

**IEA MEETINGS, LONDON, UK**

**Washington Accord Meeting – Closed Session**

**Japan (JABEE) – Scheduled Review Report**

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## Report of the Visiting Team on the Periodic Review of JABEE under the Washington Accord

12-21 November 2017

Educational Establishments Visited:

Kagoshima University  
Shibaura Institute of Technology

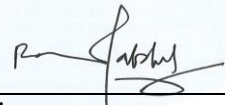
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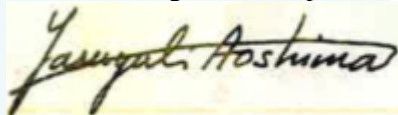


Signature

25 January 2018

### Member under review

We have sighted the report and had opportunity to correct matters of factual accuracy



Dr. Yasuyuki AOSHIMA, JABEE

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SION OF THE WASHINGTON ACCORD SECRETARIAT

## **RECOMMENDATION TO SIGNATORIES**

This report precedes meetings of the JABEE Accreditation Commission for discussion and decision of accreditation actions and the JABEE Board of Directors for final approval of accreditation actions. Both meetings are scheduled for spring 2018. As such, this periodic review report does not provide a final recommendation.

However, based on evidence considered to date, the Washington Accord periodic review team that visited JABEE preliminarily recommends that JABEE be accepted by the other signatories, for a period of six years, as leading to outcomes substantially equivalent to those recognized by the Accord subject to satisfactory review of the JABEE Accreditation Commission and Board of Directors meetings.

The recommendation of the periodic review team is based on evidence collected during an on-site visit to JABEE, including observation of two accreditation visits.

## **EXECUTIVE SUMMARY**

During the period 12-21 November 2017 a Washington Accord periodic review team, comprising representatives of the Board of Engineers Malaysia (BEM), Institution of Engineers Singapore (IES), and the Accreditation Board for Engineering and Technology (USA/ABET) conducted a periodic review of JABEE accreditation process in accordance with the review provisions of the Accord.

JABEE accredits education programs in the engineering, agriculture and science departments in higher education institutions. JABEE was established in 1999 to support fostering international professionals, and accreditation visits were initiated in 2001. JABEE joined the Washington Accord in 2005 as a signatory. The previous Washington Accord review of JABEE was initially scheduled for 2011 but occurred in 2012 following a one-year deferment after the 2011 tsunami.

JABEE is governed by a General Assembly which is advised by auditors, an Industry Advisory Council, and the JABEE Board of Directors. The Accreditation Commission and an Appeal Committee report to the Board of Directors, which is supported by the JABEE Secretariat.

JABEE has 67 full member societies representing academic societies of engineering, agriculture, and science that constitute the JABEE General Assembly. In addition, 22 members representing industry provide voluntary support to JABEE. The JABEE Board of Directors includes 30 members of whom 11 are from industry.

As of 2016, JABEE accredited 501 engineering programs at the baccalaureate or master's level. Programs are reviewed every six years or more frequently as needed. Approximately 200-300 volunteer evaluators participate in accreditation reviews each year. These volunteers are drawn from a pool of 500 available evaluators of whom about 150 are from industry.

JABEE's primary sources of income include membership fees, evaluation fees, maintenance fees, and contracted projects (consulting to other countries). Primary expenses include evaluation costs, common expenses, contracted project administration fees, and administration.

The activities of the periodic review team involved examination of documentation related to JABEE operations, the accreditation review process, and the observed accreditation visits; meetings with Signatory representatives who provided details about the accreditation process; and non-participatory observation of accreditation visits. This report precedes accreditation decision meetings of the JABEE Accreditation and JABEE Board of Directors. A supplemental report addressing the decision-making process will be provided after these meetings are concluded.

This report includes a description of the JABEE accreditation system, an overview of the visits that were observed, an assessment of JABEE's compliance with its stated policies and procedures including a documented list demonstrating compliance with Schedule B2 of the Accord Rules and Procedures, and descriptions of the evolution and implementation of recent changes to policies and criteria, and the preliminary recommendation to Accord signatories, and observations and suggestions for improvement.

Because the decision making meeting has not yet been held, the periodic review team cannot make a final recommendation regarding substantial equivalency of the JABEE accreditation system with other Washington Accord signatories. However, based on observations made to date, the periodic review team feels the standard of the graduates of JABEE accredited programs are likely substantially equivalent to graduates of other Washington Accord signatories. This finding is determined by:

- the periodic review team's belief that the accreditation standard is likely substantially equivalent to those in their home jurisdictions, and
- a collective judgement by the periodic review team as a whole that the accreditation standard is likely substantially equivalent to that of the Washington Accord as illustrated by the Washington Accord exemplar graduate attributes.

## **ACKNOWLEDGEMENTS**

The periodic review team wishes to thank the following individuals and groups for their assistance with this review:

Representatives of JABEE Volunteer Leadership:

- Dr. Mutsuhiro Arinobu, president
- Yusuke Honjo, vice president, international affairs committee chair
- Prof. Kikuo Kishimoto, executive director, accreditation affairs committee chair
- Prof. Mitsunori Makino, criteria committee chair
- Prof. Yukihiro Sato, executive director, evaluation and accreditation coordination committee chair
- The evaluation teams reviewing programs at Kagoshima University and Shibaura Institute of Technology

Kagoshima University Leadership:

- Prof. Yoshizane Maeda, president
- Prof. Mutsumi Watanabe, dean, Faculty of Engineering
- Members of the Program Operating Organization team

Shibaura Institute of Technology Leadership:

- Prof. Masato Murakami, president
- Prof. Shigeru Furuya, dean, College of Engineering and Design
- Members of the Program Operating Organization team

A special thanks to staff of the JABEE Secretariat, especially Dr. Yasuyuki Aoshima, executive managing director, and Ms. Akiko Takahashi, international affairs division manager, for logistical support before and during the periodic review visit, translation of review documents and campus visit discussions, and support of the periodic review team's comfort and well-being during the visit.

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# 1 INTRODUCTION

## 1.1 Purpose and Objectives

At the request of JABEE, the Executive Committee of the Washington Accord assigned three signatories as reviewers to examine and report on the applicant system and to make a recommendation to WA signatories. This report documents the observations, assessments, and recommendations resulting from the review of the JABEE accreditation system.

## 1.2 Approach and Methodology

The periodic review of JABEE was undertaken in accordance with the Washington Accord review provisions. The 2016 International Educational Accord Foundation Documents, in particular, B. Rules and Procedures, and C. Guidelines, formed the basis for the conduct of the review.

The periodic review team comprised three (3) members:

- Prof. Chew Yong Tian  
Representing Singapore/Institution of Engineers Singapore (IES)
- Dato’ Dr. Ir. Hj. Abdul Rashid Maidin  
Representing Malaysia/Board of Engineers Malaysia (BEM)
- Prof. Ann L. Kenimer  
Representing USA/Accreditation Board for Engineering and Technology (ABET)

Profs. Chew and Kenimer are from academia, and Dato’ Rashid Maidin is from industry.

The main activities of the periodic review team, including timelines, are shown below:

Date	Activity
10 August- 10 November	<ul style="list-style-type: none"> <li>• Visit planning and review of documents related to the visit including on-campus itineraries and Self-Review Reports for programs to be evaluated</li> </ul>
11 November	<ul style="list-style-type: none"> <li>• Periodic review team assembles in Tokyo</li> </ul>
12 November	<ul style="list-style-type: none"> <li>• Pre-meeting with JABEE executives to discuss observation of campus visits, background and history of JABEE, and JABEE accreditation criteria and processes</li> <li>• Observation of Shibaura Institute of Technology campus visit: opening address and review of program documentation</li> <li>• Observation of evaluation team meetings</li> </ul>

13 November	<ul style="list-style-type: none"> <li>• Observation of Shibaura Institute of Technology campus visit: program summaries, discussion of program documentation, all-team tour of common facilities, all-team interviews with common administrative personnel, interviews with program faculty members, interviews with program students</li> <li>• Observation of evaluation team meetings</li> </ul>
14 November	<ul style="list-style-type: none"> <li>• Observation of Shibaura Institute of Technology campus visit: review of program documentation, course observation, program-oriented facilities tour, exit meeting and executive summary</li> <li>• Observation of evaluation team meetings</li> </ul>
15-18 November	<ul style="list-style-type: none"> <li>• Free days, report preparation</li> </ul>
19 November	<ul style="list-style-type: none"> <li>• Periodic review team travels to Kagoshima</li> <li>• Observation of Kagoshima University campus visit: opening address and introductions, interview with the dean, discussion of program documentation, interviews with program graduates, interviews with program students</li> <li>• Observation of evaluation team meetings</li> </ul>
20 November	<ul style="list-style-type: none"> <li>• Observation of Kagoshima University campus visit: all-team interviews with common administrative personnel, all-team tour of common facilities, interviews with program faculty members, review of program documentation</li> <li>• Observation of evaluation team meetings</li> </ul>
21 November	<ul style="list-style-type: none"> <li>• Observation of Kagoshima University campus visit: interviews with program faculty members, review of program documentation, exit meeting</li> <li>• Observation of evaluation team meetings</li> <li>• Periodic review team travels to Tokyo</li> <li>• Exit meeting between periodic review team and JABEE executives</li> </ul>
22 November	<ul style="list-style-type: none"> <li>• Periodic review team departs Tokyo</li> </ul>

The periodic review team observed the following protocols throughout the review process:

- The periodic review team were non-participatory observers.
- The periodic review team refrained from comments on the procedures or outcomes during the visits, and only commented when requested to do so, after each visit had been concluded.
- In order to achieve complete coverage, the periodic review team divided to accompany JABEE evaluation teams according to individual areas of expertise and specialization.

### **1.3 Scope of the Report**

This report covers the periodic review team findings based on review and observation of all accreditation activities up to and including campus visits. This report precedes the JABEE decision meeting at which the programs that were observed by the review panel are considered. A supplementary report providing information on the decision-making meeting will be provided when the meeting has concluded.

## **2 THE JABEE ACCREDITATION SIGNATORY**

This section presents an overall introduction to the JABEE accreditation system, including an overview of engineering education in Japan, the link to professional practice, as well as information about the history, governance and management of JABEE.

### **2.1 Education System in Japan (UNESCO-IBE, 2011)**

Education policy in Japan is set by the Ministry of Education, Culture, Sports, Science and Technology (MEXT). The Ministry's Higher Education Bureau oversees higher education policy planning; approves establishment of universities, junior colleges, and colleges of technology; and provides administration for student admission, student support, and internationalization (MEXT, 2017).

Six years of elementary and an additional three years of lower secondary education are compulsory in Japan. Following completion of lower secondary school, Japanese students may matriculate into three years of upper secondary school or colleges of technology.

Higher education is provided through universities, junior colleges, institutes of technology, and special training schools. Junior colleges offer two- or three-year programs while universities typically offer four-year programs that require 124 credits. Universities are classified into three broad categories—national universities, local public universities, and private universities. Universities are subject to compulsory accreditation by the Japan University Accreditation Association or the National Institution for Academic Degrees and Quality Enhancement of Higher Education.

### **2.2 Engineering Education**

In 2013 there were 782 universities in Japan including 86 national, 90 local public, and 606 private universities (MEXT, 2017), many of which provide four-year engineering programs. In addition, there are 51 national, three local public, and three private institutes of technology (Aoshima, 2017). These institutes of technology provide a five-year normal course and a two-year advanced course. The last two years of the five-year normal course plus the two-year advanced course are considered equivalent to the university baccalaureate degree. Approximately 250 of these universities and institutes of technology offer engineering programs. Baccalaureate engineering programs typically require 124 credits completed over a four-year period of study. Curricula include foundational mathematics and science, engineering topics, a culminating project, and a general education component that provides breadth to the curriculum through topics such as culture, arts, creativity, language, and ethics.

Across Japan, there are roughly 2,000 programs related to JABEE-accredited fields. Of these, about 1,500 are engineering programs of which about 25% are accredited by JABEE. JABEE-accredited programs have produced roughly 250,000 graduates (Aoshima, 2017).

Entry to universities and junior colleges requires completion of upper secondary school. National and local public university admission also relies on student performance on the National Center Test for University Admissions. Engineering programs at private universities may require additional entrance exams.

Data published by MEXT (MEXT, 2017) indicate that there were 389,168 students pursuing baccalaureate engineering degrees in 2015. Approximately 14% of the students were female. The largest percentage (61%) of students studied at private universities followed by national universities (34%) and local public universities (5%).

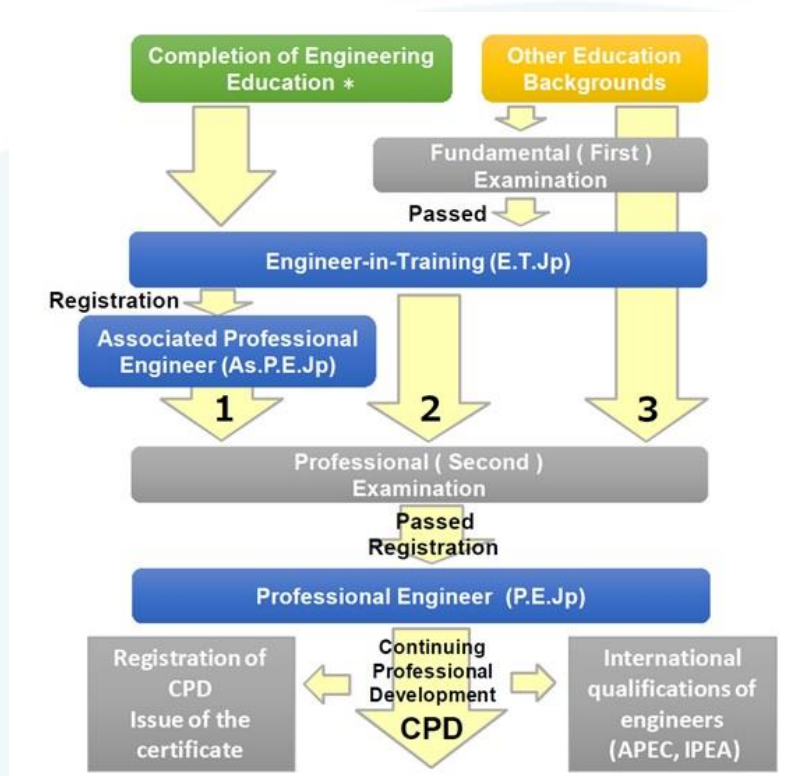
### **2.3 Structure of the Japanese Engineering Community**

Japan's Professional Engineer Act established a national certification, Professional Engineer Japan (P.E.Jp), which is defined as “an engineer who is engaged in the professional practice of providing services for science and technology fields, involved in planning, research, design, analysis, testing, evaluation and training.” (IPE, 2017). Certification is applied to 21 technical disciplines.

The Institute of Professional Engineering in Japan administers the first and second examinations for professional engineers under the authority of MEXT, which officially issues the licence. Acquisition of a P.E.Jp is not required to practice engineering in Japan. Employment of professional engineers, however, is a consideration for government-sponsored projects. An engineering education is not required for professional practice, only passing the required exams and gaining professional experience.

Certification as a P.E.Jp requires successful completion of a fundamental examination, completion of at least four years of professional practice under the supervision of a certified professional engineer, and a professional examination (Figure 1). Graduates of JABEE-accredited programs are not required to sit for the fundamental examination. In 2015 there were approximately 17,000 P.E.Jp practitioners, 30,000 applicants for certification, and 25,000 examinees. Roughly 15% of applicants were successful.

Continuing professional development is expected following acquisition of the P.E.Jp with an emphasis on engineering ethics, advancement of science and technology, changes in social environments, and improvement in decision making.



**Figure 1. Pathways to Professional Engineer certification in Japan (\*completion of JABEE-accredited engineering education program). JABEE, 2017a.**

## 2.4 History and Governance of JABEE

In 1997 a preparation committee was formed to initiate and establish JABEE. The agency was established in 1999 as a NGO. JABEE performed its first accreditation reviews in 2001 and gained provisional status in the Washington Accord that same year. JABEE became a Washington Accord signatory in 2005 (Aoshima, 2017).

At its inception in 1999, JABEE had support from academic programs across the country and 91 engineering societies. Some societies that were only peripherally related to programs JABEE accredits are no longer engaged, but at the time of the periodic review 67 engineering societies were still affiliated with JABEE.

At the time of the periodic review, 22 industrial members provide voluntary support to JABEE. While initial one-time funding was provided from Ministry of Education Culture Sports Science and Technology and Ministry of Economy, Trade, and Industry at the time of JABEE’s establishment, the agency is now self-supporting.

As illustrated in Figure 2, JABEE functions under the governance of a General Assembly and a Board of Directors who receive input from an Industry Advisory Council and Auditors. The Board of Directors includes 30 members of whom 11 are from industry. Industrial engagement in JABEE governance has increased since last periodic review. Agency activities are supported by the JABEE secretariat which employs a staff of 11.

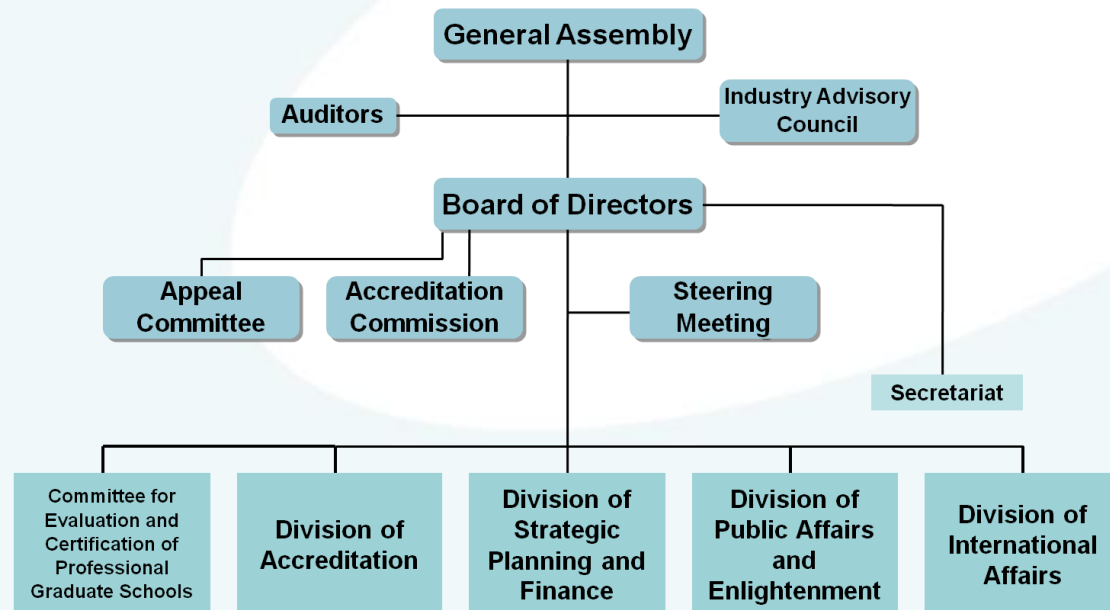


Figure 2. JABEE Governance and Organizational Structure (JABEE, 2017b).

## 2.5 Organization and Management

JABEE provides accreditation for four categories of programs: engineering at the baccalaureate level, engineering at the masters level, computing and IT-related programs at the baccalaureate level, architectural and architectural engineering education at both the baccalaureate and masters level, and certification for professional graduate programs. Pursuit and maintenance of JABEE accreditation is voluntary and at the discretion of the program and institution whereas certification of professional graduate schools is compulsory. Nevertheless, JABEE is independent from any governmental body. JABEE sends a list of accredited programs to MEXT every year to facilitate the ministry's annual announcement of JABEE-accredited programs in the Government Gazette (Aoshima, 2017).

In 2016, JABEE had a total income of approximately ¥ 246,000,000. Primary income sources included evaluation fees, accreditation maintenance fees, and income from contractual consulting to other countries establishing accreditation programs. That same year, JABEE's total expenses were approximately ¥ 217,000,000 with primary expenses consisting of evaluation costs, administration, administrative fees for contracted projects (consulting to other countries), and operational costs.

About 140 volunteer members are involved in various JABEE committees and related activities. JABEE also relies on committees for individual engineering disciplines which involve another 200 volunteers. In addition, JABEE maintains a pool of about 500 trained evaluators of whom 150 come from industry. For single-program evaluations, typically one team chair, two evaluators, and often one observer are assigned to each program evaluated. For simultaneous evaluation of two or more programs, a lead evaluator is appointed to evaluate items common to all programs and program-level teams include a lead and deputy evaluator plus observers. Therefore, JABEE mobilizes about 200-300 volunteers annually in support of the 70-100 programs evaluated per year. Finally, JABEE trains and sustains a group of about 25 Washington Accord reviewers.

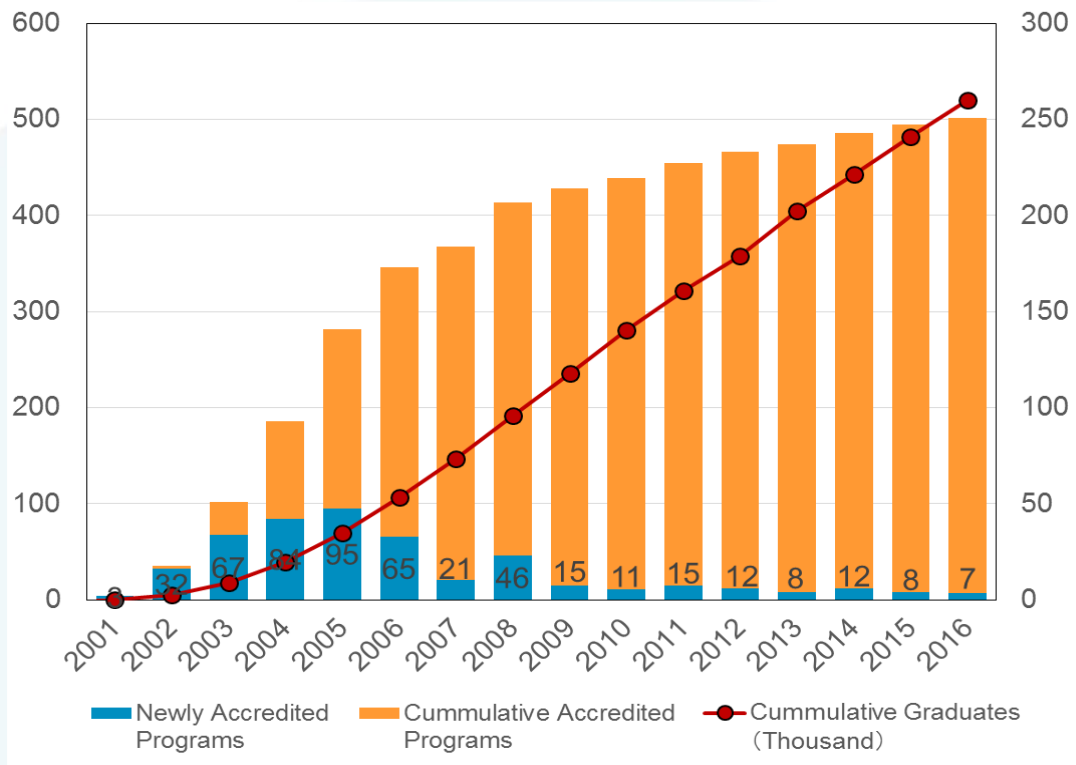
JABEE provides face-to-face training for all program evaluators and additional training provided by several societies. JABEE anticipates initiation of an e-learning component for its training programs in 2017. Training is provided for Washington Accord reviewers every three to four years.

JABEE actively participates in the International Engineering Alliance and is a signatory in the Washington Accord and Seoul Accord and a provisional signatory for the Canberra accord. JABEE is not a member of EUR-ACE or a signatory of the Sydney or Dublin Accords.

## **2.6 Role of Accreditation / Recognition**

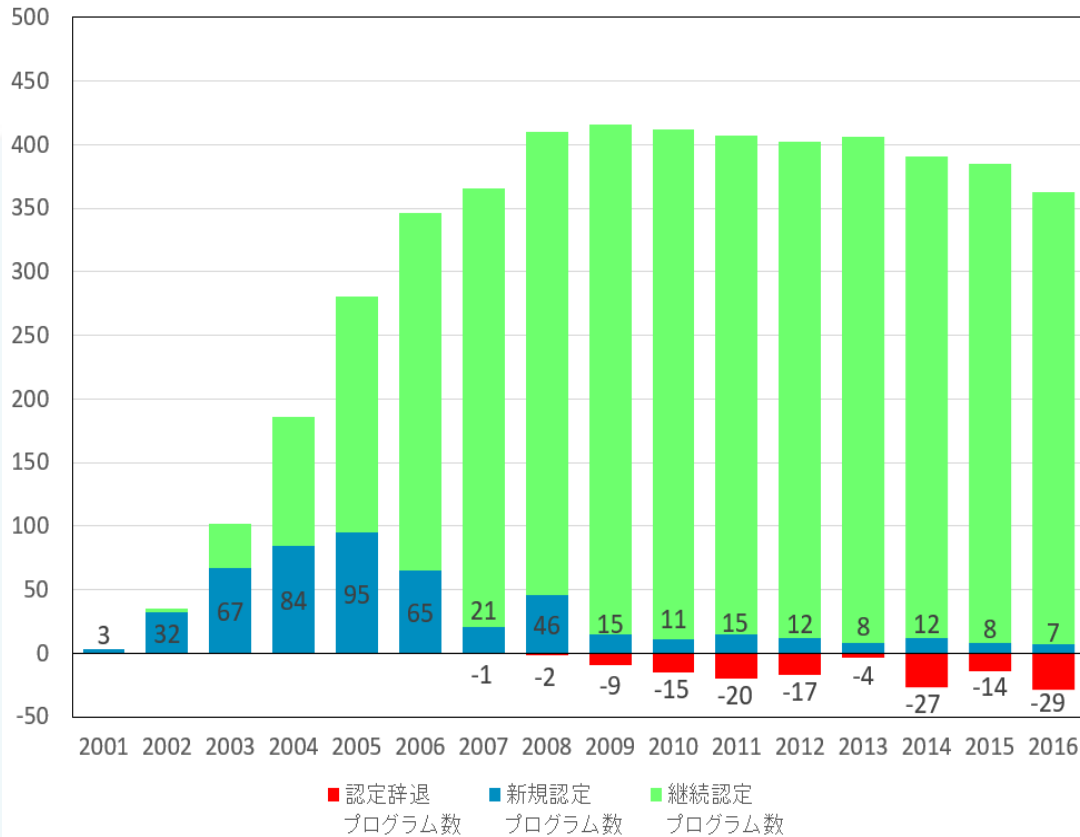
Figure 3 provides a summary of the number of JABEE-accredited programs including the number of new accreditations per year (left axis). In addition, Figure 3 shows the cumulative number of graduates from JABEE-accredited programs on an annual basis (right axis). Accredited programs are located across Japan at national, local public, and private institutions. JABEE publicizes its activities and objectives on its web site and through workshops and symposia held at least twice per year.





**Figure 3. Number of JABEE-accredited programs and graduates. (Aoshima, 2017)**

Over the past few years, several programs have withdrawn JABEE accreditation (Figure 4), and the number of withdrawn programs has exceeded the number of newly-accredited programs in some years. JABEE staff attribute this decline in accredited programs to several factors. First, many industries and higher education institutions may not recognize the value of accreditation, and industries often focus more on on-site training rather than employment preparation through higher education. Second, some programs express concern over the workload associated with compulsory institution-level accreditation combined with JABEE’s optional program-level accreditation. Finally, national funding for public universities has decreased and some are concerned about the cost of acquiring and maintaining programmatic accreditation.



**Figure 4. Total number of JABEE accredited programs by year. Green represents total programs, blue programs requesting initial accreditation, and red programs withdrawing accreditation. (Aoshima, 2017)**

To increase interest in accreditation, a committee was established consisting of representatives from the MEXT Director General for Higher Education and JABEE. This committee developed four strategies aimed at increasing awareness of and interest in accreditation: avoiding duplication with national institutional-level accreditation and simplifying the evidential documentation required for reviews, strengthen training programs for evaluators especially those who are new and include experts from other fields on evaluation teams, align scheduling for program reviews so that all programs at an institution are reviewed at the same time and reduce team size to lower accreditation costs, and increasing outreach to students and parents and to industries to increase awareness of JABEE accreditation. JABEE has initiated implementation of these strategies and full implementation is anticipated in 2018.

### **3 ACCREDITATION POLICIES, CRITERIA, AND PROCEDURES**

The basis for JABEE activities are contained in a number of publicly-available documents, including:

#### Accreditation Framework and Process

- JABEE Fundamental Framework for Accreditation of Professional Education Programs applicable in the years 2012-
- JABEE Rules and Procedures for Evaluation and Accreditation applicable in the years 2015-
- Flow of Evaluation and Accreditation
- JABEE Evaluation Guide applicable in the years 2015-
- JABEE Standard for Formation of Evaluation Team for Professional Education Professional Education Programs at Bachelor Level applicable in the year 2015-
- JABEE Standard for Formulation of Evaluation Team for Architectural and Architectural Engineering Education Programs at Bachelor and Master Level applicable in the year 2012-
- JABEE Code of Ethics for Evaluation Team Members applicable in the years 2015-

#### Accreditation Criteria and Related Documents

- JABEE Common Criteria for Accreditation of Professional Education Programs applicable in the years 2012-
- JABEE Category-dependent Criteria for Accreditation of Professional Education Programs applicable in the years 2012-
- JABEE Criteria Guide for Accreditation of Engineering Education Programs at Bachelor Level applicable in the years 2012-
- JABEE Criteria Guide for Accreditation of Architectural and Architectural Engineering Education Programs at Bachelor and Master Level applicable in the years 2012-

#### Guidance for Programs

- JABEEs Guideline and General Policy on EDE (Engineering Design Education)
- JABEE Evaluation and Accreditation Guideline on EDE
- Preparation Guide for Self-review Report 2014

The purpose of this section is to highlight the main attributes of the JABEE system. For complete details, reference should be made to the JABEE documents.

### **3.1 Philosophy**

JABEE's purpose is to "support fostering international professionals and to contribute to the development of the society and industry through the accreditation of education programs in engineering, agricultural and science departments in higher education institutions." Accreditation by JABEE is voluntary, and third-party evaluations are conducted in cooperation with professional societies in fields of engineering, agriculture, and science (JABEE, 2017c).

JABEE accredits programs leading to baccalaureate or masters degrees. Five categories of accreditation are defined by JABEE: engineering education programs at bachelor level, engineering education programs at master level, computing and IT-related education programs at bachelor level, computing and IT-related education programs at master level, architectural and architectural engineering education programs at bachelor and master level. Programs seeking JABEE accreditation must have an official Japanese name which is publicized to the public and clearly differentiated from other programs at the institution, policies and procedures governing student transfer between curricula at the institution (if such transfer is allowed), and minimum curriculum requirements established for the baccalaureate or masters level. Programs in engineering education at bachelor level category are mutually recognized under the Washington Accord.

### **3.2 Accreditation Process Overview**

A JABEE accreditation evaluation requires approximately one year to complete (Figure 5). The evaluation process begins when a program submits an application for evaluation to JABEE. The Evaluation and Accreditation Coordination Committee of JABEE determines whether or not an application is accepted.

The program is responsible for preparing a self-review report and gathering evidential documentation to be inspected during the on-site review. JABEE appoints the evaluation team and its chair. The chair works with the program to establish a specific itinerary for the on-site visit.

As noted previously, JABEE provides significant guidance through publically-available documents. This guidance includes detailed descriptions of the evaluation process, the criteria used to guide evaluation, and requirements for the self-review report.

On-site visits typically occur in September through November. Results of the evaluation are summarized in first and second evaluation reports. Second evaluation reports are reviewed for consistency by the applicable Evaluation Committee by Field to prepare an evaluation report by field. The evaluation report by field serves as the basis of the final evaluation report to be considered to determine final accreditation decisions.



**Figure 5. JABEE Accreditation Timeline (Sato, 2017).**

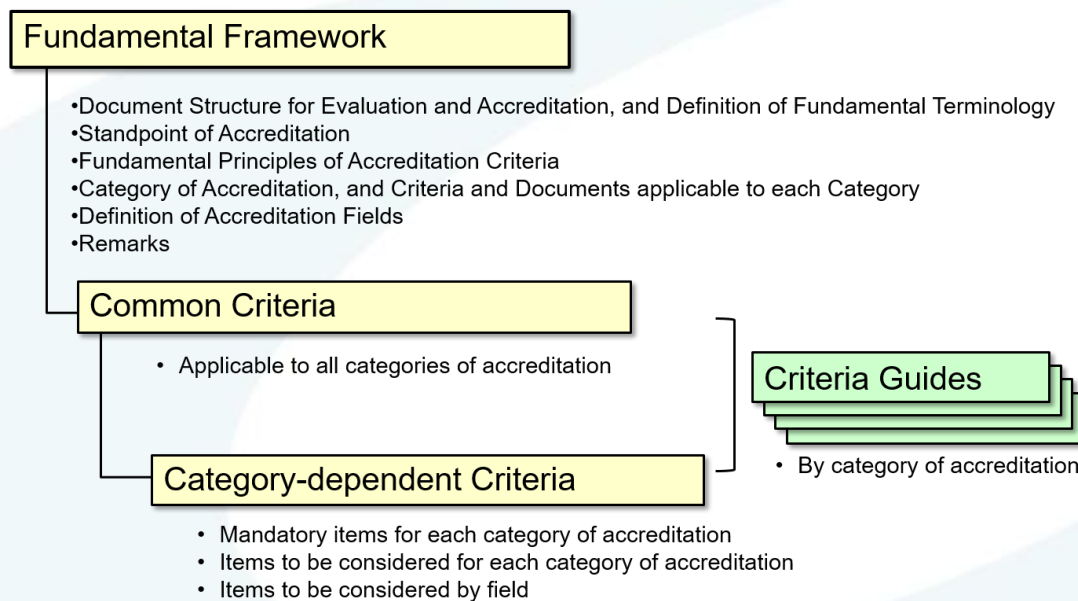
### 3.3 Criteria

As illustrated in Figure 6, JABEE criteria consist of a fundamental framework, criteria common to all categories of accreditation, and category-dependent criteria. The category-dependent criteria accommodate differences across different degree levels and fields of study. Common criteria were established to foster a closed-loop programmatic improvement process—establish outcomes, implement, assess and evaluate, and implement improvements. Category-dependent criteria supplement the common criteria to address degree level and/or discipline. Category-dependent criteria include mandatory and recommended items that specifically address degree level and category. The category-dependent criteria also include items related to specific disciplines (Makino, 2017).

The common criteria include:

1. Learning Outcomes
2. Educational Methods
3. Achievement of Learning Outcomes
4. Educational Improvement

Category-dependent criteria specific to baccalaureate-level engineering programs include a mandatory requirement that “The curriculum of the program shall be designed for four-year duration of learning and education and more than 60% of the curriculum shall be formed by mathematics, natural sciences and engineering sciences appropriate to the field.” Additional items to be considered for baccalaureate-level engineering programs include:



**Figure 6. Structure of JABEE accreditation criteria (Makino, 2017).**

- An ability of multidimensional thinking with knowledge from global perspective
- An ability of understanding of effects and impact of professional activities on society and nature, and of professionals' social responsibility
- Knowledge of and ability to apply mathematics and natural sciences
- Knowledge of the related professional fields, and ability to apply
- Design ability to respond to requirements of the society by utilizing various sciences, technologies and information
- Communication skills including logical writing, presentation and debating
- An ability of independent and life-long learning
- An ability to manage and accomplish tasks systematically under given constraints
- An ability to work in a team

Category-dependent criteria also address items to be considered by specific engineering disciplines or fields. JABEE provides criteria guides for each set of category-specific criteria. These guides serve as a reference for institutions and programs by providing additional information about the criteria, but do not provide prescriptive instructions or directives.

A mapping of JABEE's category-specific outcomes for baccalaureate-level engineering programs against the International Engineering Alliance Graduate Attributes (version 2 – 18 June 2009) are presented in Appendix B. Based on observations to date, the periodic review team believes the alignment between the JABEE category-dependent criteria and the IEA Graduate Attributes is sufficient to provide assurance that the JABEE accreditation system likely leads to outcomes substantially equivalent

to those recognized by the Accord. This preliminary finding will be reviewed and, as appropriate, affirmed following the periodic review team's observation of recordings from the JABEE accreditation decision-making meetings.

As described in *JABEE Rules and Procedures for Evaluation and Accreditation applicable in the years 2015-*, the "degree of accordance" or compliance with JABEE accreditation criteria is judged using four categories:

- Accept (A): A review item or large category of review meets the accreditation criteria.
- Concern (C): A Review item or large category of review meets the accreditation criteria at this point however improvement is expected.
- Weakness (W): A review item or large category of review almost meets the accreditation criteria at this point however its degree of accordance is weak and improvement is required.
- Deficiency (D): A review item or large category of review does not meet the accreditation criteria.

### **3.4 Evaluation Team**

Based on recommendations from its Evaluation Team Dispatching Organization and with approval of the Evaluation and Accreditation Coordination Committee, JABEE appoints a chair of the evaluation team and evaluation team members. Typically three evaluators are assigned to a team reviewing each program when only one program is evaluated. For simultaneous evaluation, JABEE appoints a leader for the group of evaluation teams, who reviews common parts of self-review reports, and two evaluators in each program-specific team within the group. If possible, one evaluator will be from industry and the other from academia. One team member will serve as a lead evaluator for the program. Teams often include observers who are completing training for future service as part of an evaluation team. The leader of the group of evaluation teams coordinates review of the self-review report by evaluation teams and, based on that review, asks questions and requests supporting documentation from the program.

### **3.5 On-Campus Procedure and Assessment**

On-site evaluations occur in September through November. In preparation for this visit, the program gathers documentation that evidences compliance with the criteria. During the on-site visit, the evaluation team inspects evidential documentation and conducts interviews with program faculty members, staff, students, and graduates. The chair of the evaluation team prepares a program review report.

### **3.6 Post-Visit Policies and Procedures**

The program has opportunity to correct factual errors, appeal contents of the report, or report improvements made following the on-site visit or following submission of the first evaluation report. The leader of the group of evaluation teams reviews any information received from the program and in consultation with the evaluation team members creates a second evaluation report.

All second evaluation reports within a specific engineering discipline are reviewed by the Evaluation Committee by Field to confirm consistency and equivalency of judgment. Discrepancies are reviewed in consultation with the leader of the group of respective evaluation teams. The Evaluation and Accreditation Coordination Committee harmonizes feedback from the Evaluation Committee by Fields and recommends accreditation or non-accreditation. These recommendations, along with the self-review reports, are forwarded to the Accreditation Commission for final decision regarding accreditation and the term of validity of accreditation (up to six years). The Board of Directors approves the publication of the decisions made by the Accreditation Commission. Programs may appeal a non-accreditation decision to JABEE within three months after receiving notice of the decision.



## 4 SUMMARY OF VISITS AND OBSERVATIONS

The Washington Accord periodic review team observed accreditation visits to two different higher education institutions covering a total of four engineering educational programs.

### 4.1 Shibaura Institute of Technology

#### **Background**

Shibaura Institute of Technology is a private university with campuses located in the Koto, Minato Wards of Tokyo, and in the Saitama Prefecture. The institution has roots in the former Tokyo Higher School of Industry and Commerce and was founded as Shibaura Institute of Technology in 1949. The university maintains an educational philosophy of “learning through practice” which includes hands-on and project-based learning strategies and intensive English preparation.

Educational programs focus on engineering, engineering management, and architecture. The university consists of six colleges and schools: College of Engineering, College of Systems Engineering and Science, College of Engineering and Design, School of Architecture, Graduate School of Engineering and Science, and Graduate School of Engineering Management. In 2017, the total university enrollment was 8,724 undergraduate, 999 masters, 71 doctoral, and 26 engineering management students.

The College of Engineering was established in 1949 with the founding of current Shibaura Institute of Technology. The college offers eleven baccalaureate programs (applied chemistry, architecture, architecture and building engineering, civil engineering, communications engineering, electrical engineering, electronics engineering, engineering science and mechanics, information science and engineering, materials science and engineering, and mechanical engineering) and had a 2017 enrollment of 4,705 students. Faculty in the College of Engineering number 146.

#### **The Accreditation Process**

The JABEE evaluation visit at Shibaura Institute of Technology occurred on 12-14 November 2017. Four programs, chemical, electrical, mechanical engineering and engineering science and mechanics, were reviewed by JABEE during the observed campus visit. The periodic review team observed the evaluation of the electrical and mechanical engineering programs.

The evaluation visit followed processes and included standard tasks outlined in *JABEE Rules and Procedures for Evaluation and Accreditation Applicable in the years 2013-*. The evaluation teams spent most of their time reviewing evidential documentation made available during the campus visit and interviewing administration, faculty, students, and graduates of the program. JABEE observers participated in evaluation team activities and discussions, but refrained from making evaluations or judgements about the accreditation review.

### **The Visit Schedule**

The on-campus visit schedule included activities that were common to all teams plus in-department activities specific to each engineering program reviewed.

12 November	
13:30-14:00	Opening address
14:00-14:10	Confirmation of on-site review documentation
14:10-15:30	Team meetings
15:30-16:30	Interviews with program graduates
16:30-17:00	Team meetings
17:00-18:00	Return to hotel
18:00-19:00	Team dinner
19:00-21:00	Evaluation team meetings
13 November	
8:50-9:10	Review and confirmation of visit schedule
9:15-10:45	Program summary and Q&A
10:50-11:50	Inspection of on-site documentation
11:50-12:40	Team lunch
12:40-14:00	All-team tour of facilities common to both programs
14:00-15:00	All team interviews with faculty and staff from common subjects
15:00-16:30	Interviews with program faculty members
16:30-17:30	Interviews with program students
17:30-18:00	Return to hotel
18:00-19:00	Team dinner
19:00-21:00	Evaluation team meetings
21 November	
8:50-9:00	Review and possible amendment of visit schedule
9:00-10:40	Inspection of on-site documentation
10:40-11:00	Class observation
11:00-12:00	Tour of program facilities
12:00-13:00	Team lunch
13:00-14:30	Evaluation team meetings
14:30-15:00	Exit report

### **Visiting Team**

For each program, the evaluation team included two evaluators, one serving as lead evaluator and one as deputy evaluator, plus one observer. Additionally, an experienced evaluator appointed by JABEE served as the leader of the group of all evaluation teams. As much as possible, program teams included at least one representative from industry and one representative from academics. The individual program teams and overall group of evaluation teams demonstrated strong camaraderie and were clearly dedicated to conducting a thorough and fair evaluation.

### **Documentation**

Translated copies of the Self-review Reports for the electrical and mechanical engineering programs were provided to the periodic review team prior to the campus visit. Additional documentation available on campus included course materials, examinations, project reports, and other student work. This additional documentation was not translated, but was used extensively by the evaluation teams.

### **Observations**

Considerable time during the campus visits was spent reviewing evidential documentation provided by the programs. Teams conducted thorough searches and evaluations of these evidential materials. Several opportunities for interaction between evaluation teams and program were scheduled so that teams could ask questions and seek additional evidence.

Interviews were well-organized. Faculty, staff, students, and graduates provided detailed and forthright responses. The evaluation team asked specific questions related to the program's compliance with the accreditation criteria. As needed, the evaluation team requested evidentiary document to support compliance. Exchanges between the evaluation team and the program's faculty, staff, students, and graduates were professional and cordial.

During team meetings, JABEE criteria were projected onto a screen for all evaluation team members to use during team deliberations regarding level of compliance. Decisions were clearly made by the team and no team members appeared to dominate team discussions.

### **Visit Outcomes**

The exit meeting was attended by university leadership, including the president, and several faculty representatives from the reviewed programs. The chair of each program evaluation team provided an oral summary of the teams findings relative to the JABEE criteria. The Program Review Report (at Exit Meeting) was also left with the person in charge of the program.

### **Comments on the Performance of the Visiting Team**

Overall, members of the JABEE evaluation teams functioned very well and conducted a professional review. It appeared that JABEE observers who participated in the campus visit as part of their training as future evaluators gained valuable experience. The JABEE criteria were clearly followed and formed the basis for team discussions. The periodic review team felt that the JABEE team findings were appropriate and in very good alignment with JABEE criteria and policies.

## 4.2 Kagoshima University

### Background

Kagoshima University is a national university located at the southern end of the Japanese Archipelago in Kagoshima Prefecture. The university's history reaches back to Hangaku Zoshikan School which was established in 1773 and operated by a feudal domain. Several higher education institutions, including the Seventh Higher School, merged between 1868 and 1912, and Kagoshima University was established in 1949.

The university's educational charter is to "help students discover and develop their potential and ability and provide a wide-range of liberal arts and professional education to help individuals foster a spirit of initiative that capitalizes on local attributes. Kagoshima University endeavors to provide graduates of both high morality and social nature who aspire to overcome challenge and work activity for the global society" (kagoshima-u.ac.jp).

The university is comprised of nine undergraduate faculties and ten graduate schools. In 2016, the total student body was 10,566 with 9,025 undergraduates, 966 masters, and 575 doctoral students. Approximately 300 of these students were non-Japanese. In addition to its comprehensive educational programs, Kagoshima University maintains a significant research enterprise.

The Faculty of Engineering was established in 1945 as the Kagoshima Prefectural College of Engineering and became a prefectural university in 1949. The faculty integrated into Kagoshima University in 1965. The faculty is comprised of seven departments: Applied Chemistry and Chemical Engineering, Architecture and Architectural Engineering, Bioengineering, Information and Computer Science, Electrical and Electronics Engineering, and Mechanical Engineering. About 490 students are admitted into undergraduate engineering programs each year.

### The Accreditation Process

The JABEE evaluation visit of Kagoshima University occurred on 19-21 November 2017. Only the chemical and biochemical engineering and architecture and building engineering programs were reviewed by JABEE during the observed campus visit. The periodic review team observed the evaluation of both programs.

### The Visit Schedule

The on-campus visit schedule included activities that were common to all teams plus in-department activities specific to each engineering program reviewed.

19 November	
13:30-14:00	Welcome from the dean, greetings from leader of group of evaluation teams, program briefings

14:00-14:30	Interview sessions with the programs
14:30-15:00	In-program discussion of review documentation
15:00-16:00	Inspection of on-site documentation; team meetings
16:00-16:30	All-team interviews with program graduates
16:30-17:00	All-team interviews with program students
17:00-17:30	Evaluation team meetings
17:30-18:00	Interviews with programs to discuss additional information needed
18:00-19:00	Team dinner
19:00-22:00	Evaluation team meetings
20 November	
9:00-9:30	Interviews with programs and personnel common to both programs
9:30-11:00	All-team tour of facilities common to both programs
11:00-12:00	Interviews with program faculty members and interviews with faculty and staff providing common education subjects
12:00-13:00	Team and program lunch meeting
13:00-13:30	Evaluation team meetings
13:30-14:00	Interviews with programs to discuss additional information needed
14:00-16:00	Inspection of on-site documentation and team meetings
16:00-17:30	Open
17:30-18:00	Interviews with programs to discuss additional information needed
18:00-19:00	Team dinner
19:00-22:00	Evaluation team meetings
21 November	
9:00-9:30	Interviews with programs
9:30-12:00	Inspection of on-site documentation and team meetings
12:00-13:00	Team lunch
13:00-15:00	Evaluation team meetings
15:00-15:30	Exit report

### **Visiting Team**

For each program, the evaluation team included two evaluators, one serving as lead evaluator and one as deputy evaluator, plus one observer. Additionally, an experienced evaluator appointed by JABEE served as the leader of the group of all evaluation teams. As much as possible, program teams included at least one representative from industry and one representative from academics. The individual program teams and overall group of evaluation teams demonstrated strong camaraderie and were clearly dedicated to conducting a thorough and fair evaluation.

### **Documentation**

A translated copy of the Self-review Reports for the two programs reviewed were provided to the periodic review team prior to the campus visit. Additional documentation available on campus included course materials, examinations, project reports, and other student work.

### **Observations**

It was evident that the programs at Kagoshima University were not as well prepared for the JABEE evaluation as were the programs at Shibaura Institute of Technology. However, while the evaluation teams were required to expend extra effort to gather evidence regarding compliance with the criteria, the programs reviewed appeared to generally meet the criteria with no deficiencies identified.

### **Visit Outcomes**

The periodic review team's travel schedule back to Tokyo did not allow observation of the exit meeting at Kagoshima University. However, as the periodic team left campus, the JABEE evaluation teams were preparing oral summaries to be given at the exit meeting and Program Review Reports (at Exit Meeting) to be left with the persons in charge of the programs. Also, requests to move the exit meeting to an earlier time in the afternoon could not be accommodated because upper-level university administration were only available to attend the exit meeting at the later time. Thus, while the periodic review team did not observe the exit meeting, it was clear that the meeting at Kagoshima University shared many of the same characteristics as the meeting observed at Shibaura Institute of Technology.

### **Comments on the Performance of the Visiting Team**

The periodic review team felt that the evaluation teams for Kagoshima University conducted a thorough and fair review to obtain additional information and evidential documents which were not initially provided by the programs. During the course of the on-site visits, the evaluation teams worked diligently to gather additional evidence related to the accreditation review and to provide the programs reasonable opportunity to demonstrate compliance with JABEE's accreditation criteria. The criteria again formed the foundation of team discussions and members of the evaluation team all participated in discussions and decisions.

#### **4.3 JABEE Decision Meeting**

This report precedes meetings of the JABEE Accreditation Commission for discussion and decision of accreditation actions and the JABEE Board of Directors for final approval of accreditation actions. Both meetings are scheduled for spring 2018. As such, this portion of the report will be provided in a supplementary addendum after the decision-making meeting is complete.

## **5 COMPLIANCE WITH STATED POLICIES AND PROCEDURES**

The periodic review has based its comments about JABEE's compliance with its published policies and procedures on the pre-visit documentation and on-campus conduct of the visiting teams.

In this section, the periodic review team provides observations and findings about JABEE's compliance with its published policies and procedures. This includes the pre-visit documentation, the on-campus conduct of the accreditation visits and the work of the JABEE examination teams, and the JABEE decision meeting conduct and outcomes.

### **5.1 Pre-Visit Documentation**

Pre-visit documentation provided to evaluation teams prior to the visit consisted primarily of the programs' Self-Review Reports and related supporting documents. The periodic review team found these documents to be very thorough and to comprehensively address the JABEE criteria. The evaluation teams clearly used this pre-visit documentation to focus their efforts while on campus, particularly review of evidential materials provided on campus, requests for additional evidential documents, and interviews with program faculty, staff, students, and graduates.

### **5.2 On-Campus Activities**

On-campus visits were largely used to confirm information provided in pre-visit documentation and to gather additional information when needed. The evaluation teams scheduled several hours during the campus visit to review evidential documentation provided on-campus. As needed, the evaluation teams requested additional information if what was provided on campus was insufficient.

Interviews with program faculty, staff, students, and graduates were professional and cordial. Some interview questions related to general aspects of the program such as students' overall preparation for employment or graduate school, etc. Other interview questions focused on items the evaluation teams were more carefully investigating while on campus. For both campuses observed, many of the focused questions related to incorporation of team work into the curriculum.

Campus tours included visits to laboratories, lecture-style classrooms, and student support service offices. For both campuses, these facilities were found to be at least adequate with many being quite commendable. While laboratory facilities visited appeared to meet national safety standards, there appeared to be some variation in national standards across nations represented on the periodic review team.

### **5.3 JABEE Decision Meeting**

This report precedes meetings of the JABEE Accreditation Commission for discussion and decision of accreditation actions and the JABEE Board of Directors for final approval of accreditation actions. Both meetings are scheduled for spring 2018. As such, this portion of the report will be provided in a supplementary addendum after the decision-making meeting is complete.



## 6 RESOLUTION OF PREVIOUS ISSUES

The periodic review in 2012 identified two shortcomings and one recommendation for JABEE. The shortcomings and recommendation are listed below along with a summary of actions taken by JABEE to address the matter.

*Whereas the Periodic Review Team notes that special effort has been put into ensuring that Multidisciplinary Team Work in the programmes, it notes that this aspect still remains a challenge, and as such should continue to be identified as a shortcoming.*

In response to this shortcoming, JABEE organized a joint workshop with the Japanese Society for Engineering Education in 2013 that focused on teamwork. In addition, JABEE developed strengthened criteria related to teamwork and provided detailed supporting information in the criteria guidance document. Because this enhanced teamwork requirement is still new, some programs observed by the periodic review team appear to struggle with integration of teamwork into the curriculum. To accommodate programs through this initial transition period, JABEE has coached teams to allow some flexibility with this newly-enhanced requirement, recommending shortcomings only at the concern level for the first few years of implementation. The periodic review committee believes that JABEE's actions to address this shortcoming are well underway and that the shortcoming will be resolved.

*The Periodic Review Team makes a general observation that internationalisation of the programmes, given that they are taught in Japanese, does pose a significant challenge. This aspect should be considered to be a shortcoming – although it is recognised that the challenge is significant.*

While JABEE criteria do not specifically require internationalization as part of the criteria, many institutions appear to be establishing programs to enhance global awareness. Both institutions visited during the periodic review have established exchange programs that attract students from several other countries. In addition, both campuses provide both on-campus language programs and international study abroad opportunities. The periodic review committee believes that development of internationalization programs by the institutions visited is indicative of a general trend toward increased globalization in engineering curricula. As such, the periodic review committee feels that this shortcoming will be resolved.

*The Periodic Review Team strongly recommends that the JABEE consider a process of provisional accreditation. This could be based on a paper review and an abridged visit to a programme. This view is based on the need to increase the number of participating programmes, and to find a method of encouraging participation by working with interested institutions.*

JABEE's process for provisional accreditation has been in place for three years. To date, four programs have applied for provisional status and additional applications are anticipated within the next year or two. The periodic review committee believes this recommendation has been appropriately addressed by JABEE.

## 7 CRITIQUE OF ACCREDITATION SYSTEM AND SUGGESTIONS FOR IMPROVEMENT

In this section, the periodic review team provides a critique of the JABEE accreditation system.

### 7.1 Summary of Good Practices

The periodic review team identified several strengths of the JABEE evaluation process:

- The JABEE evaluation teams evidenced strong enthusiasm for the review process. Across all teams observed, there was a strong commitment to implementation of JABEE policies and criteria.
- A very structured review process supports compliance with JABEE policies and criteria.
- The structure of JABEE committees, particularly the use of discipline-specific Field Evaluation Committees that review consistency across all review reports respective to that discipline, supports consistency in the accreditation system. In addition, the Evaluation and Accreditation Coordination Committee reviews all reports to provide a second consistency check.

### 7.2 Accreditation System Critique

The periodic review team did not find any significant issues, weaknesses, or deficiencies in the JABEE accreditation system. A critique of various components of the JABEE accreditation system follows:

#### Governance and Operations

JABEE has a well-defined and effective governance structure. Volunteer committees provide highly effective leadership for accreditation operations such as team formation and consistency checks. These volunteer operations receive strong support from capable staff in the JABEE secretariat office.

#### Policies and Criteria

JABEE's accreditation criteria are well-organized and clear. In addition, JABEE provides guidance documents to help programs understand expectations regarding compliance with their criteria. Evaluation team members receive excellent training and clearly have a good understanding of the criteria. The criteria serve as a framework for team discussions.

### Accreditation Procedures

Policies and procedures for the conduct of program reviews are clear, and a strong training program for evaluators supports compliance with these policies. The evaluation teams observed were clearly knowledgeable about JABEE processes, and team members worked together to ensure that the reviews were completed in a fair and thorough manner.

### Reporting of Outcomes

The evaluation teams provided an oral summary of their findings to the programs at the conclusion of the campus visit. These exit meetings were attended by college and institution leadership, demonstrating that the visited institutions valued the teams' feedback. In addition, the Program Review Report (at Exit Meeting) for each program describing preliminary findings was left with the programs at the conclusion of the exit meeting.

### Recent and Planned Improvements

JABEE staff and volunteers demonstrate a strong commitment to continuous improvement. As previously described, JABEE has taken positive action to address recommendations made during the previous periodic review. In addition, staff and volunteers were thoroughly engaged in the periodic review process and supported thorough and frank discussion.

The following recommendations are provided for JABEE's consideration in the spirit of continuous improvement:

- Over the past few years, the number of programs discontinuing JABEE accreditation has been greater than the number of programs seeking initial accreditation (Figure 4). The periodic review team believes there are three primary causes for this net loss: 1. Insufficient understanding on behalf of industries, parents, and students about the value of JABEE accreditation; 2. A perception by institutions that the JABEE accreditation process is onerous and duplicative with national accreditation at the institution level; and 3. The very small benefit gained in the pathway to P.E.Jp certification for graduates from JABEE-accredited programs compared to those from non-accredited programs. Net loss of accredited programs is not sustainable over the long term. JABEE has been investigating this trend and worked with the MEXT to develop four strategies (1. Avoiding duplication with national institutional-level accreditation and simplifying the evidential documentation required for reviews; 2. Strengthen training programs for evaluators especially those who are new and include experts from other fields on evaluation teams; 3. Align scheduling for program reviews so that all programs at an institution are reviewed at the same time and reduce team size to lower accreditation costs; and 4. Increasing outreach to students and parents and to industries to increase awareness of JABEE accreditation) to re-

verse the trend. While JABEE has made significant progress toward implementation of these strategies, the periodic review team strongly encourages JABEE to complete implementation to strengthen adoption of accreditation.

- JABEE and many of the engineering programs it accredits would benefit from increased interaction with industry. Such interactions could support broader understanding of the benefit of hiring graduates of JABEE-accredited programs. JABEE may wish to consider recommending that programs establish industrial advisory boards to provide guidance regarding student outcomes and to engage in student design experiences. Similarly, JABEE may wish to consider recommending that programs facilitate interaction between evaluation teams and representatives from industries that hire program graduates.
- The evaluation teams observed during the periodic review consisted entirely of Japanese males. However, the students of the engineering programs and employees in the industries served by JABEE are becoming more diverse. While it may be several years before women and international engineers reach a level of professional experience needed for service as a volunteer, JABEE is encouraged to develop strategies for increasing the diversity of their volunteer pool.
- Currently, the only process available for receiving feedback on the performance of JABEE evaluation team members is informal and ad-hoc. JABEE may benefit from implementation of a systematic and structured format for volunteer evaluation. Such feedback would aid JABEE in identifying evaluators who do not perform up to desired standards as well as high-performing evaluators who may be good candidates for future leadership roles.

Though it does not apply specifically to the periodic review of JABEE, the periodic review team offers the following suggestions on the Washington Accord periodic review process:

- The additional benefit gained from observing a second campus visit did not appear to justify the extra time and expense required. The IEA may wish to consider reducing the number of campus visits required for periodic review, particularly for signatories that have previously completed at least one prior periodic review with no weaknesses or deficiencies.

- The format of the Washington Accord report required a significant amount of general information, such as descriptions of the educational system in the signatory's country and highly detailed descriptions of the signatory's accreditation criteria and processes. Reduction or elimination of these sections, especially where related information is easily found online or obtained from the signatory, may yield a more efficient report format that provides sufficient information to the IEA while reducing the workload for periodic review teams.
- JABEE recommends and the periodic review team fully supports that a translated recording of the decision making meeting be provided to the team for review in lieu of having a member of the periodic review team attend the meeting in person.

### **7.3 Contrasts Among Signatories**

Members of the periodic review team offer the following comparisons and contrasts with accreditation processes of their home signatories:

- ABET—Many similarities were found between JABEE and ABET policies, processes, and criteria. While JABEE's criteria, especially related to student outcomes, are more detailed than those used by ABET, the general topics align quite well. JABEE employs multiple reviewers for each program whereas ABET teams typically have only one evaluator per program. The team structure used by JABEE facilitates discussion within each program review, but team size becomes large quickly when several programs are reviewed at the same time.
- IES—IES accreditation visits normally begin with a short introductory PowerPoint presentation of the university and faculty during a meeting with the dean and all evaluation teams. The same is done at the departmental level for each evaluation team. These presentations are done for the benefit of new evaluation members so they quickly have an impression of the university, faculty, and department. The evaluated program also organizes a dinner for the evaluation team members, alumni, industrial consultative members, and key staff to meet and interact. Participation of industry in university education does not appear to be as strong in Japan as in Singapore.

### **7.4 Concluding Remarks**

Because the decision making meeting has not yet been held, the periodic review team cannot make a final recommendation regarding substantial equivalency of the JABEE accreditation system with other Washington Accord signatories. However, based on observations made to date, the periodic review team feels the standard of the graduates of JABEE accredited programs are likely substantially equivalent to graduates of other Washington Accord signatories. This finding is determined by:

- the periodic review team's belief that the accreditation standard is likely substantially equivalent to those in their home jurisdictions, and
- a collective judgement by the periodic review team as a whole that the accreditation standard is likely substantially equivalent to that of the Washington Accord as illustrated by the Washington Accord exemplar graduate attributes.

## **8 RECOMMENDATION TO SIGNATORIES**

This report precedes meetings of the JABEE Accreditation Commission for discussion and decision of accreditation actions and the JABEE Board of Directors for final approval of accreditation actions. Both meetings are scheduled for spring 2018. As such, this periodic review report does not provide a final recommendation.

However, based on evidence considered to date, the Washington Accord periodic review team that visited JABEE preliminarily recommends that JABEE be accepted by the other signatories, for a period of six years, as leading to outcomes substantially equivalent to those recognized by the Accord subject to satisfactory review of the JABEE Accreditation Commission and Board of Directors meetings.

The recommendation of the periodic review team is based on evidence collected during an on-site visit to JABEE, including observation of two accreditation visits.



## APPENDIX A

### JABEE's Member Societies, Supporting Members, and Board of Directors

#### JABEE Member Societies

Architectural Institute of Japan, AIJ  
Atomic Energy Society of Japan, AESJ  
Information Processing Society of Japan, IPSJ  
Japan Association for Forest and Natural Environment Engineering Education, JAFEE  
Japan Association of International Commission of Agricultural Engineering, JAICAE  
Japan Concrete Institute, JCI  
Japan Federation of Managerial Engineering Societies, FMES  
Japan Industrial Management Association, JIMA  
Japan Prestressed Concrete Engineering Association, JPCEA  
Japan Society for Bioscience, Biotechnology, and Agrochemistry, JSBBA  
Japan Society for Food Engineering, JSFE  
Japan Society of Civil Engineers, JSCE  
Japan Society of Corrosion Engineering, JSCE  
Japan Society of Engineering Geology, JSEG  
Japan Society of Erosion Control Engineering, JSECE  
Japan Welding Society, JWS  
Japanese Association of Groundwater Hydrology, JAGH  
Japanese Institute of Landscape Architecture, JILA  
Japanese Society for Engineering Education, JSEE  
Magnetics Society of Japan, MSJ  
Operations Research Society of Japan, ORSJ  
Reliability Engineering Association of Japan, REAJ  
Society of Automotive Engineers of Japan, Inc., JSAE  
The Ceramic Society of Japan, CerSJ  
The Chemical Society of Japan, CSJ  
The Crop Science Society of Japan, CSSJ  
The Electrochemical Society of Japan, ECSJ  
The Foundation of Agricultural Science of Japan, FASJ  
The Geological Society of Japan, JGS  
The Illuminating Engineering Institute of Japan, IEIJ  
The Institute of Electrical Engineers of Japan, IEEEJ  
The Institute of Electrical Installation Engineers of Japan, IEIEJ  
The Institute of Electronics, Information and Communication Engineers, IEICE  
The Institution of Professional Engineers, Japan, IPEJ  
The Iron and Steel Institute of Japan, ISIJ  
The Japan Institute of Metals, JIM  
The Japan Landslide Society, JLS  
The Japan Society for Aeronautical and Space Sciences, JSASS  
The Japan Society for Analytical Chemistry, JSAC  
The Japan Society for Management Information, JASMIN  
The Japan Society for Research Policy and Innovation Management, JSRPIM  
The Japan Society for Technology of Plasticity, JSTP

The Japan Society of Applied Physics, JSAP  
The Japan Society of Mechanical Engineers, JSME  
The Japan Society of Naval Architects and Ocean Engineers, JASNAOE  
The Japan Wood Research Society, JWRS  
The Japanese Forest Society, JFS  
The Japanese Geotechnical Society, JGS  
The Japanese Society for Food Science and Technology, JSFST  
The Japanese Society for Horticultural Science, JSHS  
The Japanese Society for Quality Control, JSQC  
The Japanese Society of Agricultural Machinery, JSAM  
The Japanese Society of Fisheries Engineering, JSFE  
The Japanese Society of Fisheries Science, JSFS  
The Japanese Society of Irrigation, Drainage and Rural Engineering, JSIDRE  
The Japanese Society of Revegetation Technology, JSRT  
The Mining and Materials Processing Institute of Japan, MMIJ  
The Physical Society of Japan, JPS  
The Robotics Society of Japan, RSJ  
The Society for Biotechnology, Japan, SBJ  
The Society of Chemical Engineers, Japan, SCEJ  
The Society of Fiber Science and Technology, Japan, SFSTJ  
The Society of Heating, Air-Conditioning and Sanitary Engineers of Japan, SHASE  
The Society of Instrument and Control Engineers, SICE  
The Society of Plant Engineers Japan, SOPE  
The Society of Polymer Science, Japan, SPSJ  
The Society of Project Management, SPM  
Turbomachinery Society of Japan, TSJ

### **JABEE Supporting Members**

Ajinomoto Co., Inc.  
ALPS ELECTRIC CO., LTD.  
FUJITSU LIMITED  
Hitachi, Ltd.  
IHI Corporation  
JFE STEEL Corporation  
KAJIMA CORPORATION  
Kao Corporation  
MITSUBISHI CHEMICAL CORPORATION  
Mitsubishi Gas Chemical Company, Inc.  
Mitsui Chemicals, Inc.  
NEC Corporation  
NIPPON KOEI CO., LTD  
NIPPON STEEL & SUMITOMO METAL CORPORATION  
NTC Consultants Inc.  
Panasonic Corporation  
SANSUI CONSULTANTS CO., LTD.  
SHIMIZU CORPORATION

Sumitomo Chemical Co., Ltd.  
 TAISEI CORPORATION  
 Takenaka Corporation  
 The Japanese Society of Rural Development Engineers

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Director	Hitoshi Nara	The Institution of Professional Engineers, Japan
Director	Atsushi Fukuda	Japan Society of Civil Engineers
Director	Yoshiyuki Ueshima	The Iron and Steel Institute of Japan
Director	Hitoshi Omura	The Japanese Society of Irrigation, Drainage and Reclamation Engineering
Director	Junichi Koizumi	Representing 8 Chemical and Chemistry-related Engineering Societies
Director	Shugo Watabe	The Foundation of Agricultural Science of Japan
Director	Kotaro Asai	Information Processing Society of Japan
Director	Yoshiaki Tanaka	The Institution of Electronics, Information and Communication

Director	Yasuo Suzuki	Representing 7 Engineering Physics and Applied Physics societies
Director	Yasuhiro Tujimura	Japan Federation of Managerial Engineering of Japan
Director	Hideo Sakai	Japan Association for Forest and Natural Environment Engineering Education
Director	Yasuhisa Asano	The Society for Biotechnology, Japan

## APPENDIX B

### Compliance of JABEE's Program Outcomes with the IEA Graduate Attributes (version 2 – 18 June 2009)

Differentiating Characteristic	Washington Accord Graduate Attribute	Related JABEE Criteria
Engineering Knowledge	WA1: Apply knowledge of mathematics, natural science, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to the solution of complex engineering problems.	<p>(c) Knowledge of and ability to apply mathematics and natural sciences</p> <ul style="list-style-type: none"> <li>• Knowledge of mathematics and natural sciences required in the related engineering fields</li> <li>• An ability to apply including combining the knowledge mentioned above</li> </ul> <p>(d) Knowledge of the related engineering fields, and ability to apply</p> <ul style="list-style-type: none"> <li>• Knowledge of the related engineering fields</li> <li>• An ability to apply including combining the knowledge mentioned above</li> <li>• An ability to utilize hardware and software required in the related engineering fields</li> </ul>
Problem Analysis: Complexity of analysis	WA2: Identify, formulate, research literature and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences. (WK1 to WK4)	<p>(e) Design ability to respond to requirements of the society by utilizing various sciences, technologies and information</p> <ul style="list-style-type: none"> <li>▪ An ability to recognize problems to be solved</li> <li>▪ An ability to specify constraints from public welfare, environmental safety, and economy to be taking account of</li> <li>▪ An ability to logically specify, organize, and analyze problems to be solved</li> <li>▪ An ability to plan detailed policies toward prob-</li> </ul>

		<p>lem-solving by taking account of various constraints and applying systematic knowledge of mathematics, natural sciences and engineering sciences in the related engineering fields</p> <ul style="list-style-type: none"> <li>▪ An ability to actually solve problems in accordance with the policies as planned</li> </ul>
<p>Design/development of Solutions: Breadth and uniqueness of engineering problems i.e. the extent to which problems are original and to which solutions have previously been identified or codified</p>	<p>WA3: Design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations. (WK5)</p>	<p>(e) Design ability to respond to requirements of the society by utilizing various sciences, technologies and information</p> <ul style="list-style-type: none"> <li>▪ An ability to recognize problems to be solved</li> <li>▪ An ability to specify constraints from public welfare, environmental safety, and economy to be taking account of</li> <li>▪ An ability to logically specify, organize, and analyze problems to be solved</li> <li>▪ An ability to plan detailed policies toward problem-solving by taking account of various constraints and applying systematic knowledge of mathematics, natural sciences and engineering sciences in the related engineering fields</li> <li>▪ An ability to actually solve problems in accordance with the policies as planned</li> </ul>
<p>Investigation: Breadth and depth of investigation and experimentation</p>	<p>WA4: Conduct investigations of complex problems using research-based knowledge (WK8) and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.</p>	<p>(e) Design ability to respond to requirements of the society by utilizing various sciences, technologies and information</p> <ul style="list-style-type: none"> <li>▪ An ability to recognize problems to be solved</li> <li>▪ An ability to specify constraints from public welfare, environmental safety, and economy to be taking</li> </ul>

		<p>account of</p> <ul style="list-style-type: none"> <li>▪ An ability to logically specify, organize, and analyze problems to be solved</li> <li>▪ An ability to plan detailed policies toward problem-solving by taking account of various constraints and applying systematic knowledge of mathematics, natural sciences and engineering sciences in the related engineering fields</li> <li>▪ An ability to actually solve problems in accordance with the policies as planned</li> </ul>
Modern Tool Usage: Level of understanding of the appropriateness of the tool	WA5: Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering problems, with an understanding of the limitations. (WK6)	<p>(d) Knowledge of the related engineering fields, and ability to apply</p> <ul style="list-style-type: none"> <li>▪ Knowledge of the related engineering fields</li> <li>▪ An ability to apply including combining the knowledge mentioned above</li> <li>▪ An ability to utilize hardware and software required in the related engineering fields</li> </ul>
The Engineer and Society: Level of knowledge and responsibility	WA6: Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice and solutions to complex engineering problems. (WK7)	<p>(a) An ability of multidimensional thinking with knowledge from global perspective</p> <ul style="list-style-type: none"> <li>▪ Knowledge of diverse culture and society of mankind as well as nature</li> <li>▪ An ability to take action appropriately based on the mentioned above</li> </ul> <p>(b) An ability of understanding of effects and impact of engineering on society and nature, and of engineers' social responsibility</p> <ul style="list-style-type: none"> <li>▪ Understanding of impact of technology of related engineering fields on <u>public welfare</u></li> </ul>

		<ul style="list-style-type: none"> <li>▪ Understanding of implication of technology of related engineering fields on environmental safety and sustainable development of society</li> <li>▪ Understanding of engineering ethics</li> <li>▪ An ability to take action based on the understanding mentioned above</li> </ul>
Environment and Sustainability: Type of solutions.	WA7: Understand and evaluate the sustainability and impact of professional engineering work in the solution of complex engineering problems in societal and environmental contexts. (WK7)	<p>(b) An ability of understanding of effects and impact of professional activities on society and nature, and of professionals' social responsibility</p> <ul style="list-style-type: none"> <li>▪ Understanding of impact of technology of related engineering fields on public welfare</li> <li>▪ Understanding of implication of technology of related engineering fields on environmental safety and sustainable development of society</li> <li>▪ Understanding of engineering ethics</li> <li>▪ An ability to take action based on the understanding mentioned above</li> </ul>
Ethics: Understanding and level of practice	WA8: Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice. (WK7)	<p>(b) An ability of understanding of effects and impact of professional activities on society and nature, and of professionals' social responsibility</p> <ul style="list-style-type: none"> <li>▪ Understanding of impact of technology of related engineering fields on public welfare</li> <li>▪ Understanding of implication of technology of related engineering fields on environmental safety and sustainable development of society</li> <li>▪ Understanding of engineering ethics</li> <li>▪ An ability to take action based on the understanding mentioned above</li> </ul>



<p>Individual and Team work: Role in and diversity of team</p>	<p>WA9: Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.</p>	<p>(i) An ability to work in a team</p> <ul style="list-style-type: none"> <li>▪ An ability to precisely judge and carry out own work during corroborative work</li> <li>▪ An ability to appropriately judge what others should do and to address to others during corroborative work</li> </ul>
<p>Communication: Level of communication according to type of activities performed</p>	<p>WA10: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.</p>	<p>(f) Communication skills including logical writing, presentation and debating</p> <ul style="list-style-type: none"> <li>▪ An ability to deliver information and opinion to the others</li> <li>▪ An ability to understand information and opinion delivered by others</li> <li>▪ An ability to exchange information and opinion by utilizing foreign languages such as English</li> </ul>
<p>Project Management and Finance: Level of management required for differing types of activity</p>	<p>WA11: Demonstrate knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.</p>	<p>(h) An ability to manage and accomplish tasks systematically under given constraints</p> <ul style="list-style-type: none"> <li>▪ An ability to accomplish tasks systematically under given constraints including time and cost</li> <li>▪ An ability to grasp the progress of the plan and modify it as required</li> </ul>
<p>Lifelong learning: Preparation for and depth of continuing learning.</p>	<p>WA12: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.</p>	<p>(g) An ability of independent and life-long learning</p> <ul style="list-style-type: none"> <li>▪ Understanding of necessity of continuous professional development to perform as a life-long engineer</li> <li>▪ An ability to acquire necessary information and knowledge</li> </ul>

## **APPENDIX C**

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Supplemental Report of the Visiting Team  
on the Periodic Review of JABEE  
under the Washington Accord

12-21 November 2017

Educational Establishments Visited:

Kagoshima University  
Shibaura Institute of Technology

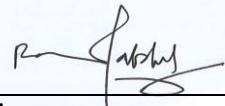
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Prof. Chew Yong Tian  
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Signature

Dato' Dr. Ir. Hj. Abdul Rashid Maidin  
Malaysia/Board of Engineers Malaysia (BEM)



Signature

Prof. Ann L. Kenimer (chair)  
USA/ABET



Signature

6 March 2018

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## **RECOMMENDATION TO SIGNATORIES**

This supplemental report amends information provided in period review report submitted on 25 January 2018. Specifically, this supplemental report addresses the JABEE decision making meetings held in February and March 2018.

Based on observations described in the 25 January 2018 periodic review report and review of recordings of the decision making meetings, the Washington Accord team that visited JABEE recommends that JABEE be accepted by the other signatories, for a period of six years, as leading to outcomes substantially equivalent to those recognized by the Accord.

The recommendation of the monitoring team is based on evidence collected during an on-site visit to JABEE, including observation of two accreditation visits.

### **ACKNOWLEDGEMENTS**

The periodic review team thanks the JABEE Secretariat staff, particularly Dr. Yasuyuki Aoshima and Ms. Akiko Takahashi, for providing translated recordings of those portions of the decision making meetings related to the accreditation visits observed at Shibaura Institute of Technology and Kagoshima University.

The period review report of JABEE dated 25 January 2018 was submitted prior to the team's evaluation of the JABEE accreditation decision making meetings. This supplemental report specifically addresses the decision making process and, therefore, focuses only on related report sections and the team's final recommendation regarding substantial equivalency.

## **4 SUMMARY OF VISITS AND OBSERVATIONS**

### **4.3 JABEE Decision Meetings**

#### **Background**

JABEE's accreditation decision making occurs in three phases:

- A technical review of all evaluated programs was completed by the Evaluation and Accreditation Coordination Committee at its meetings on 2, 3, and 17 February 2018. This committee discussed each program's compliance with JABEE criteria, assessed consistency across evaluated programs, and provided specific recommendations regarding accreditation or non-accreditation. Since this committee's discussions provide the basis for accreditation actions, recordings of these discussions were translated and provided to the periodic review team.
- Accreditation action recommendations were forwarded to the Accreditation Council which voted on the final accreditation actions and, as applicable, terms of accreditation validity. This meeting occurred on 26 February 2018.
- Accreditation actions were approved for publication by the JABEE Board of Directors at their meeting on 6 March 2018.

#### **Meeting Progress**

As previously noted, discussions of the Evaluation and Accreditation Coordination Committee focus on programs' compliance with the JABEE criteria and consistency of evaluation results across institutions. Based on these discussions, the Evaluation and Accreditation Coordination Committee develops recommendations for accreditation or non-accreditation. Translated recordings of these meetings, particularly those discussions related to the observed evaluations at Shibaura Institute of Technology and Kagoshima University, were evaluated by the periodic review team.

The Evaluation and Accreditation Coordination Committee meeting opened with a review of JABEE rules and procedures, including JABEE's Code of Ethics, confidentiality, defined conflicts of interest, and recusal requirements for individuals having conflicts of interest with a program under discussion. The remainder of the Evaluation and Accreditation Coordination Committee meeting was devoted to in-depth discussion of individual programs with a focus on evaluation findings and associated accreditation recommendations.

### **Discussion of Programs and Decisions**

For each program evaluated, a summary of the evaluation team's findings was presented orally along with the team's recommendations. Discussion of the team's findings followed with an emphasis on applicable accreditation criteria and consistency with other programs. As needed, the committee would revisit programs previously discussed if there was concern that the earlier recommendations were not consistent with other findings. For example, the accreditation recommendation for the electrical engineering program at Shibaura Institute of Technology was tabled to allow the associated Evaluation Committee by Field to provide additional input related to one criterion. Similarly, some criteria compliance scores for the architectural engineering program at Kagoshima University were revised following feedback and clarification provided by the evaluation team. Overall, program discussions were thorough yet fair and appeared to conform to JABEE policies, procedures, and criteria.

## **5 COMPLIANCE WITH STATED POLICIES AND PROCEDURES**

### **5.3 JABEE Decision Meetings**

The JABEE decision meetings were clearly grounded in applicable policies, procedures, and criteria. Conflict of interest policies were highlighted and committee members recused themselves as needed. Evaluation results for each program were thoroughly discussed and careful attention was paid to consistency across programs. Final recommendations for accreditation or non-accreditation appeared to be based on JABEE criteria and developed on deliberate and fair discussion of evidence.



## **7 CRITIQUE OF ACCREDITATION SYSTEM AND SUGGESTIONS FOR IMPROVEMENT**

### **7.4 Concluding Remarks**

Based on observations described in the periodic review report dated 25 January 2018 and this supplemental report, the periodic review team feels the standard of the graduates of JABEE accredited programs are substantially equivalent to graduates of other Washington Accord signatories. This finding is determined by:

- consideration by the reviewers as to whether they consider that the accreditation standard is substantially equivalent to those in their home jurisdictions, and
- a collective judgement by the monitoring team as a whole as to whether the accreditation standard is substantially equivalent to that of the Accord as illustrated by the exemplar graduate attributes of the relevant Accord.

## **8 RECOMMENDATION TO SIGNATORIES**

Based on observations described in the 25 January 2018 periodic review report and review of recordings of the decision making meetings, the Washington Accord team that visited JABEE recommends that JABEE be accepted by the other signatories, for a period of six years, as leading to outcomes substantially equivalent to those recognized by the Accord.

The recommendation of the monitoring team is based on evidence collected during an on-site visit to JABEE, including observation of two accreditation visits.