PREPARING THE ENGINEERING SELF-STUDY & ACCREDITATION "MYTHS"

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ABET

Assuring Quality • Stimulating Innovation

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Disclaimer

The information presented here represents the collective experience of the panel members and does not represent any endorsement by either ABET, Inc., or the Engineering Accreditation Commission.

Getting Started

- Download from the ABET website at http://www.abet.org/accreditation the current versions of:
  - Accreditation Policies and Procedures Manual, 2013-2014 (APPM)
  - Criteria for Accrediting Engineering Programs, 2013-2014
  - Engineering Self-Study Questionnaire Template, 2013-2014 (SSQ)

Recent Changes

- Program Educational Objectives
- Program Outcomes ➜ Student Outcomes
- Assessment-Use of sampling codified
- Evaluation-minor rewording

SSQ Considerations

- It is a guided tour of what you will want to put into the Self-Study Report (SSR).

- It can be used as a check list.

- It is not intended to be limiting.

- It is usually posted on the ABET website in July of the year prior to the visit .

Some Self-Study Myths

Myth #1
We Can Wait to Start the Self-Study

- Self-Study preparation should begin NO LATER than the fall prior to year of visit.
- Provide time to:
    - Synthesize materials into coherent whole.
    - Engage faculty and staff to ensure Self-Study is representative of program.
    - Review by someone not involved in the preparation.

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Myth #2
We Do Not Need to Answer All Questions

- The reader expects to see your self-study report developed in the format of the SSQ.

- Be sure to include all items that appear in the self-study questionnaire *Table of Contents.*

- If a section does not apply or you need to deviate in the location of material, make it clear for the reader why, and how to find the material.

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Myth #3
Faculty Do Not Need to be Involved in Self-Study Development

- Although all faculty do not need to participate in the writing of the self-study, they SHOULD contribute to its development by reviewing, providing data/information, and be able to respond to questions about its content.
  - It is representative of the program.
  - They can speak to the various elements of the program during the Site Visit.

Myth #4
Do Not Need to Tell ABET About Significant Changes Until Visit

Report significant changes in:

- Program name
- Faculty
- Program objectives
- Curricular content
- Student body
- Administration
- Facilities
- Institutional commitment
- Financial status

What is "Significant" Change?

- Characteristics to consider:
  - Has a direct effect on the accredited program.
  - Resolves a prior Weakness or Deficiency
  - Affects ability to meet ABET criteria or policy.
  - Affects ability to deliver instruction.
  - Affects timely completion of degree.
  - Etc.

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Self-Study Basics and Context

- Presents your program to the evaluation team
- Informs team of elements of the program as they relate to the criteria
- Affords team its FIRST IMPRESSION of the extent to which the program meets the criteria
- Gives an impression of the institution's preparation for the upcoming visit

The Preparation Activity

The Accreditation Timeline

January
Institution requests accreditation for engineering programs

May - July
Team chairs assigned, dates set, team members chosen

January - February
Draft statements edited and preliminary statements sent to institutions

May - June
Necessary changes, if any, are made

August
Institutions notified of this action

Year 1 ←---------- **Year 2** ----------→

February - May
Institution prepares self-evaluation
(Program Self-Study Report)

September - December
Visits take place, draft statements written and finalized following 7-day response period

March - April
Institutions respond to draft statement and return to ABET w/i 30 days

July
EAC meets to take final action

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Time Frame for Responses

- Responses to the SSQ items are generally for the year in which self-study is prepared (year prior to visit)
- Self-study is due July 1 of year of visit
- New Readiness Review--for new programs that have no "sister" programs in any of the four commissions
- Assessment material will cover previous years as well
- Some tables request information for years prior to self-study
- Updates for year of visit can be provided on-site to evaluation team
- Upcoming changes should be noted in self-study, especially if they will be effective in year of visit

Audience for the Self-Study

- Team Chair
  - Overall team manager
  - Typically responsible for institutional issues
  - Responsible for overall report and presentation to commission detailing findings
  - Experienced evaluator, but maybe not in your specific discipline
- Program Evaluator(s)
  - Concerned with program-specific details
  - Will coordinate findings with other PEVs on team and with team chair to seek consistent and appropriate interpretation relative to the criteria
  - Expertise in specific discipline
  - May or may not have a lot of ABET experience, but has extensive training conducted by ABET and is evaluated using the ABET PEV Competency Model.

Tips to Connect with Your Audience

- Make it easy for the reader to find information required
  - Table of Contents
  - To-the-point responses
  - Specific pointers to documents or other sections as appropriate
- Clearly explain institution or program-specific jargon
- OK to use disciplinary jargon
- Footnote if not sure what response is expected, to explain your interpretation

Preparation Tips

- Appoint leader of self-study preparation early in fall prior to year of visit
- Assign tasks to key persons at program, college, and institutional level as appropriate
- Synthesize materials into coherent whole
- Leave time for review before due date
  - By someone not involved in the preparation, if possible.

Considerations for Evaluation Success

- Institutions:
  - On-going compliance with the criteria and policy
  - Thorough preparation of program Self-Study reports
  - Supporting materials that are accessible and clearly tied to demonstrating compliance with the criteria
  - Timely 7-day and due-process responses
  - Good communication with Team Chair and program evaluators

More Considerations for Evaluation Success

- Read through the SSQ, particularly the comments about preparation.

- Retain any instructions as to how to fill out the SSQ in the SSR sections and tables as you are preparing it. In the final product, eliminate the instructions and any footnotes that are *de facto* explanations.

- **Turn on the spell and grammar checkers!**

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How Is Self-Study Organized?

- In concert with the criteria
  - Students
  - Program Educational Objectives
  - Student Outcomes
  - Continuous Improvement
  - Curriculum
  - Faculty
  - Facilities
  - Support
  - Program Criteria (as applicable)

Types of Responses

- Respond directly and succinctly to the questions in each section of the SSQ

- Narrative explanations

- Tables and figures

- Appendices (vitae, course descriptions, institutional summary)

What About Tables and Figures?

- Don't change the format without a good reason.

- Feel free to add additional tables and/or figures to make your self-study more understandable and to explain relevant points about your program.

- The goals are content (numbers, facts, and trends) and clear communication.

- Update tables immediately before visit when appropriate

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Criterion Specifics

Criterion 1: Students

- The quality and performance of students and graduates is an important success factor.

- To determine success, the institution must evaluate, advise, and monitor students.

- Policies/procedures must be in place and enforced for acceptance of transfer students and validation of courses taken elsewhere.

- Assure that all students meet all program graduation requirements.

Typical Student Issues

- Students never meet with a faculty member for career advising

- No procedures to ensure any transfer credits are properly validated for equivalency with program curriculum

- Don't include advising & graduation checksheets or transcripts in the body of the SSR or appendices. The team will have these when you provide transcripts.

Criterion 2: Program Educational Objectives

- Broad statements that describe what graduates are expected to attain within a few years of graduation.

Criterion 2: Program Educational Objectives

- Published Educational Objectives consistent with the mission of the institution, the needs of the constituencies and these criteria.

- A documented, systematically utilized effective process, involving the constituencies, that periodically reviews the objectives to ensure they remain consistent with the mission, constituent needs and these criteria.

Highlights

- The process needs to document and demonstrate that the PEO's are based on constituent needs which were determined by involving them in some manner.

- They are also to be reviewed and revised as needed.

- Assessment and evaluation of PEO's is no longer required.

- If you continue to survey the alumni in order to capture information about your graduates, could potentially use as a Criterion 4 Continuous Improvement action.

PEO Issues

- Contain Student Outcomes language
- Frequently too many
  - more work to review & revise
- Language imprecise, e.g.,
  - 'are capable of'
  - 'are equipped with'
  - 'have the attitude and —'
  - 'have good or a solid understanding of ---'
  - 'Successfully pursue---'
- Large number of constituents, many not involved in establishing the PEO's, nor in subsequent reviews and revisions.

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Simplify!

1. Meet the expectations of employers of xxxx engineers-
2. Qualified graduates will pursue advanced study if desired-

YOU'RE DONE!

Summarize Constituent Input to PEOs

Input Method	Schedule	Constituent
Alumni survey	Every three years	Alumni 2-5 years out
Employer focus group	Every two years during Career Fair	Employers (and recruiters); some are alumni
Senior exit interview	Annually	Students; retrospective discussion of PEOs and their intended career paths
Advisory Council discussions	As needed—available annually	Industrial representatives, employers, alumni
Curriculum Committee meetings	Available as frequently as needed	Faculty and students

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PEO Issues

- Do the published PEO's meet the definition?
  - Are they really broad statements that describe what the graduates are expected to attain within a few years?
- Can the program convince the team that the PEO's are consistent with constituent needs?
- There is no language that insists on constituent approval, however there must be involvement!
- Is there a documented and effective process, involving program constituencies, for the periodic review and revision of PEOs?

Criterion 2 FAQ's

- What if the PEO's really sound like outcomes (instead of objectives?
  - If PEO's are not PEO's, there will be a C2 shortcoming.
- What if PEO's are ambiguous or reflect outcomes retooled to apply after graduation?
  - Becomes a team judgment – do they meet the intent of the Criterion?
- What if there is no process for determining the needs of the program's constituents?
  - If the PEOs do not incorporate constituents' needs, there is a Criterion 2 shortcoming.

Criterion 3:
Student Outcomes

- Documented outcomes that prepare graduates to attain the program educational objectives.

    - Narrow statements that describe what students are expected to know and be able to do by the time of graduation. These relate to the skills, knowledge, and behaviors that students acquire in their matriculation through the program.

- An assessment and evaluation process that periodically documents and demonstrates the extent to which the student outcomes are attained now resides in Criterion 4.

Student Outcomes

- Student outcomes for engineering are defined as (a) – (k) plus any additional ones articulated by the program
- The program must demonstrate that the engineering criteria (a) – (k) are attained to some extent decided upon by the program
- Student outcomes must foster attainment of the PEO's
  - Must describe in the Self-Study Questionnaire
- There still must be an assessment and evaluation process that *periodically* documents and demonstrates the degree to which outcomes are attained, however, as noted previously, this is now in Criterion 4, Continuous Improvement.

Student Outcome Issues!

- Excessive number of outcomes supported by a single course
  - 5-11 in the major design experience-not credible
- Course grades or Instructor 'opinion' used as basis for assessing
  - Grading ≠ Assessment
- Program Criteria elements added as additional Outcomes
- Syllabus text doesn't agree with course outcome support claim
- Outcomes with multiple parts, e.g., design & conduct experiments- (Outcome b)
  - Students never actually 'design' an experiment and then 'run' it to see if the design worked.

Considerations in the Assessment and Evaluation of the Student Outcomes that are to be described/demonstrated in Criterion 4

SSQ Text-Outcomes Assessments

1. A listing and description of the <u>assessment processes</u> used to gather the data upon which the evaluation of each student outcome is based. <u>Examples of data collection processes</u>: specific exam questions, student portfolios, internally developed assessment exams, senior project presentations, nationally-normed exams, oral exams, focus groups, industrial advisory committee meetings, or other processes that are relevant and appropriate to the program

2. The <u>frequency</u> with which these assessment processes are carried out

3. The <u>expected level of attainment</u> for each of the student outcomes

4. <u>Summaries of the results</u> of the evaluation process and an analysis illustrating the extent to which each of the student outcomes is being attained

5. How the results are <u>documented and maintained</u>

Assessment and Evaluation Materials

- Provide documentation of interaction with constituents with respect to determining needs and developing/reviewing program educational objectives to meet those needs.
- Provide data used to assess level of achievement of student outcomes.
- Provide results of evaluation of assessment results.
  - Level of achievement of each outcome
  - Conclusion as to whether action is needed with respect to each outcome

Student Outcomes

- The process of assessment and evaluation needs to demonstrate the degree to which outcomes are attained, however, there is no language
  - that says all outcomes must be attained to the same degree
  - that says anything about a numeric scale measuring degree of attainment
  - that says the outcomes must be measured
    - Although "degree" implies some quantitative gauge

Student Outcomes Assessment

- What about assessment data? What is adequate data?
  - Does it **all** have to be objective/direct? (NO)
  - Can it be subjective? (Some of it may be; nothing says it has to be)
  - Is the observation or conclusion of course instructor adequate? (What was his or her basis for the observation?)
  - Does evidence for each outcome have to be in the form of work the student has produced? (No, however, the PEV & ultimately the team, needs to be convinced that outcome attainment has been demonstrated.)

Some things that seem to work for some programs

- Major design experience for engineering programs:
    - a- knowledge of math, science and engineering
    - c- design a system, component, process
    - d- multi-disciplinary teams
    - e- formulate & solve engineering problems
    - g- communicate
- FE Exam for (f) – ethics
- Laboratory experience and reports for (b)
- 4 or more outcomes remain that need to be addressed

Myth #5
Display Materials Must be by Outcome

- Display Materials are needed to :
  - Demonstrate specific topics as well as breadth and depth of material included in each course.
  - Support classification of course as math/science, engineering topics.
  - Demonstrate achievement of student outcomes.
- Neither the criteria nor APPM prescribe how to organize the materials, discuss with PEV long before the visit, make it easy for her/him.

Myth #6
We Only Need Student Work for Demonstration of Outcomes

- Student work is needed to demonstrate:
  - Type and level of work required in courses.
  - Grading standards.
  - Achievement of student outcomes.
  - Validation of curriculum table.

Display Materials Guidelines

- Make easy for program evaluator to find and follow.

- Well-organized and clearly labeled.

- Some will repeat, expand, or be a copy of what is included in self-study.

Examples of Display Materials

Can also display scanned materials electronically if accessible to PEV.

Myth #7
We Need Course Materials for Every Course in the Curriculum

- Course materials/syllabi and student work are needed for the technical courses included in the curriculum and your assessment plan.
  - Regardless of frequency offered.
  - Includes the required math / science courses (however, no student work needed for these).
- Course materials/syllabi and student work are NOT needed for Gen Ed courses.

Sample SO Assessment Plan

Activity for each Student Outcome	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6
Review of performance indicators that define the outcome	X			X		
Review the map of educational strategies related to performance indicators		X			X	
Review mapping and identify where data will be collected		X			X	
Develop and/or review assessment methods used to assess performance indicators		X			X	
Collect data			X			X
Evaluate assessment data including processes				X		
Report findings				X		
Take action where necessary				X		

Sample Assessment Plan for Student Outcome (a)

Performance Indicators	Method(s) of Assessment	Where data are collected (summative)	Length of assessment cycle (yrs)	Year(s) of data collection	Target for Performance
1) **Problem statement shows understanding of the problem**	Faculty assessment of design problem statement	EGR 4090	3 years	2007, 2010	90%
	Senior Survey	On-line survey			
2) **Solution procedure and methods are defined.**	Faculty assessment of senior project plan	EGR 4090	3 years	2007, 2010	85%
	Senior Survey	On-line survey			
3) **Problem solution is appropriate and within reasonable constraints**	Faculty assessment of senior design solution	EGR 4090	3 years	2007, 2010	80%
	Senior Survey	On-line survey			

Criterion 4: Continuous Improvement (CI)

- Criterion 4 essentially now contains two components, namely

- A documented process incorporating relevant data to regularly assess and evaluate the extent to which each of the Student Outcomes is being met.

- Any other actions you take to improve the program, regardless of how you obtained information/data prompting you to take an improvement action.

Myth #8
Continuous Improvement Only Applies to Criteria 2, 3, & 4

- Continuous improvement applies to all 8 general criteria and any program criteria.

What Does CI Mean? (see tomorrow's sessions!)

- An educational program process should involve a clear understanding of:
  - Mission
  - Constituents
  - Objectives (what one is trying to achieve)
  - Outcomes (learning that takes place to meet objectives)
  - Processes (internal practices to achieve the outcome)
  - Facts (data collection)
  - Evaluation (interpretation of facts)
  - Action (change, improvement).

What *Does* Criterion 4 Say?

- The program ***must*** regularly use appropriate, documented processes for evaluating the extent to which the student outcomes are being attained. The results of these evaluations ***must*** be utilized as input for the continuous improvement of the program. Other available information ***may*** also be used to assist in effecting the continuous improvement of the program.

- Results and descriptions of former C3 processes have moved to C4.

- Language in C4 changed from **should** use the results to **must** use.

We Made Major Changes in the Program Recently. What Do We Do (No New Data)?

- Great! You identified (perhaps through your program of assessment and analysis) that a change was needed to achieve outcomes, or to improve some other aspect of your program.

- Relate the changes to statements in the criteria as much as possible and describe them in the parts of the self-study that relate to these criteria.

- Include what led to them, when they take effect, and when their impact will be assessed.

Continuous Improvement Activities

- Describe continuous improvement activities: what was done, why, when, status of the activity or what has been the result.

- Demonstrate link between evaluation results and continuous improvement activities.

Add a Summary Table of Actions to Improve Program since the last visit, perhaps Table 4-1

AY 07-08	AY 08-09	AY 09-10	AY 10-11	AY 11-12	AY 12-13
2	10	1	3	4	??

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AY 07-08
Action 1.

Action Taken:	**Created a two-course major design sequence. Added a new course, EECE 4279 Professional Development and Capstone Design, as a prerequisite to EECE 4280, Electrical and Computer Engineering Design.**
Basis for Action:	**Improve compliance with respect to outcomes (f), (h), and (i) and criterion 5, based on EAC of ABET visit comments .**
Date:	**Fall 2007**
Results:	**In EECE 4279, additional time is devoted prior to the implementation of the design project on activities related to outcomes (f), (h), and (i). Students must write and orally defend a major design project proposal before the start of EECE 4280. Students devote more time in EECE 4280 to the implementation of the project.**

Criterion 5: Curriculum

- One year of a combination of college level mathematics and basic sciences appropriate to the discipline.

- One and one-half years of engineering topics, consisting of engineering sciences and engineering design appropriate to the student's field of study.

- Curriculum culminating in a major design experience incorporating appropriate engineering standards and multiple realistic constraints.

Syllabi - Purpose

- Support classification of courses as shown in curriculum table

- Show scope of courses – breadth/depth of topics

- Indicate textbooks or other supporting documents

- Follow specified outline (specifies minimum required information) for all courses

- Alternative formats possible, perhaps desirable

- EAC: No more than two pages for each course, some programs capture all the information in a single page

Criterion 5-Curriculum Issues

- Split of an Engineering Course between M/BS and Engineering Topics categories

- Significant design cited in Table 5.1 courses that is not evident in course syllabi or student work

- Major Design Experience missing
  - Standards
  - Constraints

Standards & Constraints

Student	#1	#2	#3-6
Project Title & Area			
Thermal Systems			
Mechanical Systems			
Constraints			
Economic			
Environmental			
Sustainability			
Manufacturability			
Ethical			
Health and Safety			
Social			
Political			
Other			
Standards			
?			
?			

Program Criteria Curriculum Aspects

- There are Program Criteria for almost all programs. These are:
    - Curriculum
    - Faculty (no requirement for BME, ChE, EE, CpE, Petroleum and Software Engineering)
- Was being treated by many programs as additional outcomes, which was not consistent with Criterion 5-Curriculum

Criterion 6: Faculty

- Sufficient number to achieve program objectives.

- Competent to cover all curricular areas of program.

- Authority for creation, delivery, evaluation, modification and continuous improvement of the program.

Criterion 6: Faculty

Summary and Description of in Tables 6.1 & 6.2:

- Composition (including size), credentials, experience, and workload of program faculty
- Teaching, research, and other scholarly activity and performance
- Service activity and performance
- Course and program development and delivery
- Competencies
- Professional development activities

Faculty Vitae/Resumes - Purpose

- Support summary in faculty analysis table
- Show education, experience, recent and current activities, currency in the field
- Help program evaluator identify whom to interview
- Common format for all faculty
- EAC: 2-page limit

Criterion 6 Issues

- Professional development & institutional support

- Many/most faculty received some or all degrees from program

- Little evidence of currency in the field or plans to maintain currency

Criterion 7: Facilities

- Adequate to (safely) accomplish educational objectives and outcomes of the program.

- Foster faculty-student interaction; encourages professional development & professional activities; and provide opportunities to use modern engineering tools.

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Criterion 7-Facilities Issues

- Outdated laboratory equipment

- Lack of modern computing hardware and software relevant to program

- Lack of identified source of funding for equipment acquisition, maintenance and replacement

- Safety issues are likely to be cited as a deficiency

Criterion 8: Support

- Sufficient to attract, retain, and provide for continued professional development of faculty.

- Sufficient to acquire, maintain, and operate facilities & equipment appropriate for the program.

- Constructive leadership

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Related Opportunities

- Accreditation Visit Logistics Panel
  - Saturday April 13, 8 am to 9 am.
- Self-Study Report Room Open
  - Friday April 12, 7 am to 5 pm
  - Saturday April 13, 7 am to 5 pm
- Self-Study Room Panel
  - Saturday April 13, 3:30 pm to 5 pm

Thank you for your participation!

Questions??