10:30-12:10 Eng. Lecture Rm. 222
Mech. 3722-119 elective	Nano/Micro Energy Systems (2 cr.)	Prof. Suzuki (Mech.)	Study of the fundamentals of microscale thermal hydraulics, micro energy conversion systems, etc. and their implementation.	Winter Semester Wed. 10:30-12:10 Eng. Lecture Rm. 223