ABET Accreditation: Overview

Understanding What, Why and How

Association of Thai Professionals in America and Canada

Goals of the Workshop

- To provide an overview of the TABEE/ABET Accreditation system and process to set in motion the preparation for a successful TABEE/ABET Accreditation effort
- To help initiate the preparation of the Self Study Report (SSR) by focusing on
  1. The development of Program Educational Objectives (PEOs) along with the plan and process for periodic review of PEOs
  2. Selection of instruments for assessing Student Outcomes (SOs) along with the development of data collection plan
- To demonstrate how to perform an actual assessment and evaluation of SOs using data collected
- To use results of SOs assessment/evaluation to develop an action plan for Continuous Improvement
- To learn how to prepare the remaining parts of SSR: Criterion 1 Students; Criterion 5 Curriculum; Criterion 6 Faculty; Criterion 7 Facilities; Criterion 8 Institutional Support; and Program Criteria (if any)
- To learn how to prepare for the actual site visit by the ABET PEV team

Why US Institutions need to have ABET Accreditation?

- Recruiting tools:

  Non-ABET accredited schools cannot compete in recruiting top-class students

- International standards of Quality Assurance:
  - Graduates are well-qualified to enter the global workforce or graduate schools anywhere in the world
  - Schools are global (rather than just local) and are competitive in global recruiting
- Eligibility for Federal grants:

  Non-ABET accredited schools do not qualify for key federal grants

Why should Engineering Programs In Thailand have ABET Accreditation?

- International standards of Quality Assurance:
  - Graduates are well-qualified to enter the global workforce or graduate schools anywhere in the world
  - Schools are global (rather than just local) and are competitive in global recruiting

- Increase competitiveness internationally
  - Many Engineering programs in ASEAN countries are **ABET-Accredited** (Vietnam Taiwan, Indonesia, etc.)

ABET and the Washington Accord

Mutual Recognition Agreements (MRAs), often known as "accords," are non-governmental agreements among organizations that accredit academic degree programs.

These agreements recognize the *substantial equivalency* of participating organizations' accreditation processes and their graduates' preparedness to begin professional practice at the entry level.

Substantial equivalency means that the accreditation systems have comparable standards, outcomes, and processes, even though they may not be identical.

We are a signatory to five MRAs:

- The multilateral **Seoul Accord** (for computing programs)
- The **bilateral agreement between Engineers Canada and ABET** (for engineering programs)
- The multilateral **Washington Accord** (for engineering programs)
- The multilateral **Sydney Accord** (for bachelor degree-level engineering technology programs)
- The multilateral **Dublin Accord** (for associate degree-level engineering technician programs)

ABET and the Washington Accord

- The Washington Accord is a mutual recognition agreement (MRA) which pertains to engineering programs accredited by its signatories in their jurisdictions since 1989. Signatories to the Washington Accord are organizations responsible for accrediting engineering programs in Australia, Canada, Chinese Taipei, Hong Kong, Ireland, Japan, Korea, Malaysia, New Zealand, Singapore, South Africa, Turkey, the United Kingdom, and the United States.

- The Washington Accord assists in determining if an engineering program in one signatory's jurisdiction is recognized for purposes of licensure and registration, employment, or admission to graduate school in another jurisdiction.

JURISDICTION

- The Washington Accord only recognizes engineering programs accredited within the signatories' own jurisdictions. Signatories to the Washington Accord may accredit programs outside of their jurisdiction, but only those programs accredited within their jurisdictions are recognized by the Accord. For example, although we accredit programs in countries outside of the U.S., the Washington Accord recognizes only ABET-accredited programs within the U.S.

The ABET Accreditation Process

The entire process takes typically 20 months.

Year 1:

January: Institution requests to ABET

June: Team of PEVs is assigned to the institution

July: SSRs are sent to the PEV team

Fall: * Between September and December.

* Each program will:
  - Receive a statement of preliminary findings written by the respective PEV at the exit meeting.
  - Have **two weeks** to make any corrections of fact

December: Team chair develops a Draft Statement from the material written by the PEVs and adding material that applies to the institution as a whole.

Draft Statement is reviewed by two editors from EAC and by ABET staff for adherence to standards and consistency.

The ABET Accreditation Process

Year 2:

January: The edited Draft Statement is sent to the institution, which has 30 days to respond.

February: Response to the Draft Statement is sent to the chair of the PEV team

March-June: Team chair uses the response from the institution, with assistance from the PEV as needed, to prepare the Final Statement, which again is edited and then provided to the full Commission for action.

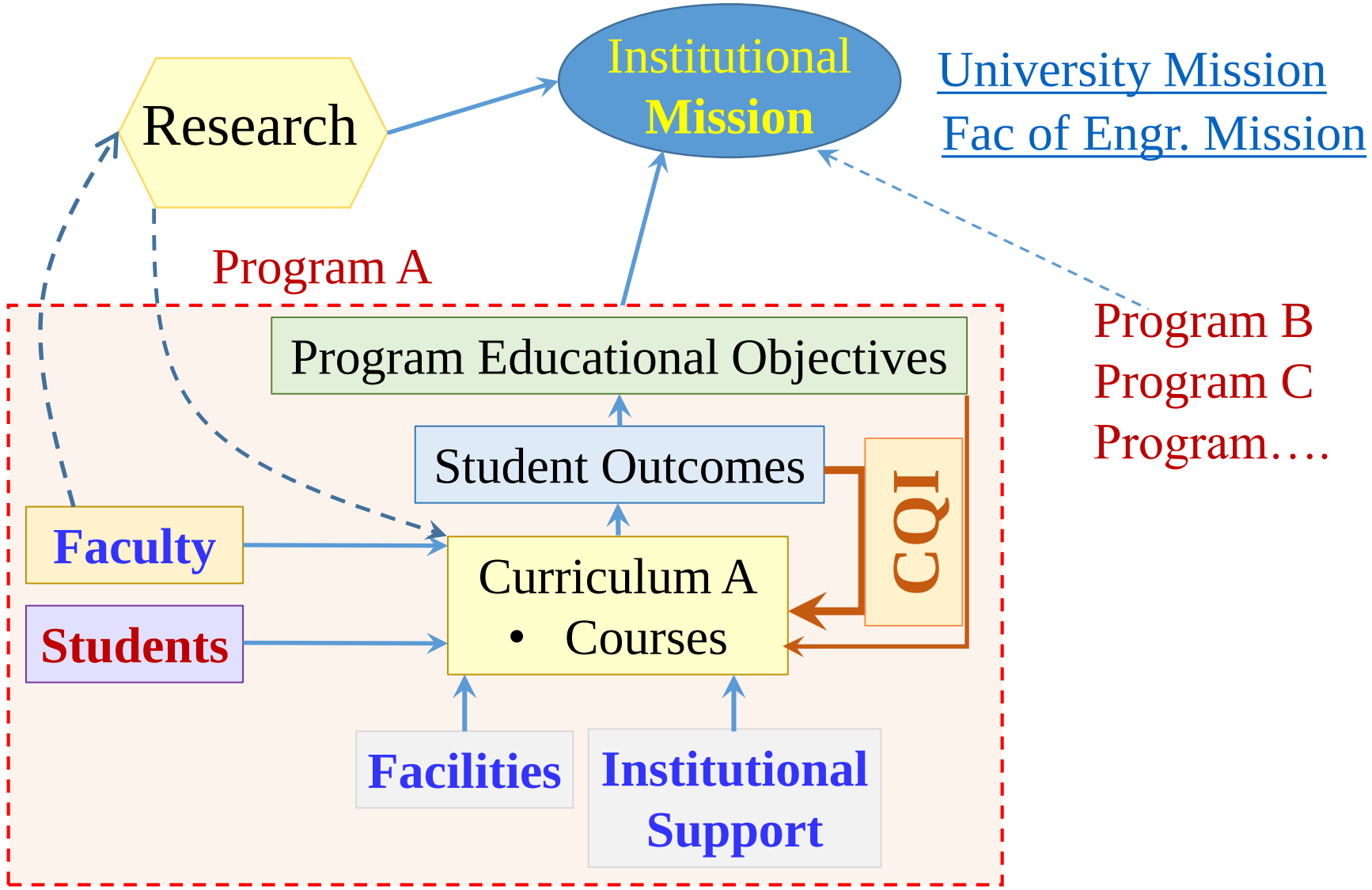
July: Final accreditation decisions are made at the Summer Commission Meeting in July of the second year.

August: ABET notifies the institution of the final accreditation action

What to DO to Prepare for ABET

1. Make a request to ABET
2. **Prepare Self-Study Report and all supporting documents**
3. Host mock visit by Mock Program Evaluators (Mock PEVs)
4. **Host actual site visit by ABET PEVs**
5. Respond to Exit Statement and Draft statement within the given time frames
6. Wait for the verdict

The Underlying Premise



The Underlying Premise

A good undergraduate engineering degree program must

- produce graduates who are well-equipped and ready to enter the job market in their chosen fields and who will continue to grow and be successful in their life-long careers.
- Have program educational objectives that are consistent with the institution and serve the needs of constituencies.
- Have curriculum that include (1) **minimum requirements on basic sciences and math (30 credits),** and (2) **major design experience**
- Continually assess student outcomes (knowledge and skills students have acquired at the time of graduation) and use the results to continually make improvement on the structure, content, and delivery of the curriculum

Source: ABET

What does it take to get an ABET Accreditation?

To demonstrate COMPLIANCE with the following criteria

General Criteria

Criterion 1: STUDENTS
Criterion 2: PROGRAM EDUCATIONAL OBJECTIVES
Criterion 3: STUDENT OUTCOMES
Criterion 4: CONTINUOUS (QUALITY) IMPROVEMENT
Criterion 5: CURRICULUM
Criterion 6: FACULTY
Criterion 7: FACILITIES
Criterion 8: INSTITUTIONAL SUPPORT

Program Criteria

- Developed specifically for individual programs by their respective professional associations/societies
- Some programs do not have any

Key Features of ABET system

- **Outcome-based** (goal-driven not input-driven)
- **Emphasis on the establishment, maintenance and documentation of well-defined processes** (including procedures, steps, and timing) to
  - Develop PEOs and SOs
  - Periodically Review and Update PEOs
  - Assess and Evaluate SOs
  - Use SOs evaluation results (and periodic review of PEOs) to do CQI
- Curriculum requirements that include **(1) minimum requirements on basic sciences and math (30 credits),** and (2) **major design experience**

Three Key Steps to Prepare for ABET

1. Make sure that Curriculum is in compliance with ABET Criterion 5
2. Prepare Self-Study Report and all supporting documents
3. **Prepare for and Host the actual site visit by ABET PEVs**

First Step:
Critical Compliance with Criterion 5: Curriculum

(a) one academic year of a combination of college-level mathematics and basic sciences appropriate to the program. (the lesser of 25% of total credits or **30 credits**)

(b) one and one-half academic years of engineering sciences and engineering design appropriate to the program and utilizing modern engineering tools.

(c) a broad education component that includes humanities and social sciences, complements the technical content of the curriculum, and is consistent with the program educational objectives.

(d) Students must be prepared to enter the professional practice of engineering through a curriculum culminating in a major design experience based on the knowledge and skills acquired in earlier course work and incorporating appropriate engineering standards and multiple realistic constraints.

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First Step:
Critical Compliance with Criterion 5: Curriculum

Course (Department, Number, Title) List all courses in the program by term starting with the first term of the first year and ending with the last term of the final year.	Indicate Whether Course is Required, Elective or a Selected Elective by an R, an E or an SE.[1]	Subject Area (Credit Hours)			Last Two Terms the Course was Offered: Year and, Semester, or Quarter	Maximum Section Enrollment for the Last Two Terms the Course was Offered[2]
		Math & Basic Sciences	Engineering Topics Check if Contains Significant Design (√)	Other		
1st Year/1st Semester						
010013016 Engineering Drawing	R		3		1/2018 1/2017	
010013017 Computer Programming	R		3		1/2018 1/2017	
040113001 Chemistry for Engineers	R	3			1/2018 1/2017	
040113002 Chemistry Laboratory for Engineers	R	1			1/2018 1/2017	
040203111 Engineering Mathematics I	R	3			1/2018 1/2017	
040313005 Physics I	R	3			1/2018 1/2017	
040313006 Physics Laboratory I	R	1			1/2018 1/2017	
Language Elective Course	E			3	1/2018 1/2017	
Physical Education Elective Course	E			1	1/2018 1/2017	
1st Year/2nd Semester						
010013402 Engineering Thermodynamics	R		3		2/2018 2/2017	
010213525 Engineering Materials	R		3		2/2018 2/2017	
040203112 Engineering Mathematics II	R	3			2/2018 2/2017	
040313007 Physics II	R	3			2/2018 2/2017	
040313008 Physics Laboratory II	R	1			2/2018 2/2017	
Language Elective Course	E			3	2/2018 2/2017	
Humanities Elective Course	E			3	2/2018 2/2017	
Physical Education Elective Course	E			1	2/2018 2/2017	
1st Year/Summer Semester						
030103200 Machine Tools Practice	R		2		Summer/2018 Summer/2017	

First Step:
Critical Compliance with Criterion 5: Curriculum

2nd Year/1st Semester						
010013121 Engineering Mechanics	R		3		1/2018 1/2017	
010113851 Basic Electrical Engineering	R		3		1/2018 1/2017	
010113852 Basic Electrical Laboratory	R		1		1/2018 1/2017	
010213410 Manufacturing Processes	R		3		1/2018 1/2017	
040203211 Engineering Mathematics III	R	3			1/2018 1/2017	
040503011 Statistics for Engineering and Scientists	R	3			1/2018 1/2017	
Language Elective Course	E			3	1/2018 1/2017	
2nd Year/2nd Semester						
Computer – aided Design 010913120	R		3		2/2018 2/2017	
010913121 Maintenance Engineering	R		3		2/2018 2/2017	
010913122 Solid Mechanics with Stress Simulation of Parts	R		3(√)		2/2018	
Science and Mathematics Elective Course	E			3	2/2018 2/2017	
Language Elective Course	E			3	2/2018 2/2017	
Social Sciences Elective Course	E			3	2/2018 2/2017	
3rd Year/1st Semester						
010913230 Industrial Work Study	R		3		1/2018 1/2017	
010913430 Engineering Economy	R		3		1/2018 1/2017	
010913530 Operations Research	R		3		1/2018 1/2017	
010913531 Production Planning and Control	R		3(√)		1/2018 1/2017	
Industrial Engineering Elective Course	E			3	1/2018 1/2017	
Language Elective Course	E			3	1/2018 1/2017	
3rd Year/2nd Semester						

First Step:
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010913231 Safety Engineering	R		3		2/2018 2/2017	
010913330 Quality Control	R		3		2/2018 2/2017	
010913331 Applied Statistics for Engineers	R	3 (√)			2/2018 2/2017	
010913630 Industrial Plant Design	R		3		2/2018 2/2017	
Industrial Engineering Elective Course	E			3	2/2018 2/2017	
Free Elective Course	E			3	2/2018 2/2017	
3rd Year/Summer Semester						
010913631 Training	R		280 hrs.		Summer/2018 Summer/2017	
4th Year/1st Semester						
010913440 Industrial Cost Analysis and Budgeting	R		3		1/2018 1/2017	
010913641 Industrial Engineering Project I	R		3(√)		1/2018 1/2017	
010913644 Industrial Engineering Laboratory	R		1(√)		1/2018 1/2017	
Industrial Engineering Elective Course	E			6	1/2018 1/2017	
Free Elective Course	E			3	1/2018 1/2017	
4th Year/2nd Semester						
010013921 Mechanical Engineering Laboratory I	R		2		2/2018 2/2017	
010813901 Ethics for Profession	R			1	2/2018 2/2017	
010913642 Industrial Engineering Project II	R		3(√)		2/2018 2/2017	
Industrial Engineering Elective Course	E			6	2/2018 2/2017	
Sciences and Math Elective Course	E			3	2/2018 2/2017	
TOTALS (in terms of semester credit hours)		27	69	54		

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		Math & Basic Sciences	Engineering Topics Check if Contains Significant Design (√)	General Education	Other		
1st year student							
Semester 1							
CHM 103 Fundamental Chemistry	R	3				1	-
CHM 160 Chemistry Laboratory	R	1				1	-
GEN 111 Man and Ethics of Living	R			3		1	-
LNG 101 General English	R			3		1	-
MEE 111 Engineering Drawing	R		3			1	-
MTH 101 Mathematics I	R	3				1	-
PHY 103 General Physics for Engineering Student I	R	3				1	-
PHY 191 General Physics Laboratory I	R	1				1	-
Semester 2							
EEE 110 Electric Circuits	R		3			2	-
GEN 121 Learning and Problem Solving Skills	R			3		2	-
LNG 102 Technical English	R			3		2	-
MEN 111 Engineering Materials	R		3			2	-
MTH 102 Mathematics II	R	3				2	-
PHY 104 General Physics for Engineering Student II	R	3				2	-
PHY 192 General Physics Laboratory II	R	1				2	-
2nd year student							

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		Math & Basic Sciences	Engineering Topics Check if Contains Significant Design (√)	General Education	Other		
Semester 1							
EEE 260 Electrical Instruments and Measurements	R		3			1	1
EEE xxx Electrical Engineering Elective 1	E		3			1	1
GEN 101 Physical Education	R			1		1	-
GEN 231 Miracle of Thinking	R			3		1	-
LNG 103 English for Workplace Communication	R			3		1	-
MEE 214 Engineering Mechanics	R		3			1	-
MTH 201 Mathematics III	R	3				1	-
Semester 2							
EEE 112 Computer Programming for Electrical Engineers	R		3			2	1
EEE 190 Electrical Practice	R		1			2	1
EEE 220 Electrical Machines I	R		3			2	1
EEE 270 Electronics Engineering	R		3			2	1
EEE 322 Electrical System Design	R		3			2	1
GEN 241 Beauty of Life	R			3		2	-
PRE 290 Industrial Organization and Management	R		3			2	-
3rd year student							
Semester 1							
EEE 291 Fundamental Electrical Engineering Laboratory I	R		1			1	1
EEE 321 Electrical Machines II	R		3			1	1

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		Math & Basic Sciences	Engineering Topics Check if Contains Significant Design (√)	General Education	Other		
EEE 330 Power Generation, Transmission and Distribution Systems	R		3			1	1
EEE 372 Power Electronics	R		3			1	1
EEE 380 Control Systems	R		3			1	1
EEE xxx Electrical Engineering Elective 2	E		3			1	1
MEE 428 Thermal Sciences	R		3			1	-
Semester 2							
EEE 331 Electric Power Systems Analysis	R		3			2	1
EEE 332 Electrical System Design	R		3			2	1
EEE 391 Electrical Engineering Drawing	R		1			2	1
EEE 392 Fundamental Electrical Engineering Laboratory II	R		1			2	1
EEE 397 Seminar and Electrical Engineering Mini Project I	R		1			2	1
EEE 450 High Voltage Engineering	R		3			2	1
EEE xxx Electrical Engineering Elective 3	E		3			2	1
GEN 351 Modern Management and Leadership	R			3		2	-
Summer							
EEE 300 Industrial Training	R		3			1	1
4th year student							
Semester 1							
EEE 440 Power System Protection	R		3			1	1
EEE 498 Electrical Engineering Project Study	R		1			1	1

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		Math & Basic Sciences	Engineering Topics Check if Contains Significant Design (√)	General Education	Other		
EEE xxx Electrical Engineering Elective 4	E		3			1	1
EEE xxx Electrical Engineering Elective 5	E		3			1	1
EEE xxx Electrical Engineering Elective 6	E		1			1	1
GEN xxx General Elective 1	E			3		1	-
XXX xxx Elective Subject 1	SE				3	1	-
Semester 2							
EEE 499 Electrical Engineering Project	R		3			2	1
EEE xxx Electrical Engineering Elective 7	E		3			2	1
EEE xxx Electrical Engineering Elective 8	E		3			2	1
EEE xxx Electrical Engineering Elective 9	E		1			2	1
XXX xxx Elective Subject 2	SE				3	2	-
GEN xxx General Elective 2	E			3		2	-
Add rows as needed to show all courses in the curriculum.							
TOTALS-ABET BASIC-LEVEL REQUIREMENTS		21	91	31	6		
OVERALL TOTAL CREDIT HOURS FOR COMPLETION OF THE PROGRAM	149						
PERCENT OF TOTAL		14.1%	61.1%	20.8%	4%		
Total must satisfy Minimum Semester Credit Hours		32 Hours	48 Hours				

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Criterion 5
Major Design Experience: Capstone Projects

Key characteristics of Capstone Projects:

1) Based on the knowledge and skills acquired in earlier course work
2) Must involve real design of some real life systems, components, devices, structures or processes
3) Must produce some artifacts (e.g. prototypes, engineering drawings, computer algorithms, PCB, devices, process flow diagrams, etc.) as deliverables
4) Must incorporate appropriate engineering standards and multiple realistic constraints
5) Must be done as a team
6) Must include presentation (in addition to written report)

Three Key Steps to Prepare for ABET

1. Make sure that Curriculum is in compliance with ABET Criterion 5
2. Prepare Self-Study Report and all supporting documents NEXT
3. **Prepare for and Host the actual site visit by ABET PEVs**

End of Overview

of

ABET Accreditation System and Process