



2009 Mechanical Engineering
Education Conference
March 27 – March 31
Hilton Head Island, S.C.

ABET Preparation Workshop

Presented by

ASME Committee on Engineering Accreditation

Patsy Brackin, Rose-Hulman Institute
of Technology

Mo Hosni, Kansas State University

Bill Wepfer, Georgia Institute of
Technology



Agenda

- 7:30 Breakfast
- 8:00 General Introductions (Patsy)
- 8:15 What is the CEA and why do you care? (Mo)
- 8:30 Program Education Objectives (PEO's) (Patsy)
- 9:50 Break
- 10:00 Preparing materials for your visit (Mo)
- 10:30 Responding to your visit (Bill)
- 11:00 ABET Panel Discussions

General Introductions

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

ABET

ABET accomplishes its purposes through standing committees and commissions.

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

ASME Committee on Engineering Accreditation (CEA)

The Committee on Engineering Accreditation (CEA) is a standing committee of the Board of Directors of the Center for Education. The Committee has frontline responsibility for ASME's role in the accreditation of engineering degree programs through the ABET Engineering Accreditation Commission.

The Committee reviews matters related to accreditation criteria for mechanical engineering and related degree programs in the U.S., develops and maintains a cadre of over 125 highly qualified program evaluators, and supports 60-90 on-campus evaluation visits each year.



ASME - CEA

[www.asme.org/Governance/Centers/
Education/Committee_Accreditation.cfm](http://www.asme.org/Governance/Centers/Education/Committee_Accreditation.cfm)

Committee on Engineering Accreditation (CEA)

- **CEA Membership**

- 17 members: 7 current PEVs, 7 EAC members and 3 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/EngMech statements with shortcomings to assure consistency across programs and with the PEVs comments.
- 2) November - at the IMECE, General business meeting.

ASME -CEA Membership

<u>John Cipolla</u> (05-10) Northeastern University	Chair (08-09)
<u>Lawrence Butkus</u> (05-10) US Air Force	Chair-Elect (08-09)
<u>Patricia Brackin</u> (05-10) Rose-Hulman Institute of Technology	Secretary (08-09)
<u>Mo Hosni</u> (07-12) Kansas State University	Executive Committee Member
<u>Eugene Brown</u> (06-11) Virginia Tech	EAC Member
<u>Rebecca Brannon</u> (08-13) University of Utah	At-Large
<u>Mo Dehghani</u> (07-12) Lawrence Livermore National Laboratory	At-Large

ASME -CEA Membership (cont.)

<u>Pamela Eibeck</u> (05-10) Texas Tech University	EAC Member
<u>Gina Lee-Glauser</u> (05-10) Syracuse University	EAC Member
<u>Mary Kasarda</u> (07-12) Virginia Tech	At-Large
<u>Gary Kinzel</u> (04-09) Ohio State University	EAC Member
<u>Darrell Pepper</u> (08-13) University of Nevada, Las Vegas	EAC Member
<u>Craig Somerton</u> (08-13) Michigan State University	At-Large
<u>Patrick Usoro</u> (05-10) General Motors	EAC Member
<u>William Wepfer</u> (04-09) Georgia Institute of Technology	EAC Member
<u>Dick Warder</u> (08-13) University of Memphis	At-Large

Responsibilities of the CEA

- Maintain a pool of highly qualified Program Evaluators (PEVs)
- Nominate new members to CEA as needed
- Maintain ME Program Criteria
- Review accreditation statements and actions to detect trends and assure consistency

CEA Subcommittees

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

GENERAL CRITERIA FOR BACCALAUREATE LEVEL PROGRAMS

1. Students
2. *Program Educational Objectives*
3. Program Outcomes
4. Continuous Improvement
5. Curriculum
6. Faculty
7. Facilities
8. Support
9. Program Criteria

ME Program Criteria

These program criteria will apply to all engineering programs including "mechanical" or similar modifiers in their titles.

- Curriculum

The program must demonstrate that graduates have the ability 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 work professionally in both thermal and mechanical systems areas.

- Faculty

The program must demonstrate that faculty members responsible for the upper-level professional program are maintaining currency in their specialty area.

Program Educational Objectives

Criteria for Accrediting Engineering Programs

Effective for Evaluations during the 2009-2010 Accreditation Cycle

Program Educational Objectives – Program educational objectives are broad statements that describe the career and professional accomplishments that the program is preparing the graduates to achieve.

Proposed Change: 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.

From ABET.org [2009-2010 Criteria](#)



Your Turn

- 3 Minutes
- Write one program educational objective for your program

Why do we care?

- Confusing PEOs with Program Outcomes (Pos) can result in a concern or a weakness
- Concern
- Weakness

Sample PEO's from Various Web Sites

Program Objectives

The objectives of the Mechanical Engineering program are to produce graduates who will:

1. have successful careers, and become leaders, in industry and the public sector;
2. appropriately apply acquired knowledge, work well with other people, effectively communicate ideas and technical information, and continue to learn and improve; and
3. successfully pursue advanced studies, if they so choose, and subsequently contribute to the development of advanced concepts and leading edge technologies.

Sample PEO's from Various Web Sites

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.

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.

Sample PEO's from Various Web Sites

Our graduates will meet or exceed the expectations of employers.

Our graduates will be prepared to pursue and obtain professional licenses and advanced degrees in engineering and other professional fields.

Our graduates will engage in lifelong learning to maintain professional competency.

Career and Professional Accomplishments

- Registered Professional Engineer
- ASME Fellow
- Doctor
- Law
- Professor
- Expert Witness
- ASME Committee Member
- CEO
- Entrepreneur

Your turn (10 minutes)

- Look at what you wrote for a PEO
- Be very critical. Do you want/need to revise it?
- Talk to the members at your table and develop one terrific objective

Let's hear your draft Program Educational Objectives



Demonstrating Program Educational Objectives

- Direct *vs.* Indirect Measures
- If you have an assessment office, talk to them!
- Surveys are acceptable for PEO's
 - Alumni surveys
 - Employer surveys
 - Talk to companies when they come to interview – especially alums who come to interview

Ideas for demonstrating: Our graduates will be successful in their careers

- They have jobs
- They have received promotions
- They have received more responsibility
 - Larger more difficult projects or problems
 - Serve as mentors
- They have received increased compensation

Ideas for demonstrating: Our graduates will continue professional development.

- Number of graduate courses taken
- Number of professional courses taken
- Number of patents
- Professional registration
- Papers/ conference talks/workshops
- Company training
- Continuing Education Credits



Questions 

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Preparing your program for the
ABET Visit



Resources for Programs

- ABET Website is the best source for the most updated information (<http://abet.org/>)
- Click on the “Resources for Programs” to download forms, manuals, documents, and check on “Deadlines and Due Dates” (<http://abet.org/deadline.shtml>)
- 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.
- Template for self-study is posted on ABET website July of year prior to visit.
- Assessment should be a regular process.
- Appoint leader of document 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.
- ABET HQ staff will help as questions arise.

How is the Self-Study Organized?

In concert with the criteria:

1. Students
2. Program Educational Objectives
3. Program Outcomes
4. Continuous Improvement
5. Curriculum
6. Faculty
7. Facilities
8. Support
9. 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 (No New Data)?

- Great! 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 must be prepared.

Definitions

(From Section II.D.1. of the ABET Accreditation Policy and Procedure Manual)

Assessment – Assessment is one or more processes that identify, collect, and prepare data to evaluate the attainment of student outcomes and program educational objectives.

Effective assessment uses relevant direct, indirect, quantitative, and qualitative measures as appropriate to the outcome or objective being measured. Appropriate sampling methods may be used as part of an assessment process.

Definitions

(From Section II.D.1. of the ABET Accreditation Policy and Procedure Manual)

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 and program educational objectives are being attained. Evaluation results in decisions and actions regarding program improvement.

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/forms.shtml>

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

Other Materials to include:

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

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.

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.
- Demonstrate achievement of all POs.

Assessment/Evaluation Notebook contd.

- 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!).
- Demonstrate involvement of constituents especially in setting and reviewing PEOs.

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/objectives 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
- 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

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.
- THEN 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!!! These are all we PEVs know about you.
- It is o.k. to use a consultant and/or host a mock visit

Questions/Discussion?



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Responding to your ABET visit



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.

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

7-day response: Errors of fact

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.

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.

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.
- Consider addressing concerns.
- Observations do not need any action.

PANEL DISCUSSIONS

TIPS FOR A SUCCESSFUL ABET VISIT

Panel Members

- Krishnaswamy Srinivasan
Professor and Chair
Mechanical Engineering
Ohio State University
- James Jones, Associate Professor
and Associate Head, School of
Mechanical Engineering, Purdue
University

General Question

- Can you give us a high level description of how you evaluate your program outcomes?

What tips do you have for programs?

Additional Questions