



2013 ASME International
Mechanical Engineering Education
Conference
March 14 – March 16
San Diego, CA

ABET Preparation Workshop

Presented by
ASME Committee on Engineering Accreditation (CEA)


Daisie Boettner, United States Military Academy at West Point
Patsy Brackin, Rose-Hulman Institute of Technology
Mo Hosni, Kansas State University, *(ASME Vice President, Board on Education)*
Bill Wepfer, Georgia Institute of Technology, *(ASME Senior Vice-President, Public Affairs and Outreach Council)*



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ABET Workshop Agenda 14 March 2013 8:00 AM - 11:45 AM


7:30	Breakfast
8:00	General Introductions (Mo Hosni)
8:15	What is the ASME CEA? (Mo Hosni)
8:20	Don't forget the APPM (Daisie Boettner)
8:30	Recent and proposed changes (Daisie Boettner)
8:45	Criteria II, III and IV (Patsy Brackin)
10:00	Break
10:10	Preparing materials for your visit (Mo Hosni)
10:30	Responding to your visit (Bill Wepfer)
11:00	Recent ABET Review Discussions



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General Introductions

- Name
- Institution
- Position
- When is your next ABET visit?
- Where are you with your assessment cycle?
- (30 seconds)



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ABET VISION IS GLOBAL



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ABET Organization Design

- ABET is a **federation** of 30 professional engineering & technical societies
- Neither institutions nor individuals are members of ABET
- ABET relies on the services of almost **2000 volunteers** and 33 full-time and five part-time staff



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Who in the U.S. Recognizes ABET?

- 30 Member & Associate Member Societies of ABET
- Council for Higher Education Accreditation (CHEA)
- State Boards for Engineering & Surveying Licensure & Registration (over 55 jurisdictions)
- U.S. Patent Office
- U.S. Reserve Officers Training Corps
- Council of Engineering Specialty Boards (CESB)
- Board of Certified Safety Professionals (BCSP)
- Accreditors in other disciplines
- U.S. Trade Office
- U.S. State Department
- Employers (position announcements)

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Who Recognizes ABET outside the U.S.?

- Washington Accord (accreditation of engineering programs for engineers by accreditors in 14 countries)
- Sydney Accord (accreditation of bachelors level engineering technology programs by accreditors in 8 countries)
- Seoul Accord (accreditation of computing programs by accreditors in eight countries)
- Dublin Accord (Provisional recognition status of accreditation of associates level engineering technology programs)
- Other accreditors outside of the United States (MOUs)
- Ministries of Education (several countries)
- Employers (position announcements)

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ABET accomplishes its purposes through standing committees and commissions

Commissions are:

- Engineering Accreditation Commission (EAC)
- Technology Accreditation Commission (TAC)
- Computing Accreditation Commission (CAC)
- Applied Science Accreditation Commission (ASAC)

Standing committees of each commission are:

- Nominating Committee
- Criteria Committee
- Training Committee
- Consistency



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ASME Committee on Engineering Accreditation (CEA)

- The Committee on Engineering Accreditation (CEA) is a standing committee of the ASME Board on Education.
- CEA has frontline responsibility for ASME's role in the accreditation of engineering degree programs through the ABET Engineering Accreditation Commission.
- CEA reviews matters related to accreditation criteria for mechanical engineering and related degree programs in the U.S.
- CEA develops and maintains a cadre of over 125 highly qualified program evaluators, and supports 60-90 on-campus evaluation visits each year.



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ASME Committee on Engineering Accreditation (CEA) Membership & Meetings

- **CEA Membership**
 - 17 members: 7 current PEVs, 8 EAC members and 2 former EAC members
- **CEA Meetings**
 - CEA meets twice a year
 - 1) **July** - Immediately preceding the EAC meeting at which final accreditation actions are taken. Examine all ME and Engineering Mechanics statements with shortcomings to assure consistency across programs. CEA also reviews PEVs performance.
 - 2) **November** - at the IMECE, General business meeting.



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ASME CEA Subcommittees

- **Subcommittee A:** ME Program Criteria and PEV Training (for ME program criteria only)
- **Subcommittee B:** PEV Management
- **Subcommittee C:** Nominations




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Don't forget the Accreditation Policy and Procedure Manual!

by

Daisie Boettner
The United States Military Academy at West Point

<http://www.abet.org/DisplayTemplates/DocsHandbook.aspx?id=3146>




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**ACCREDITATION
POLICY AND PROCEDURE
MANUAL**


Effective for Reviews During the
2013-2014 Accreditation Cycle

Inspected and approved by the
ABET
Board of Directors
on 07/27/12
October 27, 2012



Applied Science Accreditation Commission
Computing Accreditation Commission
Engineering Accreditation Commission
Engineering Technology Accreditation Commission

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July 2013

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APPM: Common Mistakes

- Logos (II.A.2) for use by accredited programs (info@abet.org)
- Identification of accredited program in catalogs/similar publications (II.A.6.)
 "accredited by the _____ Accreditation Commission of ABET, <http://www.abet.org>."






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APPM: Common Mistakes

II.G.4.a. Submittal of Transcripts - Prior to arriving on-site, the team will request official transcripts of the most recent graduates from each program. Each program being evaluated will **provide official transcripts with associated worksheets and any guidelines** used by the advisors.

II.G.6.b.(1) Facilities - Evaluators will examine to assure the instructional and learning environments are **adequate** and are **safe** for the intended purposes.

II.G.6.b.(2) Materials - Evaluators will review **samples of displayed course materials** including course syllabi, textbooks, example assignments and exams, and examples of student work, typically ranging from excellent through poor. (Note: many institutions are providing sample work only electronically.)



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What's New Policy and Procedures Manual

2013-2014 Accreditation Cycle

Section II.A.1. – This section explicitly states that an institution may not use the same program name to identify both an accredited and a non-accredited program.

Section II.E.3.d. – This section includes the revised scope for engineering technology program accreditation to include revised program naming requirements.

Section II.E.6. – This section details the new eligibility requirement for programs seeking initial accreditation review.

Section II.E.7. – This section provides information on diploma and accreditation mills.

Section II.I. - This section clarifies requirements and process for the termination of a program's accreditation.



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What's New Policy and Procedures Manual


2013-2014 Accreditation Cycle

Section II.F.1.e. – This section explicitly provides for a program to **withdraw from accreditation** at any time in the process up to the Commissions' decision meetings in July.

Section II.G.5.a.(4)(f) – This section now allows a **team of two** (one team chair and one program evaluator) for the comprehensive re-accreditation **visit of a single program**.

Section II.G.7. – This section has been revised to **remove all constraints** for programs seeking **initial accreditation** to request **two-year retroactive** coverage for graduates.


Section II.L.6. – This section **clarifies the reporting responsibilities** to the ABET Board of Directors regarding **appeals**.



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Criteria for Accrediting Engineering Programs


- I. General Criteria
 - Criterion 1. Students
 - Criterion 2. Program Educational Objectives
 - Criterion 3. Student Outcomes
 - Criterion 4. Continuous Improvement
 - Criterion 5. Curriculum
 - Criterion 6. Faculty
 - Criterion 7. Facilities
 - Criterion 8. Institutional Support
- II. General Criteria for Masters Level Programs
- III. Program Criteria



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Recent Changes: Criteria for Accrediting Engineering Programs

- **Definitions** (Changed with 2011-2012 accreditation cycle)
 - **Program Educational Objectives** – Program educational objectives are broad statements that describe **what graduates are expected to attain within a few years of graduation**. Program educational objectives are based on the needs of the program's constituencies.



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Recent Changes - Criteria for Accrediting Engineering Programs

- **Definitions** (Changed with 2011-2012 accreditation cycle)
 - **Student Outcomes** – Student outcomes 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 as they progress through the program.



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Recent Changes- Criteria for Accrediting Engineering Programs

- **Definitions** (Updated with 2013-2014 accreditation cycle)
 - **Assessment** – Assessment is one or more processes that identify, collect, and prepare data to evaluate the attainment of student outcomes. Effective assessment uses relevant direct, indirect, quantitative and qualitative measures as appropriate to the outcome being measured. Appropriate sampling methods may be used as part of an assessment process.
 - There is no longer a requirement to assess program educational objectives!



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Recent Changes- Criteria for Accrediting Engineering Programs

- **Definitions** (Updated with 2013-2014 accreditation cycle)
 - **Evaluation** – Evaluation is one or more processes for interpreting the data and evidence accumulated through assessment processes. Evaluation determines the extent to which student outcomes are being attained. Evaluation results in decisions and actions regarding program improvement.
 - There is no longer a requirement to evaluate program educational objectives!



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Recent Changes - Criteria for Accrediting Engineering Programs

- I. General Criteria
 - **Criterion 2. Program Educational Objectives.**
Removes the requirement for a program to have a process for the "review and revision" of its program educational objectives (PEOs). The new language requires a documented process that is systematically utilized and effective, involving the program's constituents, for periodic review of the PEOs so that they remain consistent with the institution's mission, the constituents' needs, and the criteria.



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Recent Changes - Criteria for Accrediting Engineering Programs

- I. General Criteria
 - **Criterion 4. Continuous Improvement.**
Removes the requirement for a program to demonstrate graduate attainment of program educational objectives. This change removes the stringent requirement for assessment of program educational objectives as is required for a program's student outcomes.



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Recent Changes - Criteria for Accrediting Engineering Programs

- I. General Criteria
 - **Criterion 5. Curriculum.**
 - (a) Basic sciences are defined as biological, chemical, and physical sciences.
 - One year is the lesser of 32 semester hours (or equivalent) or one-fourth of the total credits required for graduation.



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2014-2015 – Proposed Change to the General Criteria

• Criterion 6. Faculty.

- (proposed) The program must demonstrate that the faculty members are of sufficient number and they have the competencies to cover all of the curricular areas of the program.
- (current) The faculty must be of sufficient number and must have the competencies to cover all of the curricular areas of the program.



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2014-2015 – Proposed Change to the Mechanical Engineering Criteria

1. (proposed) **Curriculum.** The curriculum must require students to apply principles of engineering, basic science, and mathematics (including multivariate calculus and differential equations); to model, analyze, design, and realize physical systems, components or processes; and prepare students to **work professionally in either thermal or mechanical systems areas while requiring courses in each area.**

1. (current) **Curriculum.** ... and prepare students to work professionally in both thermal and mechanical systems areas.



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Criteria 2, 3, and 4

by

Patsy Brackin
Rose-Hulman Institute of Technology



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PEV Worksheet

- Anyone can view the worksheet from abet.org by looking at the PEV pre-training
- Completing the PEV pre-training can be extremely helpful for your departmental ABET coordinator if she is not a PEV!

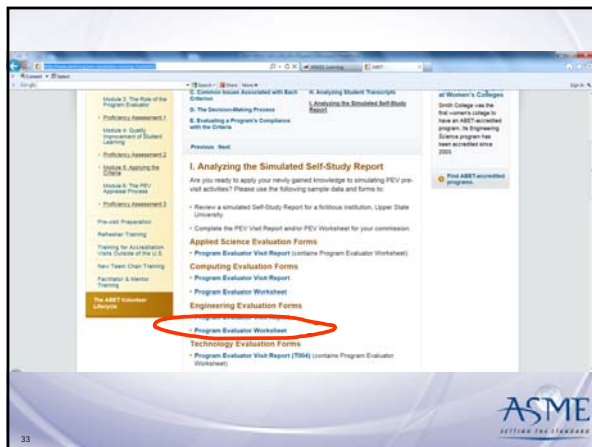
<http://www.abet.org/pev-candidate-training/>

<http://www.abet.org/pev-candidate-training-module5/>



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We are going to use portions of the ABET training self-study, and you are going to be PEVs and review criteria 2, 3, and 4.

Process:

1. Review ABET requirements for the criterion.
2. Give examples of methods for attaining.
3. You review a sample self-study, act as the PEV using the worksheet, and report back.



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Criterion 2. Program Educational Objectives

The program must have published program educational objectives that are consistent with the mission of the institution, the needs of the program's various constituencies, and these criteria. There must be a documented, systematically utilized, and effective process, involving program constituencies, for the periodic review of these program educational objectives that ensures they remain consistent with the institutional mission, the program's constituents' needs, and these criteria.

Program educational objectives are broad statements that describe what graduates are expected to attain within a few years of graduation. Program educational objectives are based on the needs of the program's constituencies.



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Sample PEO's from Various Web Sites

1. Graduates entering immediately into professional practice upon graduation are capable of performing duties of an entry-level engineering position.
2. Graduates pursuing graduate studies are capable of successfully completing an advanced degree.
3. Graduates recognize the need for and are capable of pursuing life-long learning.



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Graduates will demonstrate technical excellence in their chosen fields, anticipate and respond to societal changes and develop careers with depth and flexibility, while retaining a professional and intellectual thrust throughout.

Specifically,

- 1a. Mechanical Engineers will show proficiency in the analysis, modeling and design of thermal and mechanical systems.
- 1b. Industrial Engineers will show proficiency in the design, analysis, optimization and improvement of integrated systems that include people, materials, information, equipment and energy.
2. Graduates will successfully integrate their academic preparation with engineering practice.
3. Graduates will effectively utilize management skills to design projects and/or programs, to lead their implementation and to present technical information, as appropriate to their field.
4. Graduates will engage in continuing education for professional development and career planning, including success in graduate education and research for those who choose to do so.



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Within a few years of earning the baccalaureate degree in Aerospace Engineering at XXX our graduates are expected to achieve one or more of the following objectives:

1. Develop successful careers as aerospace engineers; demonstrate professional engineering competence via promotions and/or positions of increasing responsibility.
2. Successfully complete or pursue graduate education in engineering and related fields, participate in professional development and/or industrial training courses and/or obtain engineering certification.
3. Participate in research and development, and other creative and innovative efforts in science, engineering and technology, and/or pursue entrepreneurial endeavors.
4. If not in an aerospace engineering career, successfully transition into an education, business, legal, medical or government career.
5. Demonstrate a commitment to the community and profession through involvement with community and/or professional organizations.



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Our program educational objectives are as follows:

- To train students with the ability to integrate, synthesize, and apply engineering principles in experimentation, analysis, and design of materials systems including metals, polymers, ceramics, composites, biomaterials, electronic materials and combinations of the above.
- To provide a supportive and stimulating environment for student development, leading to life-long learning and professional growth, as well as appreciation of the diverse roles and ethical responsibilities of their profession in society.
- To enhance understanding of materials engineering practice resulting from cooperative educational experiences.
- To provide students with a solid background in the theory and methods of their discipline and prepare them for a variety of challenging professional environments and post-baccalaureate education



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What questions do we need to ask about objectives?

1. How do you ensure that your objectives are consistent with your mission, the needs of your constituencies, and the ABET criteria?
2. Do your objectives meet the ABET definition for program educational objectives?
3. What is your process?
4. How do you involve your constituencies?

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How do you ensure that your objectives are consistent with your mission, the needs of your constituencies, and the ABET criteria?

Below are some examples of methods of successful demonstrations:

- Consistent with mission
 - Analytical paragraph, mapping, visual expression
- Consistent with needs of constituents
 - Survey of constituents indicating appropriateness of objectives, vote from industrial advisory board confirming objectives, focus groups
- Consistent with ABET criteria
 - Meets ABET definition for PEOs, matrix mapping objectives to ABET criteria, analytical paragraph

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How do we know if we have the right PEO's? Can you expand on ways to get input from constituents?

- Focus groups
 - Alumni
 - Employers
 - Students
 - Graduate schools
- Surveys
 - Alumni
 - Employers
 - Students
 - Graduate schools
- Industrial advisory board
- Program Faculty

Note: This is not assessment of your PEOs!

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How do I demonstrate Program Educational Objectives?

- You no longer have to demonstrate attainment of Program Educational Objectives.
- This is a new change, keep the criteria handy in case the PEV has not been properly trained.



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Evaluate the Criterion 2 of ABET sample self-study using the Program Evaluator Worksheet supplied. (10 minutes)



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Criterion 3. Student Outcomes

The program must have documented student outcomes that prepare graduates to attain the program educational objectives.

Student outcomes are outcomes (a) through (k) plus any additional outcomes that may be articulated by the program.

- (a) an ability to apply knowledge of mathematics, science, and engineering
- (b) an ability to design and conduct experiments, as well as to analyze and interpret data
- (c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- (d) an ability to function on multidisciplinary teams



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Criterion 3. Student Outcomes, Continued

- (e) an ability to identify, formulate, and solve engineering problems
- (f) an understanding of professional and ethical responsibility
- (g) an ability to communicate effectively
- (h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
- (i) a recognition of the need for, and an ability to engage in life-long learning
- (j) a knowledge of contemporary issues
- (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.



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What questions should we answer for Student Outcomes (SO)?

- What are your student outcomes?
- Are your SO's a-k? If not, do you include a-k?
- Do your SO's support your PEO's?



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Evaluate the selected SOs from the ABET self-study. (10 minutes)



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Criterion 4. Continuous Improvement

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 the continuous improvement of the program.



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Criterion 4 Issues

- Are all SOs (a) through (k) + being regularly assessed and evaluated?
- Do the assessment and evaluation demonstrate the extent of attainment of the SOs?
- There is no language that requires:
 - all outcomes must be attained to the same degree
 - anything about a numeric scale measuring degree of attainment
- Are those results systematically utilized as input for the continuous improvement of the program?



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Evaluate Criterion 4 in the ABET self-study.

- Outcome 1: ability to identify, formulate and solve engineering problems (p. 26)
- Outcome 6: ability to function on multidisciplinary teams (p. 40)
- Outcome 7: understanding of professional and ethical responsibility (p. 43)
- Outcome 9: the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context (p. 49)
- Outcome 10: a recognition of the need for and an ability to engage in lifelong learning (p. 52)
- Outcome 11: a knowledge of contemporary issues (p.55)



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Preparing your program for the ABET Visit

by

Mo Hosni
Kansas State University



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ABET Website has the latest information on the accreditation process

The ABET accreditation cycle is approximately one-and-a-half years from beginning to end



Preparation Process Tips

- Self-study report is due July 1 of year of visit
- Self-study report template posted on ABET website July of year prior to visit
- Appoint a leader for document preparation early in fall prior to year of visit
- Assessment should be a regular process
- 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
- ABET HQ staff will help as questions arise



How is the Self-Study Organized?

In concert with the criteria:

- Students
- Program Educational Objectives
- Student Outcomes
- Continuous Improvement
- Curriculum
- Faculty
- Facilities
- Institutional Support
- Program Criteria



What is the Time Period For My Self-Study?

- The self-study should reflect the academic year in which it is produced and submitted
- Assessment results and analyses probably will go back several years
- Upcoming changes to the program should be mentioned, particularly if they will be effective by the time of the visit



We Made Major Changes in the Program Recently. What Do We Do Without New Data?

- You identified through your program of continuous improvement that change was needed to achieve objectives and/or outcomes
- Describe what led to the changes and when the impact of the changes will be determined



What Are the Visitors Really Looking For?

- A demonstration that your program meets the criteria
- Continuous improvement is an ongoing process. The visiting team is looking over the program's shoulder at that ongoing process to determine whether that process is being applied continuously and not just before the self-study report



Preparing Materials for the Visit

- Make it easy for the PEV...he/she is one of us.
- Large amounts of unprocessed data are not helpful
- Don't wait 5 years to prepare. Try to keep assessment and evaluation data current each academic year
- Look for guidance to the
 - Policies and Procedures Manual of ABET
 - Current Engineering Criteria
 - Engineering Self Study Questionnaire <http://www.abet.org/self-study/>



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Standard materials*

Representative samples of student work that reveal the spectrum of educational outcome..., it is necessary that the institution exhibit teaching materials such as:

- course outlines and textbooks for all courses required for graduation
- Sufficient examples of student work in technical, mathematics, and science courses must be available to the visiting team for the entire campus visit
- The examples should show a range of grades for assignments, including homework, quizzes, examinations, drawings, laboratory reports, projects, and samples of computer usage in technical courses
- Examples must also be presented to demonstrate compliance with the requirement for student competence in written and oral communications


*from Policies and Procedures Manual



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Other Materials to include:

- Course outcomes linked to student outcomes,
- metrics with performance measures for these outcomes
- the results of any assessment processes done at the course level

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Design/Computational Projects

- Projects and reports
- External assessments of Designs?
- If you do an external assessment be sure to include outcome specific language in the questionnaire to assessors

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Assessment/Evaluation Notebook

- OK to be redundant with the self study (Criterion 4) itself.
- Lay out the formal assessment process
- Show the summary results of evaluations
- Include minutes of faculty meetings, curriculum committee meetings, retreats, student board meetings, external advisory board meetings, etc., at which assessment and evaluation were discussed and actions taken (or not!)

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Common Mistakes Reporting Assessment Information

- Too many data, not enough information.
 - Reporting numbers or percentages without putting them into context
- How many students/graduates in cohort
- How many students/graduates provided data
- Not describing how the data are evaluated
- Using very complex charts describing your assessment processes
- Discussing all outcomes at once instead of one at a time
- Using the terms “objectives” and “outcomes” interchangeably



Other Comments:

- Visits follow a standard process
- Sunday afternoon allows for the PEV to tour labs and view materials
- A secure room for viewing materials, along with internet connection, a printer, and a paper shredder is helpful
- It is nice to point out the bathroom, water fountain, vending machines, etc. It is good to provide water if it isn't readily available
- Allow enough time on Sunday afternoon for the PEV to study materials...it is virtually their only opportunity. Be sure materials are available throughout the visit
- Accommodate PEV requests as much as possible. Do not hesitate to show your best stuff



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The Self Study

- FIRST prepare a draft of the narrative text along the lines of the self-study questionnaire
- Prepare the required *Tables* and any additional *Exhibits* you might add
- Revise the narrative, referring frequently to the *Tables* and *Exhibits* to document all statements made
- Have someone else reread it for accuracy, typos etc.
- Make sure your self study is consistent with your website!!!
- It is o.k. to use a consultant and/or host for a mock visit



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Questions/Discussion?



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Responding to your ABET visit

by

Bill Wepfer
Georgia Institute of Technology

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Tuesday of the Visit

- Tuesday morning the PEV meets with the Department Head to read the draft exit statement
- Listen for the words: concern, weakness, and deficiency
- At the exit interview, the PEV reads the exit statement

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The due-process period begins with the departure of the visit team.

Draft statement: Preliminary findings of the team

Due-process response: Due 30 days after the receipt of the Draft Statement

Final statement: The due-process response is incorporated into the Final Statement.




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Continuation of due-process period:

Review of statement: The CEA reviews all ME department statements for consistency prior to the EAC meeting in July.

Final action: EAC meeting in July – the full commission reviews and votes on all recommended actions.


Notification of final action: ABET sends the Final Statement and transmittal letter informing you of the official accreditation actions for your programs.



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Hints


- You can begin work on your due process response the day that the ABET team leaves your campus!
- Plan to address any weakness or deficiency noted.
- Make your response “criterion-based.”
- Consider addressing concerns.
- Observations do not need any action.



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WRAP-UP DISCUSSIONS

TIPS FOR A SUCCESSFUL
ABET VISIT



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What tips do you have for
programs?



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Questions 
