## 4. Industrial Systems

The subjects "Industrial Systems" are classes to study the basics of objective appraisal, global perspective and practical understanding. In addition, students acquire leadership though the classes taught by global leaders in industrial fields. Students study the following items.

- Fundamental knowledge of Asian industry through site tours to both production and R&D facilities (including laboratories in universities) in Japan and other countries in Asia. Students have an opportunity to discuss with researchers and technicians in these institutions during the tours.
- Students take classes taught by business people who work in the fields of product development, manufacturing and services to learn "thought processes" and "practical methods" to solve their problems through the cooperation between multiple departments, and so on.

The subjects of Industrial Systems in the academic years from 2016 to 2018 are listed in **Table 4-6**.

**Table 4-6.** Industrial Systems in AY 2016–2018

| Subject | Event or Class | Contents |
|---|---|---|
| **AY 2016** | | |
| Industrial Systems (I) | Overseas fieldwork in Taiwan (Jan. 17–19, 2017) | Participants: 28 students and 19 staffs<br>Sites: National Sun Yat-sen University and Tainan Science and Technology Park in Taiwan (**IV. 7.1 (1)**). |
| Industrial Systems (II) | Domestic fieldwork in Saga and Nagasaki (Dec. 12–13, 2016) | Participants: 30 students and 2 staffs<br>Sites: Yoshinogari Solar LLC (Saga) and Mitsubishi Heavy Industries Historical Museum (Nagasaki) and so on (**IV. 7.2 (1)**). |
| Industrial Systems (III) | Lecture "Project Management 2016" (Apr. 15, May 20, Jun. 17 and Jul. 15, 2016) | Lecturer: **Yoshihide Fueda** (Section leader, *Chiyoda Corporation*)<br>This class was provided by Chiyoda Corporation as a lecture of Engineering Advancement Association of Japan (**Photo 4-2** and **Table 4-7**). |

**Table 4-6.** Industrial Systems in AY 2016–2018 (continued)

| Subject | Event or Class | Contents |
|---|---|---|
| **AY 2017** | | |
| Industrial Systems (I) | Overseas fieldwork in Indonesia (Sep. 11–18, 2017) | Participants: 13 students and 3 staffs<br>Sites: Severas Maret University in Surakarta (Indonesia), and so on (**IV. 7.1 (2)**). |
| Industrial Systems (II) | Domestic fieldwork in Fukuoka (Feb. 2, 2018) | Participants: 10 students and 1 staff<br>Sites: Fukuoka Rinkai 3R Station (Recycling Plaza) and Fukuoka City Disaster Prevention Center (**IV. 7.2 (2)**). |
| Industrial Systems (III) | Lecture "Project Management 2017" (Apr. 14, May 19, Jun. 16 and Jul. 14, 2017) | Lecturer: **Yoshihide Fueda** (Section leader, *Chiyoda Corporation*)<br>Provided by Chiyoda Corporation as a lecture of Engineering Advancement Association of Japan (**Table 4-7**).<br>See the detailed report "Project Management 2017" described below. |
| Industrial Systems (IV) | Lecture "International Cooperation" (Feb. 13–14, 2018) | Lecturer: **Masafumi Nagaishi** (Chief Representative, *JICA Timor-Leste Office*)<br>The purpose of this lecture is to understand "the world of international development" and "the reality of developing countries" approaching from the viewpoint of humanities and social sciences, beyond the frame of students' expertise (**Photo 4-3**).<br>1. Group discussion and presentation (practice)<br>2. Lecture 1 (the real situation of developing countries – case study–)<br>3. Lecture 2 (the International trend of development assistance)<br>4. Lecture 3 and 4 (the Japanese ODA and JICA)<br>5. Group discussion on some themes related on international development (practice)<br>6. Wrap up |
| **AY 2018** | | |
| Industrial Systems (II) | Domestic fieldwork in Oita and Kumamoto (Dec. 6–7, 2018) | Participants: 24 students (8 GA and 16 IEI) and 2 staffs<br>Sites: Kyushu Electric Power Hatchobaru Geothermal Power Plant and Honda Motor Kumamoto Factory (**IV. 7.2 (3)**). |
| Industrial Systems (III) | Lecture "Project Management 2017" (Apr. 14, May 19, Jun. 16 and Jul. 14, 2017) | Lecturer: **Yoshihide Fueda** (Section leader, *Chiyoda Corporation*) and **Takakazu Morimoto** (Project Manager, *Chiyoda Corporation*)<br>Provided by Chiyoda Corporation as a lecture of Engineering Advancement Association of Japan (**Table 4-7** and **Photo 4-4**). |

GA: Green Asia Program; IEI: Intellectual Exchange and Innovation Program in the Interdisciplinary Graduate School of Engineering Sciences

**Table 4-7.** The Class of Project Management as Industrial Systems (III) in AY 2016–2018

| Unit | Schedule and Contents | Lecture | | |
|---|---|---|---|---|
| | | 2016 | 2017 | 2018 |
| **Day 1** (at the Chikushi and Ito campuses with a teleconference system) | | | | |
| 01 | Orientation – project management | Y. Fueda | Y. Fueda | Y. Fueda |
| 02 | Project organization and team building | Y. Fueda | Y. Fueda | Y. Fueda |
| **Day 2** (at the Chikushi campus) | | | | |
| 03 | Case study of project management | Y. Fueda | HRM<br>Y. Fueda | T. Morimoto<br>R. Takada |
| 04 | Scope definition and work breakdown structure | Y. Fueda | Y. Fueda | T. Morimoto |
| **Day 3** (at the Chikushi and Ito campuses with a teleconference system) | | | | |
| 05 | Project control | Y. Fueda | Y. Fueda | Y. Fueda |
| 06 | Project control | Y. Fueda | Y. Fueda | Y. Fueda |
| **Day 4** (at the Chikushi campus) | | | | |
| 07 | Actual project execution | Y. Fueda | Y. Fueda | T. Morimoto |
| 08 | Case study for actual projects | Y. Fueda | Y. Fueda | T. Morimoto |

**Photo 4-2.** Project Management 2016.

**Industrial Systems (III): Project Management 2017**

The class "Project management 2017" was held as a lecture of Engineering Advancement Association of Japan (ENAA) by Chiyoda Corporation (**Photo 4-3**). The lecturer, Dr. Yoshihide Fueda (Section Leader of Engineering Consultant Cost Engineering, Project Management Unit in Chiyoda Corporation) has worked on many overseas projects for more than 30 years. The classes were intermittently conducted for 4 days in total, and 18 students studied about project management.

On April 14 (day 1), the students learned (1) the meaning of project, project management, and so on, (2) how to make an organization for the project, and (3) important roles of an administrator in the organization. On May 19 (day 2), a case study by making small groups of the students was performed as a practical training. Each group discussed and then proposed about appropriate arrangement of a liquid natural gas (LNG) plant under a given condition. On June 16 (day 3), the students tried case studies on a housing construction schedule under the limitation of period and cost. On July 14 (day 4), the students tried case studies by considering a delay during the housing construction to learn a management ability for solving such problems.

In these classes, huge overseas projects conducted by Chiyoda Corporation were introduced to the students, and they learned the crucial role of a project management for the success of projects.

**Photo 4-3.** Project Management 2017.

**Photo 4-4.** Project Management 2018.

## 5. International Exercise

### 5.1. International Exercise A

Unlike traditional education in graduate schools, the Green Asia Program aims to cultivation of not only researchers specialized in engineering and science but also human resources with panoramic intelligence based on outstanding perspective on social and industrial backgrounds, environmental adaptability, economic feasibility and sustainability for the scientific research. From this viewpoint, a subject “International Exercise A” starts at the first semester in the 1st year of the doctoral course in

order to review and asses not only the scientific and technical aspects but also the industrial implementation and social impact related to the students' researches. Through a series of classes, the students are expected to recognize social and/or economic contexts of technology. In the 3rd year of the doctoral course, each student is required to submit to the paper, the first author of which is him- or herself, to an international peer-reviewed journal (e.g., Evergreen, see **X.1**) as a final deliverable for his or her study in a series of International Exercise A (Green Asia Report, described below).

International Exercise A consists of four consecutive subjects, International Exercise A1 to A4 (2 credits for each subject) (**Table 4-8**). Types of the assumed task are shown in **Table 4-9**, which are not strictly differentiated, and a guideline for the students' setting tasks.

**Table 4-8.** Classes of International Exercise A

| Subject | Semester | Contents | Outcome |
|---|---|---|---|
| International Exercise A1 | D1, second semester | • Finding a topic and making plans of the research (research design), etc.<br>• Monthly meetings for discussion and debates<br>• Individual meetings for discussion and debates | International Exercise A report I |
| International Exercise A2 | D2, first semester | • Distilling an argument, etc.<br>• Monthly meetings for discussion and debates<br>• Individual meetings for discussion and debates | International Exercise A report II |
| International Exercise A3 | D2, second semester | • Discussing hypothesis/measurement and sources of date (information), etc.<br>• Monthly meetings for discussion and debates<br>• Individual meetings for discussion and debates | International Exercise A report III |
| International Exercise A4 | D3, first semester | • Research (in continuation of that in International Exercise A3)<br>• Individual meetings for discussion and debates<br>• Summary of the research results | International Exercise A final report "<br>(A review paper submitted to a peer-reviewed international journal)<br>Qualification (as the 4th stage gate) |

Faculty members in charge: Naoko Mae (Green Asia Education Center), Tomoaki Watanabe (Green Asia Education Center) and Jin-ichiro Hayashi (Department of Applied Science for Electronic and Materials)

**Table 4-9.** Classes of International Exercise A

| Type | Contents |
|---|---|
| I | Comprehensive review or assessment of the science and technology for the doctoral research, or of technologies or technology systems strongly related to the research, focusing on the relationship of them with general or specific industrial, social and environmental systems |
| II | Study on economic or social feasibility of the science and technology for the doctoral research, or of technologies or technology systems strongly related to the research |
| III | Study on science and technology or technology systems outside the area for the doctoral research in a manner similar to the type I or II |

**Green Asia Report (Green Asia Industrial Paper)**

As mentioned above, the result of the studies in International Exercise A, including social and industrial backgrounds, environmental adaptability, and economic feasibility and sustainability, was required to be submitted as "Green Asia Report" to a peer-reviewed international journal such as Evergreen (see **X.1**). This submission is the 4th stage gate of the program (detailed in **IV. 13**), and the students must be the first author. The Green Asia Program students belonging to the Interdisciplinary Graduate School of Engineering Sciences can count the published paper as one of at least two published papers that are demanded as a requisite for application to the doctoral degree (unfortunately the students in Graduate School of Engineering cannot treat the paper for the requisite). According to rules that changed in 2018, the submission to the journal is not necessary, and the students are also allowed to submit the results as a report-style document in order to pass the 4th stage gate. But in this case, they cannot treat the report as one of the two published papers in applying the degree mentioned above.

The reports are listed as follows.

**Reports Published in Peer-reviewed Journals**

The 1st batch students:

- The Key Factor of Acid Mine Drainage (AMD) in the History of the Contribution of Mining Industry to the Prosperity of the United States and South Africa: A Review
  Shinji Matsumoto, Hideki Shimada, Takashi Sasaoka, ***Natural Resources***, **7**, 445–460 (2016).
- How is a Sustainable Society Established? A Case Study of Cities in Japan and Germany
  Tsuyoshi Sato, *Evergreen*, **3** (2), 25–35 (2016).
- A Comparative Study of Energy Security in Okinawa Prefecture and the State of Hawaii
  Hiroki Gima, Tsuyoshi Yoshitake, *Evergreen*, **3** (2), 36–44 (2016).
- Development of Coal-Fired Power Plants: Microscopy Study of Fe-Ni Based Heat-Resistant Alloy for Efficiency Improvement
  Hiroshi Akamine, Masatoshi Mitsuhara, Minoru Nishid, *Evergreen*, **3** (2), 45–53 (2016).
- Modifying the Feed-in-Tariff System in Japan: An Environmental Perspective
  Takanori Hanada, *Evergreen*, **3** (2), 54–58 (2016).
- Characteristics of Industrial Wastewater discharged from industrialized Provinces and Specific Industrial Sectors in China based on the Official Statistical Reports
  Yusei Masaki, *Evergreen*, **3** (2), 59–67 (2016).

The 2nd batch students:

- A Comparison Study of Heap Bioleaching Sites in Chile and Finland for Further Development of Biotechnology for Mining
  Masahito Tanaka, *Evergreen*, **4** (4), 1–7 (2017).
- Social Factors Affecting Innovation Cycle of Liquid Crystal Technologies: A Japanese Case Study
  Yu Narazaki, Tomoaki Watanabe, *Evergreen*, **4** (4), 8–15 (2017).

- Research and Technical Trend in Nuclear Fusion in Japan
  Ryota Yoneda, *Evergreen*, **4** (4), 16–23 (2017).
- Current Situation and Future Scope of Biomass Gasification in Japan
  Yuki Furutani, Koyo Norinaga, Shinji Kudo, Jun-ichiro Hayashi, Tomoaki Watanabe, *Evergreen*, **4** (4), 24–29 (2017).
- Wave Energy Resource Assessment around Kyushu Based on Numerical Hindcast
  Tomoaki Hirakawa, ***Journal of Renewable and Sustainable Energy***, **10**, 024501 (2018).
- Economic Feasibility Study of E-Waste Recycling Facility in Egypt
  Tarek M. Mostafa, Dina S. Sarhan, *Evergreen*, **5** (2), 26–35 (2018).
- Impact of Internet Penetration for the Economic Growth of Indonesia
  Ryan Imansyah, *Evergreen*, **5**(2), 36–43 (2018).
- Policy Analysis on Cadaveric Kidney Donation and Transplantation
  Azizah Intan Pangesty, *Evergreen*, **5** (2), 44–49 (2018).
- Development of Environmental Policy in Indonesia regarding Mining Industry in Comparison with the United States and Australia: The Lesson That Can Be Learned
  Sendy Dwiki, *Evergreen*, **5** (2), 50–57 (2018).
- Environmental Assessment and Characteristics of Next Generation Refrigerants
  Animesh Pal, Kutub Uddin, Kyaw Thu, Bidyut Baran Saha, *Evergreen*, **5** (2), 58–66 (2018).
- Economic Assessment of the Sugarcane-based Bio-refinery in Indonesia
  Zayda Faizah Zahara, *Evergreen*, **5** (2), 67–77 (2018).
- Key Factors of Solar Energy Progress in Bangladesh until 2017
  Marzia Khanam, Muhammad Faisal Hasan, Takahiko Miyazaki, Bidyut Baran Saha, Shigeru Koyama, *Evergreen*, **5** (2), 78–85 (2018).
- Accidents in Thai Industry between 2001 and 2017
  Pennapa Tungjiratthitikan, *Evergreen*, **5** (2), 86–92 (2018).

The 3rd batch students:

- Evaluation of Green Paradox: Case Study of Japan
  Takaya Fujisaki, *Evergreen*, **5** (4), 26-31 (2018).

**Report-style Documents**

The 2nd batch students:

- Towards Carbon-neutral Fossil Fuel Power Generation: A Short Review
  Choi Cheolyong

The 3rd batch students:

- Science and Technology Trends in Two-Dimensional Materials
  Yuki Uchida
- Role and Potential of Organic Semiconductor Devices in Industry 4.0
  Shin Sakiyama

- Comparison between EUV and ArF Excimer Laser As Semiconductor Lithography Light
  Yuta Sato
- Study on Potentiality of Thermoelectric Devices of Nanodiamond Films Prepared by Physical Vapor Deposition
  Satoshi Takeichi
- Optical Communication Related Technology and Economy: Past, Now, Future and Its Relations
  Hong Bing Zhou
- Reason of Down Turn Japanese Semiconductor Industry –In the View Point of Advantage of Backwardness–
  Takayuki Maekura
- Development of Explosive and its Related Technique in Japan in the Future
  Yoshiaki Takahashi

### 5.2. International Exercise B

The Green Asia Program has held "International Forum of Green Asia" once a year. A key concept of the forum is an integration of social science, science technology, industrial technology and policy, and lectures by industry and academic leaders in Asia. In addition, the progress report of the program are performed. The doctoral students in the 3rd to 5th (final) years of the combined masters and doctoral program participate in this forum not only to present the progress of their own researches and also to play roles as staffs for design, preparation and management of the forum (International Exercise B).

As the International Exercise B1, the 1st-year doctoral students (in the 3rd year of the program) make presentations for their own research activities, including comments on social significance that is reviewed and evaluated in International Exercise A1. The 2nd-year doctoral students (in the 4th year of the program) not only present the progress of their own researches but also participate as staffs for design, preparation and management, which are required in the International Exercise B2. In addition, they propose topics of the student session. The contents of the International Exercise B3 for the 3rd-year doctoral students (in the 5th, final year of the program) include a role of a moderator in the student session and cultivation of skills to communicate with researchers and engineers in fields different from their ones.

**(1) International Forum for Green Asia 2016**

The doctoral students (1st to 3rd batch students of the program) made poster presentations for the progress and achievements of their researches. In addition, the 2nd batch, 2nd-year doctoral, students played various roles for the International Exercise B2 in designing and preparing the forum and in conducting the student session. This forum in detail is reported in **VI. 1 (1).**

**(2) International Forum for Green Asia 2017**

The doctoral students (2nd to 4th batch students of the program) made poster presentations for the progress and achievements of their researches. In addition, the 3rd batch, 2nd-year doctoral,

students shared tasks in the International Exercise B2, such as collection of abstracts for the students' poster presentations, preparation and management of the sites, works for the registration, moderating the forum, and chairing the invited lectures. This forum in detail is reported in **VI. 1 (2)**.

**(3) International Forum for Green Asia 2018**

In 2018, the international forum was independently held, and conducted as a part of the 4th Intellectual Exchange and Innovation Conference on Engineering and Sciences (IEICES) hosted by the Intellectual Exchange and Innovation (IEI) Program that is another international education program for doctoral students in the Interdisciplinary Graduate School of Engineering Sciences. The research progress of the doctoral students (3rd to 5th batch students of the program) was reported with posters, and some of them made also oral presentations. The 4th batch, 2nd-year doctoral, students contributed to collection of abstracts for the students' presentations and preparation and management of the sites. This forum in detail is reported in **VI. 1 (3)**.

## 6. Internship Program

The Green Asia Program students take part in the three different internships to foster their leadership through work experiences in industrial or research institute (**Table 4-10** and **Figure 4-1**).

**Table 4-10.** Three Internship Programs

| Subject | Credit | Standard Duration | Year of the Program |
|---|---|---|---|
| Practical School | 2 | Approximately 1 month | 1st or 2nd year (master's course) |
| International Internship | 2 | 2 to 3 months | 3rd to 5th years (doctoral course) |
| Domestic Internship | 1 | 2 to 3 weeks | 3rd to 5th years (doctoral course) |

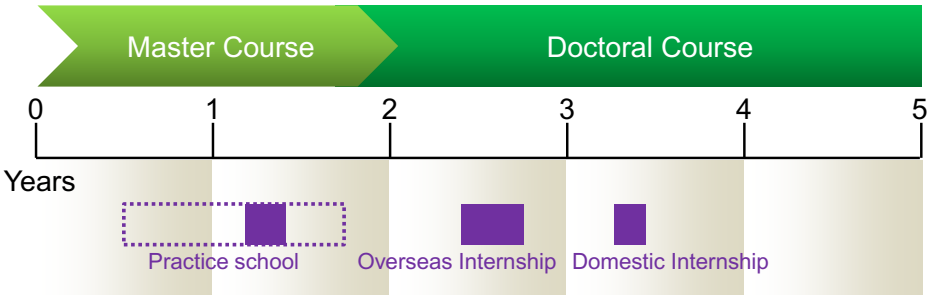


**Figure 4-1.** Varieties of internships in the Green Asia Program.

In the Practice School, each student chooses a location from various institutes and a potential on-site supervisor called "Technical Mentor" in Japan, and then makes a detailed activity plan during the internship under the guidance of the chosen mentor. After two years, the student can choose the same institute and technical mentor in the Domestic Internship again. All the internships are composed of the following steps: (1) planning the internship including selections of the institute, technical mentor, and actual research and development activities, (2) conducting the internship activities at the site, and (3) preparing a written report and making an oral presentation for the results in front of the Green Asia

faculty members to be evaluated.

From the academic year of 2017, according to the new curriculum, the standard durations of implementation are shortened as follows: Practice School (2 to 3 weeks), International Internship (3 to 6 weeks), and Domestic Internship (approximately 10 days). The students can also choose participation in job fairs or industrial symposia (2 times in total, or 1 time with presentation) as an alternative to the Domestic Internship. In the academic year of 2018, the master's course students are also allowed to conduct the International and Domestic Internships prior to the regular time schedule.

### 6.1. Practice School

In the Practice School, each of the student stays at an industrial or a research institute in Japan to conduct research and development activities. The supervisor of the student in the institute is requested to participate in his or her Mentoring Care Unit (MCU) as Technical Mentor. After completion of the internship activity, reports are submitted by not only the student but also the technical mentor and the mentoring professor.

The student's activity is evaluated based on the impression of his or her technical mentor and the oral presentation (8 minutes of presentation and 7 minutes of questions and answers) (**Photo 4-5**). The report and presentation are a part of the qualifying examination to move up to the doctoral stage of the Green Asia Program (see **IV. 10**). According to the new curriculum mentioned above, however, the 5th batch and later students are not required to make an oral presentation for the qualifying examination from the academic year of 2018, and evaluated using the activity reports.

The Practice Schools conducted during the academic years from 2016 to 2018 are listed in **Table 4-11**.

**Photo 4-5.** Presentation for Practice School (November 21, 2014).

**Table 4-11.** Practice Schools Conducted in AY 2016–2018

| Student | Institution | Period |
|---|---|---|
| **3rd Batch Student** | | |
| Ni'mah Ayu Lestari | AIST[1] (Tsukuba) （国研）産業技術総合研究所 つくばセンター | 2016.04 |
| Tomy Alvin Rival | AIST[1] (Tsukuba) （国研）産業技術総合研究所 つくばセンター | 2016.05–07 |
| **4th Batch Student** | | |
| Yusuke Egawa 江川 雄亮 | AIST[2] (JAXA[3]) 宇宙航空研究開発機構 宇宙科学研究所 | 2016.08 |
| Tsubasa Oji 大路 翼 | JAEA[4]（国研）日本原子力研究開発機構 | |
| Keishi Oyama 小山 恵史 | Swing Corporation 水 ing（株） | 2016.08–09 |
| Wei-Chen Wen 温 偉辰 | NIMS[5] （国研）物質・材料研究機構 | 2016.09 |
| Gede Dalton Surya Prayoga | Nakayama Iron Works, Ltd. （株）中山鉄工所 | 2016.11–12 |
| Sampad Ghosh | Denso Corporation （株）デンソー | 2017.05–06 |
| Dabin Chung | Korea Electrotechnology Research Institute | 2017.02–03 |
| Alisa Bannaron | NIMS[4] （国研）物質・材料研究機構 | 2016.10–11 |
| John James Duckworth | Gunze Ltd. グンゼ（株） | 2016.07–09 |
| Rezwan Ahmed | Nagoya University 名古屋大学 | 2017.06 |
| Ali Yousefian | Yokohama National University 横浜国立大学 | 2017.05–06 |
| M L Palash | Ritsumeikan Asia Pacific University 立命館アジア太平洋大学 | 2017.06–07 |
| Cao Cong | JAMSTEC[6] （国研）海洋研究開発機構 | 2017.02–03 |
| **5th Batch Student** | | |
| Shinichiro Kojima 小島 信一郎 | QST[7] （国研）量子科学技術開発機構 | 2017.08–09 |
| Kazuki Kuga 久我 一喜 | Daikin Industries, Ltd. ダイキン工業（株） | 2017.03 |
| Kim Sung Jin 金 晟眞 | MPAT[8] （国研）海上・港湾・航空技術研究所 | 2017.11 |
| Kazuki Sawayama 澤山 和貴 | FREA[9] (AIST[1]) （国研）産業技術総合研究所 福島再生可能エネルギー研究所 | 2017.09 |
| Khan MD Rauf UL Karim | Indonesian Institute of Sciences (LIPI) インドネシア科学院 | 2018.01–02 |
| Mahmoud Mohamed Mahmoud Nasef | Sumitomo Electric Industries, Ltd. 住友電気工業（株） | 2018.04–06 |
| Aditya Wibawa | Indonesian Institute of Sciences (LIPI) インドネシア科学院 | 2018.01 |
| Muhamad Affiq Bin Misran | Renesas Electronics Corporation ルネサス エレクトロニクス（株） | 2018/02 |
| Ali Mohamed Ali Ebrahim Abdelgawad | OSG Corporation オーエスジー（株） | 2018.02 |
| Eslam Naeim Hussien Abubakr | OSG Corporation オーエスジー（株） | 2018.02 |
| Fatin Hazwani Binti Mohamad Azahar | Nazrol Tech Sdn Bhd (Malaysia) | 2018.03-05 |

[1]AIST: National Institute of Advanced Industrial Science and Technology; [2]ISAS: Institute of Space and Astronautical Science; [3]JAXA: Japan Aerospace Exploration Agency; [4]JAEA: Japan Atomic Energy Agency; [5]NIMS: National Institute for Materials Science; [6]JAMSTEC: Japan Agency for Marine-Earth Science and Technology; [7]QST: National Institutes for Quantum and Radiological Science and Technology; [8]MPAT: National Institute of Maritime, Port and Aviation Technology; [9]FREA: Fukushima Renewable Energy Institute

**Table 4-11.** Practice Schools Conducted in AY 2016–2018 (continued)

| Student | Institution | Period |
|---|---|---|
| **5th Batch Student** (continued) | | |
| Wu Shun 吴 順 | Teijin Nakashima Medical Co., Ltd. 帝人ナカシマメディカル（株） | 2017.08–09 |
| Sameh Ahmed Okasha Zaki Mohamed | University of Augsburg (Germany) アウグスブルグ大学（ドイツ） | 2017.07–08 |
| Ramadan M M Aljamal | National Taiwan University 国立台湾大学 | 2017.11 |
| Hasan Muhammad Faisal | Sebelas Maret University スブラス・マレット大学（インドネシア） | 2018.02–03 |
| Ibrahim Mohamed Abdelhak Maamoun | The University of Tokyo 東京大学 | 2017.09–10 |
| Rezkia Dewi Andajani | JGI, Inc. （株）地球科学総合研究所 | 2017.08–09 |
| Niko Dian Pahlevi | China University of Geosciences 中国地質大学 | 2018.04–06 |
| **6th Batch Student** | | |
| Akira Nishio 西尾 陽 | NIMS[4] （国研）物質・材料研究機構 | 2018.09–10 |
| Kazuya Ishibashi 石橋 和也 | PWRI[10] （国研）土木研究所 | 2018.08 |
| Aira Kamito 上戸 あいら | Anton Paar Japan K.K. （株）アントンパール・ジャパン | 2017.11–12 |
| Wang Yukun 王 宇坤 | iZMA Corporation （株）iZMA | 2018.03 |
| Perera Colombatantirige Uthpala Amoda | Bry-Air (Asia) Pte. Ltd. (India) | 2018.02–03 |
| Tahmid Hasan Rupam | Bry-Air (Asia) Pte. Ltd. (India) | 2018.02–03 |
| Zhang Li 張 俐 | China University of Geosciences 中国地質大学 | 2018.03 |
| **7th Batch Student** | | |
| Saki Shigenobu 重信 咲季 | FREA[9] (AIST[1]) （国研）産業技術総合研究所 福島再生可能エネルギー研究所 | 2019.02 |

[1]AIST: National Institute of Advanced Industrial Science and Technology; [4]JAEA: Japan Atomic Energy Agency; [9]FREA: Fukushima Renewable Energy Institute; [10]PWRI: Public Works Research Institute

### 6.2. International Internship

The International Internship aims to experience and learn works in a different culture from Japanese and the student's home one through communication in English. Each student, therefore in principle, conducts this internship at a company or a research institute, including a university, outside the student's home county as well as Japan. The supervisor of the student in this internship is requested to participate in his or her Mentoring Care Unit (MCU) as Overseas Mentor.

After completion of the internship activity, reports are submitted by not only the student but also the technical mentor and the mentoring professor. The students also report the results in an oral presentation (10 minutes of presentation and 8 minutes of questions and answers) to earn the credits of the International Internship (**Photo 4-6**).

The International Internship conducted in the academic years from 2016 to 2018 is listed in **Table 4-12**.

**Table 4-12.** International Internship Conducted in AY 2016–2018

| Student | Institution (County) | Period |
|---|---|---|
| **1st Batch Student** | | |
| Tsuyoshi Sato 佐藤 幹 | University of Reading (UK) | 2016.04–06 |
| **2nd Batch Student** | | |
| Yuki Furutani 古谷 優樹 | North Carolina State University (USA) | 2017.08–09 |
| Ryota Yoneda 米田 亮太 | Princeton Plasma Physics Laboratory (USA) | 2016.08–10 |
| Tomoaki Hirakawa 平川 知明 | University of California, Berkeley (USA) | 2016.05–07 |
| Zayda Faizah Zahara | The University of Edinburgh (UK) | 2017.10–12 |
| Tarek Mahmoud Atia Mostafa | University of Auckland (New Zealand) | 2017.08–11 |
| Choi Cheolyong | Murdoch University (Australia) | 2018.03 |
| Ryan Imansyah | Technical University of Denmark (Denmark) | 2018.02–03 |
| Azizah Intan Pangesty | The clinical investigation centre for innovative technology (France) | 2017.05–07 |
| Pennapa Tungjiratthitikan | L'École supérieure de physique et de chimie industrielles de la ville de Paris (ESPCI Paris) (France) | 2016.02–07 |
| Marzia Khanam | Georgia Institute of Technology (USA) | 2018.01–03 |
| Animesh Pal | Universiti Teknologi PETRONAS (Malaysia) | 2016.07–08 |
| Sendy Dwiki | PT Arutmin Indonesia (Indonesia) | 2017.06–07 |
| **3rd Batch Student** | | |
| Shin Sakiyama 﨑山 晋 | National University of Singapore (Singapore) | 2017.01–03 |
| Yuta Sato 佐藤 祐太 | University College Dublin (Ireland) | 2017.11–12 |
| Satoshi Takeichi 武市 悟志 | The University of Sydney (Australia) | 2017.01–03 |
| Hong Bing Zhou 洪 秉宙 | Finisar Corporation (USA) | 2018.11–12 |
| Takayuki Maekura 前蔵 貴行 | Forschungszentrum Julich (Germany) | 2017.10–12 |
| Yuki Uchida 内田 勇気 | University of Manchester (UK) | 2018.01–03 |
| Takaya Fujisaki 藤崎 貴也 | University of Illinois at Urbana Champaign (USA) | 2016.11–12 |
| Yoshiaki Takahashi 高橋 良尭 | Institut Teknologi Bandung (Indonesia) | 2017.02–03 |
| Hatem Omar Amin Mostafa Elserafy | University of Washington (USA) | 2017.11–2018.01 |
| Cheng Xiaoyang | Karlsruhe Institute of Technology (Germany) | 2017.09–11 |
| Islam Md Amirul | University of Illinois at Urbana Champaign (USA) | 2018.01–02 |
| Omar Mohamed Ali Mohamed Ibrahim | Technical University of Denmark (Denmark) | 2018.04–07 |
| Konadu Kojo Twum | University of Cape Town (South Africa) | 2018.02–03 |
| Kitjanukit Santisak | Bundesanstalt für Geowissenschaften und Rohstoffe (Germany) | 2017.09 |
| Tomy Alvin Rivai | Scottish Universities Environmental Research Centre (UK) | 2017.10–11 |

**Table 4-12.** International Internship Conducted in AY 2016–2018 (continued)

| Student | Institution (County) | Period |
|---|---|---|
| **4th Batch Student** | | |
| Yusuke Egawa 江川 雄亮 | Universität Stuttgart (Germany) | 2019.01–03 |
| Keishi Oyama 小山 恵史 | Bundesanstalt für Geowissenschaften und Rohstoffe (Germany) | 2017.09 |
| Wei-Chen Wen 温 偉辰 | Interuniversity Microelectronics Centre (Belgium) | 2019.01–03 |
| Sampad Ghosh | University of Central Florida (USA) | 2018.11–2019.01 |
| Alisa Bannaron | University of St Andrews (UK) | 2019.02–03 |
| John James Duckworth | University of Notre Dame (USA) | 2018.02–03 |
| Rezwan Ahmed | University of Alberta (Canada) | 2019.01–02 |
| Ali Yousefian | National Central University (Taiwan) | 2018.02–03 |
| M L Palash | Nanyang Technological University (Singapore) | 2018.02–03 |
| **5th Batch Student** | | |
| Shinichiro Kojima 小島 信一郎 | ITER (France) | 2018.09–12 |
| Kazuki Kuga 久我 一喜 | Technical University of Denmark (Denmark) | 2019.01–03 |
| Kazuki Sawayama 澤山 和貴 | Stanford University (USA) | 2019.01 |
| Khan MD Rauf UL Karim | Hanyang University (South Korea) | 2018.12–2019.03 |
| Muhamad Affiq Bin Misran | Universiti Kebangsaan Malaysia (Malaysia) | 2018/12–2019.02 |
| Ali Mohamed Ali Ebrahim Abdelgawad | Jena University (Germany) | 2019.01–02 |
| Eslam Naeim Hussien Abubakr | Grenoble Alpes University (France) | 2019.01–03 |
| Fatin Hazwani Binti Mohamad Azahar | Eindhoven University of Technology (Netherlands) | 2019.01-02 |
| Wu Shun 吴 順 | Eindhoven University of Technology (Netherlands) | 2019.01-02 |
| Sameh Ahmed Okasha Zaki Mohamed | Technical University of Denmark (Denmark) | 2018.10–2019.01 |
| Ramadan M M Aljamal | Istanbul University (Turkey) | 2018.11–2019.01 |
| Ibrahim Mohamed Abdelhak Maamoun | Politecnico Di Torino (Italy) | 2018.11–2019.01 |
| Rezkia Dewi Andajani | Colorado School of Mines (USA) | 2019.01–02 |
| **6th Batch Student** | | |
| Akira Nishio 西尾 陽 | The University of Glasgow (UK) | 2018.12–2019.01 |
| Aira Kamito 上戸 あいら | Suranaree University of Technology (Thailand) | 2018.11–12 |
| Perera Colombatantirige Uthpala Amoda | Marche Polytechnic University (Italy) | 2019.01–02 |
| Tahmid Hasan Rupam | Nanyang Technological University (Singapore) | 2018.12–2019.01 |
| Zhang Li 張 俐 | Nanjing University (China) | 2019.01 |

**Photo 4-6.** Presentation for the International Internship.

### 6.3. Domestic Internship

In the Domestic Internship, the students stay in companies or research institutes in Japan for a relatively short period (2 to 3 weeks, but from 2017, it changed to approximately 10 days), and in principle, universities are not preferred as the site. One of the initial aims of this internship was that the students received feedbacks for their growth from their Technical Mentors (supervisors of the Practice School), and therefore this internship was conducted under the guidance of the Technical Mentors. They however cannot always accept the students again. In addition, this internship is usually conducted in latter half of the doctoral course, and it may provide the students information for their careers. The sites therefore are not restricted to ones for the Practice School.

The Domestic Internship conducted in the academic years from 2016 to 2018 is summarized in **Table 4-13**. According to the new curriculum started in 2017, the students can also choose participation in job fairs or industrial symposia (2 times in total, or 1 time with presentation) as an alternative to the Domestic Internship, which are excluded from this table. With the introduction of the new curriculum, the oral presentation for the results of the Domestic internship (**Photo 4-7**) was also demolished. From the academic year of 2018, the masters course students are also allowed to conduct the International and Domestic Internships prior to the regular time schedule.

**Table 4-13.** Domestic Internship Conducted in AY 2016–2018

| Student | Institution (County) | Period |
|---|---|---|
| **1st Batch Student** | | |
| Hiroki Gima 儀間 弘樹 | OSG Corporation オーエスジー（株） | 2016.08–09 |
| **2nd Batch Student** | | |
| Yu Narazaki 楢崎 優 | Daikin Industries, Ltd. ダイキン工業（株） | 2016.12–2017.02 |
| Yuki Furutani 古谷 優樹 | Panasonic Corporation パナソニック（株） | 2016.09–11 |
| Masahito Tanaka 田中 雅仁 | Swing Corporation 水 ing（株） | 2016.08–09 |
| Azizah Intan Pangesty | Gunze Ltd. グンゼ（株） | 2016.07 |
| Marzia Khanam | Chiba University 千葉大学 | 2016.12 |
| **3rd Batch Student** | | |
| Shin Sakiyama 﨑山 晋 | AIST[1] (Tsukuba) （国研）産業技術総合研究所（つくば） | 2016.10 |
| Yoshiaki Takahashi 高橋 良尭 | AIST[1] (Tsukuba) （国研）産業技術総合研究所（つくば） | 2017.05–08 |
| Kibria Mohammad Tawheed | NINS[2] （共）自然科学研究機構 | 2017.01–02 |
| Omar Mohamed Ali Mohamed Ibrahim | Shizen Energy Inc. 自然電力（株） | 2018.04–07 |
| Tomy Alvin Rivai | AIST[1] (Tsukuba) （国研）産業技術総合研究所（つくば） | 2018.02–03 |
| **4th Batch Student** | | |
| Yusuke Egawa 江川 雄亮 | ALE Co., Ltd. （株）ALE（エール） | 2017.06–08 |
| **5th Batch Student** | | |
| Khan MD Rauf UL Karim | Toshiba Corporation （株）東芝 | 2018.08–09 |
| **6th Batch Student** | | |
| Kazuya Ishibashi 石橋 和也 | Toshiba Corporation （株）東芝 | 2018.09–10 |

[1]AIST: National Institute of Advanced Industrial Science and Technology; [2]NINS: National Institutes of Natural Sciences

**Photo 4-7.** Presentation for the Domestic Internship (July 27, 2016).