

JABEE Criteria Guide

for Accreditation of
Engineering Education Programs at Bachelor Level
Applicable in the years 2012 -
(revised as at 10 July 2015)

Only the Japanese version of “JABEE Criteria Guide for Accreditation of Engineering Education Programs at Bachelor Level in the years 2012 -” is official.
English translation is for informational purpose.

JABEE

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JABEE Criteria Guide

JABEE Accreditation Criteria for Professional Education Programs is formed by Common Criteria and Category-dependent Criteria. This document provides guide to Accreditation Criteria for Engineering Education Programs at Bachelor Level.

Preamble

JABEE Common Criteria are provided to accredit education programs for fostering “professionals” in higher education institutions. A program seeking for accreditation shall satisfy all four Criteria described below, and shall be required to demonstrate its conformity with evidence. “Professionals” defined by JABEE are individuals who commit to specialized professions in engineering, computing and architecture.

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JABEE Criteria for Accreditation of Professional Education Programs (hereinafter referred to as “Criteria”) have been established to accredit education programs in higher education institutions that foster professionals based on the Article 3 of JABEE Charter. Education program here indicates not only curriculum of departments or courses but also includes entire educational process and environment from admission to graduation including evaluation and judgment of the qualification of program completion, and it indicates comprehensive name of the department or courses. The following programs are eligible for JABEE accreditation: bachelor level education programs at four-year universities, at schools which are established by Japanese Ministries and at industrial or technical colleges of technology added by two-year advanced course and at junior colleges added by two-year advanced course as well as programs, which JABEE considers as equivalent to the above bachelor level programs. The programs shall be such as the graduates of the programs receive bachelor degree. To which faculty or department the programs belong is not questioned as long as fundamental engineering education is provided. Also, higher education institutions shall meet the standards for establishment of universities set by the Japanese governmental law or equivalent standard. The details are set up separately.

The program shall define the profile of autonomous professionals to be fostered and define the abilities and knowledge as learning outcomes that the graduates are supposed to surly acquire at the time of completion of the program. The program is required to implement educational activities for students to achieve its learning outcomes. The program is required to design curriculum systematically for the students to be able to

achieve the learning outcomes and it is important for student and faculty to be aware of the learning outcomes on dairy basis. Also, as students achieve the learning outcomes through four-year learning and education, they are required to be consistently conscious of the learning outcomes through admission to graduation. Since the learning outcomes, which the program defines, have an aspect of contract with the society (accountability), it is important for program to broadly publicize the learning outcomes to the society. By taking account of the nature of the program referred to above, the program is required to engage continuous improvement and at the same time to consider the consistent continuity of operation.

The program is not necessary limited to the case where a whole department forms a single program as most of higher education institutions do. It is allowed for multiple departments to form a program and for a department to operate multiple programs as long as the program has substance. It is also allowed to include some subjects to be leaned off the campus in cooperation with other higher education institutions.

The name of the program needs to be listed on publicized documents of the education institution such as catalogue or guidelines for applicants. It also needs to be clearly differentiated from other programs within the same education institution, particularly, from ones which are not accredited by JABEE. The name of the department is, in principle, given to the name of the program if the whole department program is a JABEE program.

A program seeking for accreditation shall demonstrate that the program satisfies all the requirements which JABEE defines in Common Criteria and mandatory items in Category-dependent Criteria and shall demonstrate that the contents of the program are sufficiently taking account of items to be considered by field in Category-dependent Criteria. Therefore, the program needs to submit a self-review report together with evidences. The program is evaluated both by document review and on site visit.

Accreditation Criteria is consisted of criterion 1 to 4 of Common Criteria those are, Criterion 1: Learning Outcomes, Criterion 2: Educational Methods, Criterion 3: Achievement of Learning Outcomes, Criterion 4: Educational Improvement, and Items to be Considered by Field which supplement field-specific items depending on necessity to apply Common Criteria as written in Category-dependent Criteria. In Common Criteria, it is intended to assure achievement of learning outcomes in the flow of “Criterion 1: learning outcomes, including achievement of specific learning outcomes and benchmark assured by the program”, “Criterion 2: Educational Methods, including curriculum and syllabus design” and “Achievement of Leaning Outcomes, including each course and item to be achieved”.

“Professionals” defined by JABEE are individuals including researchers, who commit to

specialized professions in engineering, computing and architecture.

1. Criterion 1

Criterion 1 Learning Outcomes

- (1) The program shall define its profile of autonomous professionals to be fostered. The program shall take account of traditions, resources and fields of graduates to define the profile of professionals. The profile of professionals shall be defined by giving consideration to the requirements of the society and the demands of the students. The program shall broadly publicize the profile of professionals. The profile shall be made well-known to the students and faculty.
- (2) The program shall establish its learning outcomes that the graduates are supposed to surly acquire at the time of completion of the program by taking account of profile of autonomous professionals. The learning outcomes shall be knowledge and abilities distinctively defined with benchmarks covering the contents of (a) to (i) listed below. The program shall broadly publicize the learning outcomes. The learning outcomes shall be made well-known to the students and faculty. The learning outcomes shall be established by taking account of items which Category-dependent Criteria specifies in items (a) to (i):
 - (a) An ability of multidimensional thinking with knowledge from global perspective
 - (b) An ability of understanding of effects and impact of professional activities on society and nature, and of professionals social responsibility
 - (c) Knowledge of and ability to apply mathematics and natural sciences
 - (d) Knowledge of the related professional fields, and ability to apply
 - (e) Design ability to respond to requirements of the society by utilizing various sciences, technologies and information
 - (f) Communication skills including logical writing, presentation and debating
 - (g) An ability of independent and life-long learning
 - (h) An ability to manage and accomplish tasks systematically under given constraints
 - (i) An ability to work in a team

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Criterion 1 refers to the establishment and publicizing of the profile of the professionals which the program intends to foster and of the learning outcomes. The profile of the professionals, the state of publicity and of awareness to the students and faculty of the learning outcomes are evaluated.

“Outcomes” that JABEE defines here are the milestones which the program applies as

program criteria to evaluate students, and they also imply “learning outcomes including benchmark”, that the program assures the graduates to acquire at the time of completion of the program, by taking account of the profile of the professionals, namely, “knowledge and abilities which graduates are supposed to achieve at the time of the graduation”. “Profile of professionals” which program intends to foster” is the model that the program expects the graduates to be after having gained experience as professionals. Taking account of these, the program shall establish its own specific and distinctive learning outcomes for each (a) to (i) of Criterion 1 (2).

The purpose of evaluation and accreditation is to assure the quality of the education of the program which applied for evaluation and accreditation by reviewing whether appropriate and distinctive learning outcomes have been established, whether the educational activities are implemented so that the students achieve its outcomes, whether only the students whom have acquired the learning outcomes have graduated, whether efforts of educational improvements are continuously and voluntarily made and whether the contents of the program is publicized. Therefore, the learning outcomes are the prerequisites of the evaluation and accreditation and it shall be established based on the educational principle of the program. Criterion 1 defines the requirements for its learning outcomes to be appropriate.

The program’s establishing appropriate learning outcomes is the prerequisite to evaluate the program vis-a-vis Criteria 2 to 4. The learning outcomes shall be distinctive for the program to develop its educational contents and methods so that the students can achieve the learning outcomes, and to judge the degree of students’ achievement toward the learning outcomes with benchmark. Especially, the degree of achievement of the learning outcomes is evaluated in Criterion 3. The program needs to pay attention to the fact that if the details of the learning outcomes lack, the degree of achievement is difficult to be proven.

The program is required to define the profile of the professionals which the program intends to foster by taking account of the tradition and resources of the program, the requirements of the society and the demands of the students, to establish its own distinctive learning outcomes which materialize the contents of (a) to (i) of Criterion 1 (2), to broadly publicize its learning outcomes and to make well-known to the students and faculty of the program. As the learning outcomes have an aspect to assure to the society the knowledge and abilities that the graduates of the program have acquired, not only the contents and benchmark of the learning outcomes but also the of publicity and of awareness to the students and faculty of the learning outcomes are the subjects of the evaluation.

Criterion 1 (1)

Criterion 1 (1) requires the program to define the profile of the professionals which program intends to foster and to broadly publicize and make well-known to the students and faculty. The program is required to define the profile of the professionals which program intends to foster by taking account of the traditions and resources of the education institution and the fields of graduates. The profile of the professionals shall be established by giving consideration to the requirements of the society and the demands of the students. It is also important for the program to demonstrate how the program has established the profile of the professionals, namely how the program has assured the benchmark required by the society, taking account of the requirements of the society such as of industry where the graduates work, and the demands of the student.

“Benchmark required by the society” in establishing the profile of the professionals which program defines and the learning outcomes required by Criterion 1 (2) shall be appropriate for fundamental education at bachelor level expected to the professionals and allow international mutual recognition of the education. Benchmark here differs among the fields and changes with the times, therefore it is difficult to specifically clearly indicate. It is expected that through the evaluation and accreditation tasks, the gap of the benchmarks in mind between the education institutions and evaluation and accreditation side will be minimized and as a result the quality of education will be assured with common benchmark.

Criterion 1 (2)

Criterion 1 (2) requires to reflect the profile of the professionals as required in Criterion1(1), to establish the learning outcomes as knowledge and abilities including benchmark which the graduates are supposed to surly acquire at the time of completion of the program, and to broadly publicize its learning outcomes and make well-known to the students and faculty. Also, from its nature of accreditation of four-year program, the program shall have publicized the leaning outcomes before the program’s fourth year students at the time of evaluation have been admitted to the program in principle.

Also, Criterion 1 (2) provides in (a) to (i) the framework or category of knowledge and abilities which shall be included in the program’s own learning outcomes, and requires the program to specify its contents to establish distinctive and specific learning outcomes of the program. The reason why (a) to (i) are expressed in an abstractive way is the intention of not to prevent the diversity of the program, therefore, (a) to (i), as they stand, will not be the program’s learning outcomes but their specified contents will be the learning outcomes. It is not necessary to follow the categories of (a) to (i). It is preferred that the program

states them in relation with the educational purpose and principle of the each education institution. The benchmark to be achieved by the graduates at the time of completion of the program shall be specific to judge the degree of the achievement of students toward the learning outcomes and clear at the same time. The benchmark shall be established by taking account of the fact that the Engineering Education Programs at Bachelor Level is basically a fundamental education.

Criterion 1 (2), (a) to (i) is defined based on the following intention. Note that the (a) to (i) of the Criterion 1 (2) are listed in a order of important aspect as a human being first then the requirements of profession next. It does not mean that this order has nothing to do with the priority and the order of the education.

(a) An ability of multidimensional thinking with knowledge from global perspective

This item indicates education and ability to think required for the autonomous professionals who engage to build sustainable society, to change it from materialistic to one put emphasis on spiritual values and who are able to perform internationally. The program is expected to establish specific learning outcomes by referring to the following items as defined in Category-dependent Criteria.

- Knowledge of diverse culture and society of mankind as well as nature
- An ability to take action appropriately based on the mentioned above

(b) An ability of understanding of effects and impact of professional activities on society and nature, and of professionals' social responsibility

This item indicates engineers' ethics such as, relationship among engineering, society and nature, and understanding of professionals' social responsibility. The program is also encouraged to include understanding of engineering history. It is also acceptable for the program to educate relationship among engineering, society and nature of a specific field. It is important for the program to encourage the students preparing responsible judgments and actions required for the autonomous professionals and the program is required to provide the students with opportunities to think independently and understand practical ethics. The program is expected to establish specific learning outcomes by referring to the following items as defined in Category-dependent Criteria.

- Understanding of impact of technology of related engineering fields on public welfare
- Understanding of implication of technology of related engineering fields on environmental safety and sustainable development of society
- Understanding of engineering ethics
- An ability to take action based on the understanding mentioned above

(c) Knowledge of and ability to apply mathematics and natural sciences

This item does not only indicate acquisition of knowledge of natural sciences such as mathematics, physics, chemistry, and geology but also indicates an ability to actually apply. The program is expected to establish specific learning outcomes by referring to the following items as defined in Category-dependent Criteria.

- Knowledge of mathematics and natural sciences required in the related engineering fields
- An ability to apply including combining the knowledge mentioned above

(d) Knowledge of the related professional field, and ability to apply (include Items to be Considered by Field if defined any)

This item indicates acquisition of knowledge required in the specialized field and its ability to apply. The program is required to establish the learning outcomes including items to be considered by field defined in Category-dependent Criteria of applicable field. The program is also preferred to include an ability to set and identify problems and creativity. Taking account of these, the program is expected to establish specific learning outcomes by referring to the following items as defined in Category-dependent Criteria.

- Knowledge of the related engineering fields
- An ability to apply including combining the knowledge mentioned above
- An ability to utilize hardware and software required in the related engineering fields

(e) Design ability to respond to requirements of the society by utilizing various sciences, technologies and information

”Design” here indicates “Engineering Design”. It is not limited to drawing a plan, but refers to “the synthesis of various academic disciplines and technologies to pursue practicable solutions to a problem that does not necessarily have one correct answer”, and ability required for that is “design ability”. Design education is the most important characteristic of engineering education, and its subjects may be either hardware or software (including systems).

Engineering design ability in practice includes: conceptualize ideas; identify and formulate problems; comprehensively apply various disciplines and technologies; create ideas; identify issues from the view points of public health and safety, culture, economics, environment, ethics etc. and find solutions to the problem under these constraints; verify the results; demonstrate the ideas in drawings, sentences, equations, programs etc.; communicate with others; collaborate with others (team work); and continuously plan and implement as planned, and it is expected to perform all of those in a holistic manner; however, such ability for design encompasses such as a wide range of content and levels. With regard to item (e), the program is expected to establish specific learning outcomes by referring to the following items as defined in Category-dependent Criteria and taking

account of items to be considered by field such as, needs of society.

- An ability to recognize problems to be solved
- An ability to specify constraints from public welfare, environmental safety, and economy to be taking account of
- An ability to logically specify, organize, and analyze problems to be solved
- 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
- An ability to actually solve problems in accordance with the policies as planned

(f) Communication skills including logical writing, presentation and debating

This item indicates communication skills in a broad sense. Fundamental ability of communication in foreign languages is usually communication in English but not necessarily in English. Also, it doesn't require fluent conversational ability. It is acceptable if the graduates are able to communicate technical issues at least by taking certain training after the graduation.

Taking account of these, the program is expected to establish specific learning outcomes by referring to the following items as defined in Category-dependent Criteria.

- An ability to deliver information and opinion to the others
- An ability to understand information and opinion delivered by others
- An ability to exchange information and opinion by utilizing foreign languages such as English

(g) An ability of independent and life-long learning

In the constantly changing globalized and information-based society, an ability is needed to acquire new knowledge and appropriate information through independent and life-long learning. Therefore the program is required through lectures, undergraduate research, experiments, practical training, exercises and assignment to let students learn to get accustomed to independent and continuous leaning. Taking account of these, the program is expected to establish specific learning outcomes by referring to the following items as defined in Category-dependent Criteria.

- Understanding of necessity of continuous professional development to perform as a life-long engineer
- An ability to acquire necessary information and knowledge

(h) An ability to manage and accomplish tasks systematically under given constraints

This item indicates ability to autonomously manage tasks as planned and to accomplish on time. The program is expected to establish specific learning outcomes by referring to the following items as defined in Category-dependent Criteria.

- An ability to accomplish tasks systematically under given constraints including time and cost
- An ability to grasp the progress of the plan and modify it as required

(i) An ability to work in a team

This item indicates ability to collaboratively work with others including people from different fields. The program is expected to establish specific learning outcomes by referring to the following items as defined in Category-dependent Criteria.

- An ability to precisely judge and conduct own work during collaborative work
- An ability to appropriately judge what others should do and to address to others during collaborative work

Items to be evaluated under Criterion 1 is as follows:

1(1) [1]: The profile of the autonomous professionals which program intends to foster is defined,

1(1) [2]: The profile of the professionals shall take account of traditions, resources and fields of graduates,

1(1) [3]: The profile of the professionals shall be defined by giving consideration to the requirements of the society and the demands of the students,

1(1) [4]: The profile of the professionals shall be broadly publicized,

1(1) [5]: The profile of the professionals shall be made well-known to the students and faculty,

1(2) [1]: The program shall establish its learning outcomes that the graduates are supposed to surly acquire at the time of completion of the program by taking account of the profile of the autonomous professionals,

1(2) [2]: The learning outcomes shall be knowledge and abilities distinctively defined with benchmark covering the contents of (a) to (i) listed below:

1(2) [2] (a): An ability of multidimensional thinking with knowledge from global perspective,

1(2) [2] (b): An ability of understanding of effects and impact of professional activities on society and nature, and of professionals' social responsibility,

1(2) [2] (c): Knowledge of and ability to apply mathematics and natural sciences,

1(2) [2] (d): Knowledge of the related professional fields, and ability to apply,

1(2) [2] (e): Design ability to respond to the requirements of the society by utilizing various sciences, technologies and information,

1(2) [2] (f): Communication skills including logical writing, presentation and debating,

1(2) [2] (g): An ability of independent and life-long learning,

1(2) [2] (h): An ability to manage and accomplish tasks systematically under given constraints,

1(2) [2] (i): An ability to work in a team,

1(2) [3]: The learning outcomes shall be established with benchmark,

1(2) [4]: The learning outcomes shall be broadly publicized,

1(2) [5]: The learning outcomes shall be made well-known to the students and faculty.

2. Criterion 2

Criterion 2 Educational Methods

2.1 Curriculum Design

- (1) The program shall design the curriculum for students to achieve the learning outcomes. The curriculum shall be made well-known to the student and the faculty. The program shall clearly indicate relation of set of courses and the learning outcomes in the curriculum. Standardized course term and educational contents shall satisfy the items as defined in Category-dependent Criteria.
- (2) The program shall prepare the syllabus for each course in accordance with the curriculum. The syllabus shall be made well-known to the student and the faculty. For each course, the syllabus shall clearly describe its position in the curriculum, the educational components and methods, the learning outcomes and the evaluation methods and the evaluation criteria. The course hour shall be specified either in its syllabus or in related documents.

2.2 Implementation of Learning & Education

- (1) The program shall implement education as described in the syllabus.
- (2) The program shall encourage active learning of the students and shall commit to ensure sufficient self-learning hours for the students.
- (3) The program shall make students regularly review the degree of achievement for each learning outcome to reflect it to their learning.

2.3 Faculty

- (1) The education institution shall provide a sufficient number of faculty members to implement the curriculum with appropriate educational methods and to yield intended educational results, and shall provide the faculty with institutional support on education.
- (2) The education institution shall have communications network among faculty for close collaboration among courses set in the curriculum to obtain better educational results. The activities of the communications network shall be implemented.
- (3) The education institution shall promote Faculty Development (FD) to encourage the faculty's educational abilities. The system shall be made well-known to the faculty and FD activities shall take place in the program.
- (4) The education institution shall have a system to institutionally evaluate faculty's educational activities. The system shall be made well-known to the faculty. The system shall result in improving education.

2.4 Process of Admission

- (1) The program shall establish concrete admission policies and procedures in order to admit students with proper knowledge and abilities for the course curriculum designed to achieve the learning outcomes of the program. The program shall publicize the admission policies and procedures, and implement its admission in accordance with the policies and procedures.
- (2) In case the program consists of two tiers, the first of which is common to some number of programs, and the second of which is specific to the program, and the selective admission of students to the second tier takes place on their completion of the first tier, the education institution shall establish concrete admission policies and procedures for this selective admission. The policies and procedures shall be made well-known to the students and faculty. The students' selective admission shall be implemented in accordance with the policies and procedures.
- (3) In case the program admits students from other education institutions to transfer into the program, the program shall establish and publicize concrete policies and procedures for such transfer. The students' transfer shall be implemented in accordance with the policies and procedures.
- (4) In case the program allows students move between the courses within the education institution, the program shall establish concrete policies and procedures of moving in and out. The policies and procedures shall be made well-known to the students and faculty. The students' moving between the courses shall be implemented in accordance with the policies and procedures.

2.5 Educational Environment and Students Support

- (1) The education institution shall be equipped with classroom, laboratory, exercise room, library, information related equipment, self-learning and rest facilities, cafeteria, etc. necessary for the students to achieve the learning outcomes of the program. The program shall make efforts to ensure necessary financial resources to maintain, improve, and operate the educational environment.
- (2) The program shall have a system as for educational environment and for students' learning, such as to help students better understand lectures, and to enhance students' learning motivation, and to take account of the demands of the students on such support. The system shall be made well-known to the students, faculty and staff.

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Criterion 2 defines Educational Methods. Educational Methods here indicate curriculum or syllabus for students to achieve the learning outcomes, education institution and student

support system to implement its curriculum, and admission of the students who have necessary qualification required to take courses designed to be able to achieve the learning outcomes.

Criterion 2.1, Curriculum Design, is defined based on intention as follows:

2.1(1): This item defines curriculum. The curriculum shall be designed for students to be able to achieve the learning outcomes and shall be made well-known to the students and faculty. The curriculum shall also indicate clear relation of courses and learning outcomes.

The curriculum shall take account of knowledge and abilities of students to have at the time of admission. A good balance among lectures, exercises, experiments, lab courses, projects, drawing and undergraduate research as well as appropriate teaching methods for educational contents shall be elaborated. The program could give credits by combining relevant courses (e.g. PBL).

Relation among courses and the learning outcomes needs to be clearly indicated in the curriculum. However, each course is not required to directly link with individual learning outcome. One course could be credited to one learning outcome. Special lectures or undergraduate research could be linked with several learning outcomes. The program is required to establish system to indicate knowledge and abilities to be acquired through undergraduate research by clarifying the learning outcomes.

Category-dependent Criteria related with criterion 2.1(1) requires engineering education at bachelor level to be composed with four-year learning and education and more than 60% of mathematics, natural science and science & technology appropriate to the field. The way of indicating its "60%" could be based on either number of credit hours or course hours which the program finds easier to provide. Description of mathematics, natural science and science & technology appropriate to the fields are indicated in the Category-dependent Criteria as necessary.

2.1(2): This item defines syllabus. It indicates the program shall prepare the syllabus for each course in accordance with the curriculum and shall be made well-known to the students and the faculty.

The syllabus shall clearly describe its position in the curriculum. The educational components & methods of each course, the learning outcomes and the evaluation methods & criteria shall be indicated. The educational components, the methods & criteria to evaluate academic records shall be defined by giving consideration to the requirements of the society with benchmark. The course hour shall be specified either in its syllabus or in related documents.

Criterion 2.2, Implementation of Learning & Education is defined based on intention as follows:

2.2(1): This item requires the program to implement education as described in the syllabus. It is important that the program encourages active learning of the students. Therefore, it is allowed to implement education by making appropriate changes in the contents of course described in the syllabus taking consideration of the degree of student understanding.

2.2(2): This item encourages the program commitment to ensure sufficient self-learning hours, namely, implementation of educational activities in accordance with concept of system of credit hour. Active learning (self-learning hours) is required to earn the credit hours of the course subjects other than course house so that the program shall encourage active learning and ensure sufficient self-learning hours for the students.

To be concrete, this encourages diversified institution-oriented measures on education in accordance with concept of system of credit hours. For example, institutional guidance to encourage active learning and commitment to ensure sufficient self-learning hours, institutionalization of homework assignments for lecture course, clarification and institutional guidance of necessary hours of preview and review on syllabus, grading based on the result of self-learning of the students, establishment of the maximum number of courses for registration, utilization of GPA (Grade Point Average), locating self-learning facilities which are available at night and the combination of all of those measures.

2.2(3): This item defines the degree of achievement for each learning outcome by the students. Namely, it indicates the program to make students regularly review the degree of achievement for each learning outcome and to reflect it to their learning.

Criterion 2.3, Faculty, is defined based on intention as follows:

2.3(1): This item defines faculty allocation and institutional support on education for the faculty. Namely, the education institution shall provide a sufficient number of faculty members to implement the curriculum with appropriate educational methods, shall yield intended educational results, and shall provide the faculty with institutional support on education.

Allocation of the faculty is fundamental of the education institution, therefore, shall be independently determine by education institution. The number of faculty stipulated in the National Standards for Establishment of Universities and College of Technology shall be considered as a minimum requirement to provide faculty allocation and institutional support on education. Faculty and institutional supports on education appropriate to the field are indicated in Category-dependent Criteria if necessary.

2.3(2): This item defines communication network among faculty. Namely, the education institution shall have communication network among the faculty for close collaboration among the courses set in the curriculum to obtain better educational results. The communication network shall be made well-known to the faculty. The activities of the communication network shall be implemented.

2.3(3): This item defines system to promote Faculty Development (FD). Namely, the education institution shall promote Faculty Development (FD) to encourage the faculty's educational abilities. The system shall be made well-known to the faculty and FD activities shall take place in the program effectively. Additionally, the system shall include measure to support and encourage faculty's individual educational abilities.

2.3(4): This item defines institutional evaluation on faculty's educational activities. Namely, the education institution shall have a method to institutionally evaluate faculty's educational activities. The method shall be made well-known to the faculty and the evaluation shall be implemented by taking account of the method.

The aim of evaluation on faculty's educational activities is to promote faculty's willingness toward educational activities and broadly facilitate better education. It intends to duly evaluate faculty's educational activities as performance, at the same time, broadly disseminate to other faculty, through promoting FD activities, faculty's innovations and efforts made as a basis of evaluated activities.

Criterion 2.4, Process of Admission, is defined based on intention as follows:

2.4(1): This item defines admission policies and procedures of the students. The program shall establish concrete admission policies and procedures in order to admit students with proper knowledge and abilities for the course curriculum designed to achieve the learning outcomes of the program. The program shall publicize the admission policies and procedures, and implement its admission in accordance with the policies and procedures.

The curriculum of the college of technology which is a four-year education consisting of fourth and fifth year of regular course and first and second year of advanced course is subject to JABEE accreditation. Taking account of the fact that the first to the third year of regular course fosters fundamental knowledge and abilities with which the students are able to learn education from the fourth year, the admission of a technical college is made at the first year of regular course.

2.4(2): This item defines the selection of students during the middle of curriculum. Namely,

For the case of program consisting of two tiers, the first of which is common to some number of programs, the second of which is specific to the program, and the selective admission of students to the second tier takes place on their completion of the first tier, the education institution shall establish concrete admission policies and procedures for this selective admission. The policies and procedures shall be made well-known to the students and the faculty. The students' selective admission shall be implemented in accordance with the policies and procedures.

In principle, the students of the program shall be determined, at the latest, sometime between the admission and the beginning of first semester of third year. The list of students shall be always available for verification. For the case of college of technology, the students of program are assumed to be determined at the admission of advanced course. Therefore, specific methods of selection shall be defined, made well-known to the students and the faculty, and implemented in accordance with its decision.

2.4(3): This item defines the case of program admitting students to transfer from other education institutions into the program. The program shall broadly publicize the policies and procedures. The students' transfer shall be implemented in accordance with the policies and procedures. For the case of the college of technology, if the program has a transfer system regardless in regular course (including first to third year of education) or in advanced course, this item shall be applied. Namely, the program shall establish and publicize concrete policies and procedures for admission of such transfers.

2.4(4): This item defines the case of program allowing students to move between the courses within the education institution. Namely, the program shall establish concrete policies and procedures of move between the courses if the program allows the students to move into the other program before completing the program. The policies and procedures shall be made well-known to the students and the faculty. The students' moving between the courses shall be implemented in accordance with the policies and procedures.

This item intends a proper implementation of students' moving between the courses within the education institution in accordance with policies. The contents of its rules and appropriateness of operation shall be focused at the evaluation of accreditation. Appropriateness of operation means that the number of students moving between the courses does not exceed appropriate range. Therefore, if a large number of students move between the courses, the program would have been differently operated from its original setting as mentioned in "Guide for Preamble" and it is most probable that the program has critical problems on student admission and education methods.

Criterion 2.5 Educational Environment and Student Support, is defined based on intention as follows:

2.5(1): This item defines institution's effort to ensure the facilities, equipments and financial resources. Namely, the education institution shall be equipped with classrooms, laboratories, exercise rooms, libraries, information related equipment, self-learning and rest facilities, cafeteria, etc. necessary for the students to achieve the learning outcomes of the program. The program shall make efforts to ensure necessary financial resources to maintain, improve, and operate the educational environment.

In terms of facilities and equipments, the important point is that the students can carry out experiments in appropriate space and safely. In terms of appropriate space the National Standards for Establishment of Universities could be a reference.

2.5(2): This item defines the student support system. Namely, the program shall have a system as for educational environment and for students' learning, such as to help students better understand lectures, and to enhance students' learning motivation, and to take account of the demands of the students for such supports. The system shall be made well-known to the students, faculty and staff. The activities shall be implemented in accordance with the system.

Items to be evaluated under Criterion 2 are as follows:

- 2.1(1)[1]: The curriculum is designed for students to be able to achieve the learning outcomes of the program.
- 2.1(1)[2]: The curriculum is made well-known to the students and the faculty.
- 2.1(1)[3]: Relation of set of courses and the learning outcomes are clearly indicated in the curriculum.
- 2.1(1)[4]: Standard years required for graduation and educational contents to meet items as defined in Category-dependent Criteria.
- 2.1(2)[1]: The program to prepare the syllabus for each course in accordance with the curriculum.
- 2.1(2)[2]: The syllabus is made well-known to the students and the faculty.
- 2.1(2)[3]: For each course, the syllabus clearly describes its position in the curriculum and the educational components & methods, the learning outcomes and the evaluation methods & criteria are indicated.
- 2.1(2)[4]: The program to specify the course hour either in its syllabus or in related documents.
- 2.2(1): The program to implement education as described in the syllabus.

- 2.2(2): The program commitment to ensure encouragement of sufficient self-learning hours, namely, educational activities are implementation in accordance with concept of system of credit hour.
- 2.2(3)[1]: The program to make students regularly review the degree of achievement for each learning outcome and to reflect it to their learning.
- 2.2(3)[2]: The program to make students to reflect its to their learning.
- 2.3(1): The education institution to provide a sufficient number of faculty members to implement the curriculum with appropriate educational methods, to yield intended educational results, and to provide the faculty with institutional support on education.
- 2.3(2)[1]: The education institution to have communication network among the faculty for close collaboration among the courses set in the curriculum to obtain better educational results.
- 2.3(2)[2]: The program to implement its activities based on its communications network.
- 2.3(3)[1]: Education institution to have promotion system for Faculty Development (FD) to encourage the faculty's educational abilities.
- 2.3(3)[2]: The system is made well-known to the faculty.
- 2.3(3)[3]: FD activities are taken place in the program.
- 2.3(4)[1]: The education institution to have a method to institutionally evaluate faculty's educational activities.
- 2.3(4)[2]: The program to make its method well-known to the faculty.
- 2.3(4)[3]: Educational activities to result in improving education are implemented in accordance with the method.
- 2.4(1)[1]: The program to establish concrete admission policies and procedures in order to admit students with proper knowledge and abilities for the course curriculum designed to achieve the learning outcomes of the program.
- 2.4(1)[2]: The program to publicize Its admission policies and procedures.
- 2.4(1)[3]: The program to implement its admission in accordance with its policies and procedures.
- 2.4(2)[1]: The education institution to establish concrete admission policies and procedures for the selective admission for the case of program consisting of two tiers, the first of which is common to some number of programs, the second of which is specific to the program, and the selective admission of students to the second tier takes place on their completion of the first tier.
- 2.4(2)[2]: The program to make its policies and procedures well-known to the students and the faculty.

- 2.4(2)[3]: The program to implement students' selective admission in accordance with its policies and procedures.
- 2.4(3)[1]: The program to define the case if admitting students to transfer from other education institutions into the program.
- 2.4(3)[2]: The program to make its policies and procedures for student's transfer well-known to the students and faculty.
- 2.4(3)[3]: The program to implement its students' transfer in accordance with its policies and procedures.
- 2.4(4)[1]: The program to establish concrete policies and procedures of move between the courses if the program allows the students to move into the other program before completing the program.
- 2.4(4)[2]: The program make its policies and procedures well-known to the students and the faculty.
- 2.4(4)[3]: The program to implement its students' moving between the courses in accordance with the policies and procedures.
- 2.5(1)[1]: The education institution to equipped with classrooms, laboratories, exercise rooms, libraries, information related equipment, self-learning and rest facilities, cafeteria, etc. necessary for the students to achieve the learning outcomes of the program.
- 2.5(1)[2]: The program to make efforts to ensure necessary financial resources to maintain, improve, and operate the educational environment.
- 2.5(2)[1]: The program to have a system as for educational environment and for students' learning, such as to help students better understand lectures, and to enhance students' learning motivation, and to take account of the demands of the students for such supports.
- 2.5(2)[2]: The program make its system well-known to the students, faculty and staff.
- 2.5(2)[3]: The program implement the activities in accordance with its system.

3. Criterion 3

Criterion 3 Achievement of Learning Outcomes

- (1) The program shall evaluate, on each course, the degree of achievement of the learning outcomes for each student in accordance with the evaluation criteria and methods defined in the syllabus.
- (2) The program shall have evaluation methods for credits, which the students have earned in other higher education institutions and the credit transfer shall be accepted in accordance with the defined evaluation methods. The program shall also have evaluation methods for credits earned by the transferred students in the previous education institutions and the credit transfer shall be accepted in accordance with defined evaluation methods.
- (3) The program shall provide evaluation criteria and methods to holistically evaluate the degree of achievement of each learning outcome of the program. The evaluation shall be made in accordance with the evaluation criteria and methods.
- (4) All the graduates of the program shall have achieved all the learning outcomes of the program.
- (5) By achieving all the learning outcomes of the program, all the graduates of the program shall have acquired the contents of (a) to (i) of Criteria 1(2).

[Guide]

Criterion 3 defines the achievement of the learning outcomes of the program (Concretized form of criterion 1(2) (a) to (i)). The achievement of the learning outcomes (including its benchmark), which the program assures, is evaluated whether it is appropriately ensured.

The program is required to prove that all the graduates of the program have achieved all learning outcomes established by the program. The development of method of indicating proof and the establishment of benchmark are fully under the responsibility for the program as is the case for the development of educational methods. It is also expected to be appropriate from the point of view of the third-party. It is required for program to have preexisting graduates, records of evaluation on those graduates and evidential documents to indicate all the graduates of the program have achieved the learning outcomes. The evidential documents (e.g. answer sheets, reports) of students who lay on the boundary of passing or failing relating to benchmark judgment on achievement of learning outcomes is specifically important.

If there is no graduate of the program yet, the program shall have substantial graduates at least. In such a case, the degree of achievement of the learning outcomes by the

substantial graduates shall be the scope of evaluation. Substantial graduates here indicate students who have already graduated from the program applying to be accredited with equivalent curriculum and have acquired 70 to 80% of level of knowledge and abilities required to complete the program.

Criterion 3 is defined based on intention as follows:

3.1: This item defines the achievement of the learning outcomes for each course. Namely, the program shall evaluate, on each course, the degree of achievement of the learning outcomes for each student in accordance with the evaluation criteria and methods defined in the syllabus. Also, the program shall take account of benchmark of evaluation criteria and method defined in the syllabus from the perspective on evaluation for degree of achievement of the learning outcomes.

3(2): This item defines the handling of credits, which the students have earned in other higher education institutions. Namely, the program shall define evaluation methods for credits, which the students have earned in other higher education institutions, for credits which the transferred students have earned in the previous education institutions as the results of external evaluations if the program recognizes credit transfer of the courses required to complete the program. The credit transfer shall be accepted in accordance with defined evaluation methods.

3(3): This item defines the assurance of achievement of the learning outcomes established by the program. Namely, the program shall provide evaluation criteria and methods to holistically evaluate the degree of achievement of each learning outcome of the program. The evaluation shall be implemented in accordance with the evaluation criteria and methods.

Evaluation methods to holistically evaluate the degree of achievement of each learning outcome of the program indicates as follows. If the learning outcomes are established appropriately (Criterion 1(2)), and curriculum is holistically designed for students to be able to achieve (Criterion 2.1(1)), by achieving courses allocated for each learning outcome, students shall be able to achieve its learning outcome (Criterion 3(1)). If giving consideration on relevancy of Criterion 1, 2 and 3 and the educational process is implemented appropriately, simply by comprehending the result of evaluation on each course, each learning outcome could be achieved. Other than that, there are various ways of evaluation methods based on learning outcome such as prioritize each course (a compulsory course and elective course, lectures and experiments etc.), evaluate

comprehensively by taking account of result of external evaluations, implement evaluation of comprehensive degree of achievement of learning outcome which intend to improve education.

3(4): This item defines the assurance of achievement of the learning outcomes by all the graduates of the program. Namely, the program shall have a system to review whether all learning outcomes have been achieved by all the graduates of the program. Judgment of program completion shall be made based on its result.

3(5): This item requires by achieving all the learning outcomes of the program, that all the graduates of the program shall have acquired the contents of (a) to (i) of Criteria 1(2) with appropriate benchmark. Specifically, it is necessary for the program to indicate the assurance of sufficient degree of achievement for all the items when organizing knowledge and abilities to be assured by achieving the learning outcomes in accordance with (a) to (i) of criterion 1(2) individually.

As mentioned above, criterion 3 is defined by intending relevancy of “achievement of each learning outcomes”, “achievement of those learning outcomes as comprehension”, and “achievement of its learning outcomes by all the graduates of the program”.

Items to be evaluated under Criterion 3 are as follows:

3(1): The program to evaluate the degree of achievement of the learning outcomes on each course in accordance with the evaluation criteria and methods defined in the syllabus.

3(2)[1]: The program to define evaluation methods for credits, which the students have earned in other higher education institutions.

3(2)[2]: The program to accept credit transfer in accordance with its evaluation methods.

3(2)[3]: The program to define evaluation methods for credits which the transferred students have earned in the previous education institutions.

3(2)[4]: The program to accept credit transfer in accordance with its evaluation methods.

3(3)[1]: The program to provide evaluation criteria and methods to holistically evaluate the degree of achievement of each learning outcome of the program.

3(3)[2]: The program to implement evaluation in accordance with its evaluation criteria and methods.

3(4): All the graduates of the program to achieve all the learning outcomes of the program.

3(5): All the graduates of the program to acquire the contents of (a) to (i) of Criteria 1(2)

with appropriate benchmark by achieving all the learning outcomes of the program.

4. Criterion 4

Criterion 4 Educational Improvement

4.1 Self-review of Education

- (1) The program shall have a self-review system of educational activities in accordance with Criteria 1 to 3 on the basis of evaluation results of the degree of achievement of the learning outcomes. The self-review system shall be made well-known to the faculty. The self-review shall be implemented in accordance with the system.
- (2) The system shall include structure to take account of the requirements of the society and the demands of the students. The system itself shall have self-checking structure.
- (3) The minutes of meetings and committees relating to the system shall be accessible to the faculty. Records of any meetings relating to the system shall be accessible to the faculty.

4.2 Continuous Improvement

The program shall have a system to continuously improve its educational activities based on the self-review results. The activities for continuous improvement shall be implemented in accordance with the system.

[Guide]

Criterion 4 defines the educational improvement. Evaluation focuses on self-review system of education, system for continuous improvement based on its self-review system of education and implementation of its relevant activities. The scope of self-review and improvement here include all educational process and environment from admission to graduation.

Criterion 4 is defined based on intention as follows:

4.1(1): This item defines the self-review system of education. Namely, the program shall have a self-review system of educational activities in accordance with Criteria 1 to 3 on the basis of evaluation results of the degree of achievement of the learning outcomes. The self-review system shall be made well-known to the faculty. The self-review shall be implemented in accordance with the system.

4.1(2): This item defines the conditions of the self-review system of educational activities. Namely, the system shall include a structure to take account of the requirements of the society and the demands of the students. The system itself shall have a self-checking structure.

4.1(3): This item defines the accessibility of records relating to the self-review system of education. Namely, minutes of meetings and committees relating to the system to review the educational activities shall be accessible to the faculty.

Criterion 4.2, continuous improvement is defined based on intention as follows:

4.2: This item defines the system of continuous improvement and intends educational activities of the program to be continuously improved through evaluation activities for the accreditation. Also, its improvement shall be used for the improvement on achievement of the learning outcomes of the students.

Items to be evaluated under Criterion 4 are as follows:

4.1(1)[1]: The program to have a self-review system of educational activities in accordance with Criteria 1 to 3 on the basis of evaluation results of the degree of achievement of the learning outcomes.

4.1(1)[2]: The program to make self-review system well-known to the faculty.

4.1(1)[3]: The program to implement self-review in accordance with the system.

4.1(2)[1]: The self-review system to include a structure to take account of the requirements of the society and the demands of the students.

4.1(2)[2]: The system itself to have a self-checking structure.

4.1(3): The program to make the record of minutes of meetings and committees relating to the system to review the educational activities accessible to the faculty.

4.2[1]: The program to have a system to continuously improve educational activities of the program through evaluation activities based on the result of self-review system of education.

4.2[2]: The program to implement activities in accordance with its relating system.

Items to be Considered by Field

To apply Common Criteria to the program, supplementary items required by field could be provided separately in Category-dependent Criteria.

[Guide]

Items to be Considered by Field are defined in the Category-dependent Criteria in application and interpretation of Common Criteria if field-oriented interpretation or supplementary explanation are required for specific field. Items to be Considered by Field are not defined for fields which do not require them. Items to be Considered by Field shall be considered as supplementary at the evaluation based on mandatory items regarding Common Criteria and Category of Accreditation of Engineering Education at bachelor level. Items to be Considered by field are not independent items to be evaluated.