



AIMS Programme 2017

Guide & Application

Tokyo University of Agriculture and Technology
Faculty of Engineering

Tokyo University of Agriculture and Technology

AIMS programme guide and application 2017

I. Programme Guide

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| 1. LOCATION
Where will you study? | Tokyo University of Agriculture and Technology
Faculty of Engineering
2-24-16 Nakacho Koganei Tokyo
184-8588 Japan |
| 2. DURATION
When will you study? | <u>7th of September 2017 to 22nd of December 2017</u>
◆ Extension to the end of January 2018 is possible for students who are interested in the Engineering Industrial Training Course |
| 3. COURSE
What will you study?
Please check the attached course list. | ①. Preparatory Courses
(September 2017)
3-week programme to learn about Japanese industries, technologies, culture, and society.

②. Specialised Courses and Research Internship
(October to December 2017)
38 specialised courses are available from the eight departments and an opportunity to do a research internship in connection with the student's specialization

③. Engineering Industrial Training
(December 2017 to January 2018)
<u>Only available for students staying until the end of January</u> |
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4. Eligibility

Students from these universities are eligible to apply for the 2017 TUAT AIMS programme:

Universiti Teknologi Malaysia (UTM)

Malaysia-Japan International Institute of Technology (MJIT)

King Mongkut's University of Technology Thonburi (KMUTT)

Institut Teknologi Bandung (ITB)

Universiti Brunei Darussalam (UBD)

University of the Philippines Diliman (UPD)

De La Salle University (DLSU)

Saint Louis University (SLU)

5. Cost

TUITION: No tuition fees will be charged.

TRAVEL COSTS: Please contact individual programme coordinators to confirm any financial assistance offered.
Including costs for VISA and INSURANCE

- ACCOMMODATION:**
- **On-campus residence (Shared Flat)**
(10.000 JPY/month) + Cleaning expenses (15.000 JPY)
 - ▶ Utility bills are included.
 - ▶ Internet is not included.

 - **On-campus residence (Single)**
(28.000 JPY/month) + Cleaning expenses (15.000 JPY)
 - ▶ Utility bills and Internet are not included.

 - **Off-campus residence (Shared Flat)**
(20.000 JPY/month) + Cleaning expenses (15.000 JPY)
 - ▶ Utility bills and Internet are not included.

The accommodation will be assigned on a first-come-first served basis when applying.

6. Scholarship

The Faculty of Engineering of TUAT provides scholarships for certain students to alleviate financial difficulty and support studies in Tokyo.

For more detailed information regarding the scholarships, please contact us.

7. Application procedure

Please send **all documents** to us.

The deadline for completed applications for the programme is: the **1st of June 2017**.

Applications must be made through the students' originating university.

■ Documents to be prepared or arranged by applicant:

- ①. Completed Application Form (**Form A**)
- ②. Certificate of Health (**Form B**)
- ③. Statement of Financial responsibility (**Form C**)
- ④. Copy of Applicant's Passport
- ⑤. Two 4cm x 3cm Photos (Please paste one photo to the Application Form).

■ Documents to be requested by applicant from home institution:

- ⑥. Letter of Recommendation (**Form D**)
- ⑦. Academic Records Transcript

8. Correspondence address and contact details

Takako Ochi

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COURSE LIST

AIMS Programme 2017 - Preparatory Courses (Septemebr 2017)

Course Title	Keywords	Credits
C1 Hightech Japan	Company visit, product design, Japanese advanced technologies	1
C2 Engineering for a Sustainable World	Virtual manufacturing, product design	3
C3 Tourism & Geography in Japan	Japanese regional geography, Tourism in Japan	2
C4 Overview of Regional Sustainability Science	Regional & global sustainability, food security, energy environmental chemistry, climate change	1

AIMS Programme 2017 - Specialised Courses (October to December 2017)

Course Title	Keywords	Credits
Department of Chemical Engineering		
K1 Separation Process	Separation design, Equilibrium, Kinetics, Mass balance	3
K2 Environmental Engineering and Microbiology	Environmental pollution, water, wastewater, sustainability, risk, Pollution Control	3
K3 Chemical Reaction Engineering	Reactor design and analysis, Kinetics, Solid Catalyzed reactions, Bioreactor	3
K4 Chemical Engineering Laboratory	Process control, BOD, COD, Biokinetic parameter, coagulation, sedimentation, pH, DO, Environmental Pollution, Bioprocess Engineering	1
K5 Physical Chemistry	thermodynamics, equilibria, Gibbs free energy, rate constant, Arrhenius, rate-determining step	3
K6 Optimisation in Chemical Processes	Optimisation, Numerical Method, Decision Making	3
K7 Research Internship	Chemical Energy Engineering, Environmental Analysis, Reaction & Drying Kinetics, Powder/Particle Technology, Green Materials Processing, Reactive Transport Phenomena, Functional Membrane Systems, Effective Energy Utilisation, Crystallisation/separation & Purification, Bio-process Technology, Functional Polymeric Materials, Process Systems Engineering	2~3
Department of Mechanical Systems Engineering		
M1 Control Engineering	Control theory, modern control, transfer function, state space, state estimation, identification	3
M2 Mechanics of Machines and Vibration	Vibration, mode analysis, natural frequency	3
M3 Mechanical Component Design	Machine element, materials, bolts, shaft, shaft coupling, bearings, lubrication, gears, welding, stress function	3
M4 Numerical Methods	Numerical Analysis, Finite Difference method, Finite Element Method	3
M5 Mechanical Systems Engineering Laboratory II	Experiment, thermodynamics, fluid dynamics	1
M6 Advances in Mechanical Systems Engineering	Mechanical Systems Engineering, Advanced Concepts, Advanced Approaches	1
M7 Fluid and Thermal Engineering	Thermodynamics, fluid mechanics, heat transfer	3
M8 Research Internship	Mechanics of Materials, Experimental Mechanics, Manufacturing, Robotics, Tribology, Fracture of Materials	2~3
Department of Applied Physics		
P1 Physics of Material	Semiconductors, Device technology, Magnetism, hysteresis, Electromagnetic wave, Electric dipole interaction	3

P2	Quantum Mechanics	Quantum physics, Wave function, Schrödinger equation, Hydrogen Atom, harmonic oscillator	3
P3	Statistical Thermodynamics	Entropy, Thermal equilibrium, Boltzmann factor, Gibbs factor, Helmholtz Free energy	3
P4	Applied Physics Laboratory	LED, photoelectric effect, atomic spectra line, Rydberg constant, Stirling engine, heat pump, thermodynamics	2
P5	Control System	Automatic Control, Laplace Transform, PID control, Bode Diagram	3
P6	Research Internship	Optics, Quantum Electronics, Soft Matter, Atomic & Molecular Physics, Surface Science, Biophysics	2~3
Department of Electrical and Electronic Engineering			
E1	Control System	Automatic Control, Laplace Transform, PID control, Bode Diagram	3
E2	Microprocessor and Microcontroller	VLSI, Fabrication and Design, Layout, Graph theory	3
E3	Numerical Methods	Numerical Analysis, Finite Difference method, Finite Element Method	3
E4	Electronic Circuit and Power Electronics	Semiconductor Physics, Power Electronics, Power Devices	3
E5	Electronic Engineering Laboratory	Laboratory work	2
E6	Communication Electronics	Signal Analysis, Analog Communication, Digital Communication	2
E7	Research Internship	Power Systems Engineering, Fabrication processes for nanoscale, Quantum Devices, Human Motion Analysis & Mathematical Modeling, Solar Cell, MOS Structure Fabrication, Optical Devices, Medical Image Processing	2~3
Department of Computer and Information Science			
S1	Usability Engineering	Usability, User Experience, Interaction Design, User Testing	3
S2	Parallel Processing and Computer Network	Computer architecture, parallel processing, interconnection network	3
S3	Database	DBMS, RDB, SQL, Key-Value Store, NoSQL	3
S4	Mathematics for Data Mining and Security	Time series analysis, Supervised and unsupervised learning, Dimension reduction, Euclidean algorithm, RSA cryptography, Reed-Solomon code	3
S5	Research Internship	Systems Software, database Management System for IoT, Embedded Systems for Sensor Network, Human-computer interaction, Interconnection Networks, Biomedical Signal Processing, Machine learning, Pattern Recognition, Natural Language Processing etc	2~3
Department of Biotechnology & Life Science			
L1	Research Internship	Biophysical Chemistry, Chemical Biology	2~3
Department of Applied Chemistry			
F1	Research Internship	Synthesis and Characterization of Polymer	2~3
Department of Organic & Polymer Materials Chemistry			
G1	Research Internship	Photoconductivity photorefractivity block copolymers, Organic semiconductors	2~3
General Courses			
A1	Research and Academic Writing Skills in Engineering	Academic Writing in Engineering studies	3
A2	Engineering Industrial Training	Industrial Training, Engineering, Company Visits, Industrial health & safety	1~3

List of Research Topics for Research Internship (AIMS Programme 2017)

No.	Department	Fields	Name of Supervisor	Requirements for applicants	Comments
L-1	Biotechnology & Life Science	Biophysical chemistry	Prof. Nobuhumi Nakamura	Biology and Biochemistry	
L-2	Biotechnology & Life Science	Chemical Biology	Assoc. Prof. Kaori Sakurai	Chemistry and Biochemistry	
No.	Department	Fields	Name of Supervisor	Requirements for applicants	Comments
F-1	Applied Chemistry	Organometallic Chemistry	Prof. Masafumi Hirano		
F-2	Applied Chemistry	Organic Synthesis / Chemical Biology	Prof. Hiroki Ohguri		
F-3	Applied Chemistry	Catalysis and Green Chemistry Field	Assoc. Prof. Keiji Mori		
F-4	Applied Chemistry	Functional Nanoporous Materials	Assoc. Prof. Kazuyuki Maeda		
F-5	Applied Chemistry	Batteries and Supercapacitors	Prof. Katsuhiko Naoi		
F-6	Applied Chemistry	Electrochemistry and Energy Storage Devices	Assoc. Prof. Morihiro Saito		It is preferable to have some knowledge about 1) physical chemistry 2) catalytic science, and 3) Ion transport.
F-7	Applied Chemistry	Crystal growth of wide bandgap semiconductors	Prof. Yoshinao Kumagai		
F-8	Applied Chemistry	Thin film engineering	Assoc. Prof. Hisashi Murakami		
F-9	Applied Chemistry	Organic Iodine Chemistry	Assoc. Prof. Akio Saito		It is preferable to have some knowledge about organic chemistry.
F-10	Applied Chemistry	Synthetic Organofluorine Chemistry	Prof. Takashi Yamazaki		

No.	Department	Fields	Name of Supervisor	Requirements for applicants	Comments
G-1	Organic & Polymer Materials Chemistry	Synthesis and Characterization of Polymer	Prof. Kenji Ogino		
No.	Department	Fields	Name of Supervisor	Requirements for applicants	Comments
K-1	Chemical Engineering	Chemical Energy Engineering	Assoc. Prof. Chihiro FUSHIMI		It is preferable to have some knowledge about 1) thermodynamics 2) reaction kinetics, and 3) thermochemical conversion of coal/biomass.
K-2	Chemical Engineering	Environmental Analysis	Prof. Masaaki HOSOMI		
K-3	Chemical Engineering	Reaction and Drying Kinetics	Assoc. Prof. Susumu INASAWA	Reaction engineering, Transport phenomena	
K-4	Chemical Engineering	Powder/Particle Technology	Prof. Hidehiro KAMIYA		
K-5	Chemical Engineering	Green Materials Processing	Assoc. Prof. Wuled LENGGORO		
K-6	Chemical Engineering	Reactive Transport Phenomena	Assoc. Prof. Yuichiro NAGATSU		Students will do experiment on fluid dynamics with chemical reaction.
K-7	Chemical Engineering	Functional Membrane Systems	Assoc. Prof. Hidenori OHASHI		Students will learn graft polymerization from material surfaces. It is preferable to have some knowledge on polymer science.
K-8	Chemical Engineering	Effective energy utilization	Assoc. Prof. Makoto SAKURAI		Students will conduct experimental study on energy conversion process.
K-9	Chemical Engineering	Crystallization / Separation & Purification	Prof. Hiroshi TAKYAMA		Purification technique by using crystallization: 1) Understanding phase equilibria. 2) Characterization of crystalline particle properties.

K-10	Chemical Engineering	Bio-process Technology	Assoc. Prof. Akihiko TERADA	A student will operate and maintain a bioreactor for wastewater treatment. He/She will be equipped with essence on bioreactor engineering and biokinetics of microorganisms.
K-11	Chemical Engineering	Functional Polymeric Materials	Assoc. Prof. Hideaki TOKUYAMA	Students will synthesis and prepare various kinds of gels.
K-12	Chemical Engineering	Process Systems Engineering	Prof. Yoshiyuki YAMASHITA	Students will investigate chemical process design or modeling project. Advanced computer softwares will be used.

No.	Department	Fields	Name of Supervisor	Requirements for applicants	Comments
M-1	Mechanical Systems Engineering	Mechanics of materials Experimental mechanics	Prof. OGSAWARA, Toshio	Mechanics of materials	Mechanical testing and finite element analysis (FEA) of carbon fiber reinforced composite materials for aircraft structure
M-2	Mechanical Systems Engineering	Manufacturing	Assoc. Prof. NAKAMOTO, Keiichi	Machining*, CAD/CAM*(: not compulsive, but preferable)	The goal of students is to know fundamentals of 3D digital model and to learn CAM system for usage of machine tools.
M-3	Mechanical Systems Engineering	Robotics	Assoc. Prof. VENTURE Gentiane	computer programming	robot dynamics control or human motion analysis. The research topic is decided after discussion and to match interests both of the lab and the student.
M-4	Mechanical Systems Engineering	Tribology, Fracture of materials	Assoc. Prof. IKEDA, Koji	Materials Science or related subjects	Lubrication effect of palm oil will be selected as research topic. Student is welcomed who is interested in damage and fracture during friction.

No.	Department	Fields	Name of Supervisor	Requirements for applicants	Comments
P-1	Applied Physics	Optics, Quantum Electronics	Prof. Kazuhiko Misawa	Not specified	
P-2	Applied Physics	Soft Matter	AssocProf.Miho Yanagisawa	Not specified	Physics of gel, droplet, and liposome
P-3	Applied Physics	Atomic and Molecular Physics, Surface Science	AssocProf.Atsushi Hatakeyama	Not specified	
P-4	Applied Physics	Superconducting Materials	AssocProf.Akiyasu Yamamoto	Not specified	
P-5	Applied Physics	Biophysics	AssocProf.Yoshinori Murayama	Not specified	Physics of DNA and Microorganism

No.	Department	Fields	Name of Supervisor	Requirements for applicants	Comments
E-1	Electrical and Electronic	Power Systems Engineering	Prof. Ken Nagasaka		
E-2	Electrical and Electronic	Fabrication processes for nanoscale quantum devices	Prof. Jun-ichi Shirakashi	Physics, Quantum physics (preferable)	
E-3	Engineering Electrical and Electronic	Human motion analysis & Mathematical modeling	Assoc. Prof. Ken Takiyama		
E-4	Electrical and Electronic	solar cell	Prof. Toshiyuki Sameshima	solid state physics	
E-5	Electrical and Electronic	MOS structure fabrication	Prof. Tomo Ueno		
E-6	Electrical and Electronic	Optical Devices	Assoc. Prof. Hiromasa Shimizu	Electromagnetism	
E-7	Electrical and Electronic	Medical image processing	Prof. Akinobu Shimizu		

No.	Department	Fields	Name of Supervisor	Requirements for applicants	Comments
S-1	Computer and Information Science	Systems Software	Prof. Mitaro Namiki	OS's basis, Language C, Assembler	
S-2	Computer and Information Science	Database Management System for IoT	Prof. Mitaro Namiki	RDBMS	
S-3	Computer and Information Science	Embedded Systems for Sensor Network	Prof. Mitaro Namiki	Embedded processors, Sensors	

S-4	Computer and Information Science	Computer Graphics and Visualization	Prof. Takafumi Saito	Language C, OpenGL	
S-5	Computer and Information Science	Information Theory	Assoc. Prof. Shun Watanabe	Probability and Statistics, basic of calculus	
S-6	Computer and Information Science	Cryptography	Assoc. Prof. Shun Watanabe	basic of algebra	
S-7	Computer and Information Science	Computer Vision	Assoc. Prof. Ikuko Shimizu	C,C++	
S-8	Computer and Information Science	Image Processing	Assoc. Prof. Ikuko Shimizu	C,C++	
S-9	Computer and Information Science	3D modeling	Assoc. Prof. Ikuko Shimizu	C,C++	
S-10	Computer and Information Science	Human-computer interaction (human activity recognition using depth camera)	Prof. Kinya Fujita and Assis. Prof. Yuichiro Fujimoto	C++ language, Basic knowledge and programming skill on Computer Vision	
S-11	Computer and Information Science	Human-computer interaction (human activity recognition using depth camera)	Prof. Kinya Fujita and Assis. Prof. Yuichiro Fujimoto	C++ language, Basic knowledge and programming skill on Computer Vision	
S-12	Computer and Information Science	Mathematical Optimization	Assoc. Prof. Ryuhei Miyashiro	Linear and Integer Programming	
S-13	Computer and Information Science	Signal processing for wireless communications	Assoc. Prof. Shinya Sugiura	C++, statistics, information theory, electromagnetic theory, paper reading (http://ieeexplore.ieee.org/iel7/5/6675/6685843/06678765.pdf?arnumber=6678765)	In advance of this internship, it is needed to read the following paper: http://ieeexplore.ieee.org/iel7/5/6685843/06678765.pdf?arnumber=6678765
S-14	Computer and Information Science	System Informatics	Assoc. Prof. Kaori Fujinami	-Strong motivation on technologies that bridge the gap between physical and virtual worlds.	keywords: ubiquitous/wearable computing, human-computer interaction, physical computing, augmented reality/human, activity recognition, smartphone-based sensing/interaction
	Computer and Information Science			-Basic knowledge of physical computing (Arduino, sensors, etc.) and/or Android programming is preferable.	

S-15	Computer and Information Science	Interconnection Networks	Prof. Keiichi Kaneko	Fundamental Knowledge about Algorithms, Programming Skill	Design of a topology and/or a routing algorithm
S-16	Computer and Information Science	Multimedia-based Pedagogical Systems	Prof. Keiichi Kaneko	Experience of Implementation of an Interactive System	Design and implementation of a learning system
S-17	Computer and Information Science	Digital Design,	Assoc. Prof. Hironori Nakajo	Logic Circuits, C or Java	Try to implement a hardware accelerator with High Level Synthesis such as C or Java
S-18	Computer and Information Science	Computer Architecture, Parallel Processing	Assoc. Prof. Hironori Nakajo	C, C++ or Java, Unix (Linux)	Try to implement a high speed desktop supercomputer by parallel processing
S-19	Computer and Information Science	Software Defined Network	Prof. Nariyoshi Yamai	UNIX/Linux, Program language Ruby	
S-20	Computer and Information Science	DNS Security	Prof. Nariyoshi Yamai	UNIX/Linux, Programing language Perl/Ruby/Python	
S-21	Computer and Information Science	Biomedical Signal Processing	Prof. Toshiyuki Kondo	Programming skills (Matlab, C#) , Signal Processing, Pattern Recognition	
S-22	Computer and Information Science	Bioengineering, Robotics	Prof. Toshiyuki Kondo	Programming skills (Matlab, C#) , Pattern Recognition, Control Theory	
S-23	Computer and Information Science	Operating Systems and Databases	Assoc. Prof. Hiroshi Yamada	<ul style="list-style-type: none"> •System programming skill (implemeting shell or systems consisting of more than 1,000 lines of code) on Linux •Experience in setting up web servers and databases such as apache and MySQL •Socket programming experience in C 	Focus is on developing system-level mechanisms, not **how to use/administrate** systems.
S-24	Computer and Information Science	Machine learning, Pattern Recognition	Prof. Masaki Nakagawa		

S-25	Computer and Information Science	Pattern Recognition, Machine learning, Image & Video Processing	Assoc. Prof. Seiji Hotta		
S-26	Computer and Information Science	Signal Processing on Graphs	Assoc. Prof. Yuichi Tanaka	Linear algebra, signal processing, MATLAB, [Optional] graph theory	
S-27	Computer and Information Science	Natural Language Processing	Assoc. Prof. Katsuhide Fujita	Python or Ruby, Perl Knowledge of NLP libraries	