



Accrediting a program in Engineering Technology

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Abstract

One of the most daunting events a college faces is its program's accreditation visit from ABET. An accreditation visit in the best case occurs every six years. This paper will demystify the requirements set forth by ABET. To do this, the paper will explain each of the criteria suggesting what a program evaluator will be looking for. Best practices will be provided that make ABET preparation efficient and beneficial to the program and its faculty. ABET's goal is to insure quality and help the program make improvements. The paper will conclude with best practice ideas for display materials and a description of a typical visit.

This paper will discuss the processes and procedures that must to be carefully developed during the six years between visits in order to maximize benefit and minimize effort. Preparation for the visit can be complicated by misconceptions. This paper will address common questions, frequent mistakes and definitions for confusing terms often encountering during preparation for an ABET visit. One of the most common misconceptions occurs when a program receives their accreditation planning packet. This packet includes the: Accreditation Policy and Procedure Manual, Accreditation Criteria and Self-Study Questionnaire. The packet may look daunting to a program coordinator but the fact is the relevant criteria for your particular program is only about 3 pages long. The paper will provide a simple guide to reading the criteria and understanding its requirements. The best practices provided will help programs to benefit from the work they do while seeking accreditation.

This paper will offer simple guidelines to the requirements set forth by ABET as well explaining the criteria the program evaluators will be looking for. Best practices leveraged from multiple universities will be introduced to help programs not only benefit from their accreditation but also improve their program through the continuous improvement methods provided in this paper.

Introduction

It is well-known that the accreditation visit is an intimidating and stressful event with the level of anxiety only increasing under EC 2000. There are numerous papers dispelling the myths and attempting to explain the logistics and even a summary of the accreditation visit from a program evaluator perspective and even one from a student. Many of these papers are actually longer and more confusing than the documents provided by ABET. It is the intent of the paper to offer a simple and direct approach using the actual documents provided by ABET to the program and used by program evaluators. Once the actual ABET documents are clearly understood then and

only then will the paper discuss some of the best practices this program evaluator has seen over the past twenty accreditation visits.

Background

What does ABET stand for and what do they strive for? As stated on the ABET history web page [4] ABET is simply ABET. ABET only goes by its “Accreditation Board for Engineering and Technology, Inc.” corporate name when required by law. ABET’s full vision and mission can be found at their website [5] and can be summarized as serving the global public in many ways through assuring quality and stimulating innovation.

ABET is organized into four commissions: Applied Science Accreditation Commission (ASAC), Computing Accreditation Commission (CAC), Engineering Accreditation Commission (EAC) and Engineering Technology Accreditation Commission (ETAC). Each commission accredits programs in its discipline. Despite harmonization efforts over the last few years, differences in several of the criteria do exist. This paper will provide explanations and cite criteria used in the ETAC commission.

There are a lot of terms and supporting documents used by ABET that need to be defined. Some of the more important ones are listed below.

- 1) Team Chair (TC). The Team Chair represents ABET and is the central point of contact once a program’s request for evaluation has been accepted. The Team Chair is a highly experienced Program Evaluator who helps the Program Evaluators and program being evaluated.
- 2) Program Evaluator (PEV). The Program Evaluator does the actual program evaluation. The Program Evaluator verifies that the program meets ABET’s criteria. The Program Evaluators are volunteers from both academia and industry that are interested in improving engineering technology education. They are willing to spend a large amount of time in hopes of increasing their knowledge about accreditation and ensuring that programs produce quality future engineers.
- 3) Self-Study Questionnaire. The Self-Study is generated by a program and contains as much written evidence as possible showing how the program meets all ABET’s criteria.
- 4) Accreditation Criteria. This is the most important document. Most of the requirements ABET places on the program is contained in this document.
- 5) Program Educational Objectives (PEO). The Program Educational Objectives are essentially the mission statement of the program. They describe what the program will enable graduates to do a few years after graduation.
- 6) Student Outcomes (SO). Student outcomes describe what the students must learn. Student attainment of the Student Outcomes is verified on a regular basis.
- 7) Findings of Shortcomings. There are three types.

- a. The worst is a Deficiency which indicates that the program is not meeting the criteria or policy. A report or visit focused on this and other findings is required in two years if a program receives a Deficiency and if not resolved will cause a loss of accreditation.
 - b. The second type, a Weakness, is less severe. A Weakness indicated compliance that lacks strength. Showing some compliance to a criterion can change a Deficiency to a Weakness. A report or visit focused on this and other findings is required in two years if a program receives a Weakness but will not cause a loss of accreditation.
 - c. The last type, a Concern, is the least severe. A Concern indicated compliance that might be lost in the future. PEVs look closely at past Concerns to insure continued compliance.
- 8) Finding of Observation. When PEVs see opportunities for the program to improve that are not directly related to the criteria they write an Observation. Although not encouraged by ETAC, PEVs will also use Observations to cite areas of excellence.

The author has been a Senior Design Engineer at Eastman Kodak for 25 years and an active volunteer in both IEEE and ABET. During his seven years on IEEE's Commission for Engineering Technology Accreditation Activities (CETAA) the author has helped write new program specific criteria for several technology programs. As an ABET commissioner of five years he has helped move these changes into the current criteria. As an ABET volunteer the author evaluated over 20 programs. The author is also an Associate Professor at Rochester Institute of Technology where he is the department's associate responsible for accreditation activities. The author has developed tools in Access, Excel and Word that automate data collection and evaluation, as well as self-study materials, that increase faculty efficiency and program effectiveness.

How to have a successful accreditation

What are the steps involved in an ABET accreditation? The first step, one or two years prior to the visit, is to create an assessment and evaluation process. This process will be used to meet General Criteria 2, 3, 4 and the Program Criteria. Generally two years is needed because the assessment and evaluation must be used to make program improvements. During this process:

- 1) Program Educational Objectives (PEO) and Student Outcomes (SO) are validated by the program's constituencies,
- 2) Student attainment of the SO and Program Criteria are assessed and evaluated.
- 3) Assessment and evaluation of the SO are used to make program improvements.

If the program is new or never been accredited by ABET a readiness review will be required. The program must have graduated at least one student prior to a visit. It is best for new programs to contact ABET as soon as accreditation is considered.

For existing programs the next step is completing a request for evaluation (RFE) by January 31st of the year of review and then submission of the Self-Study on or before July 1st. General Criteria 2, 3 and 4 in the Self-Study should be written early in the spring semester allowing time for shortcomings to be addressed while the program is still in session. In May, June or July the Accreditation Lead at the institution (most often Dean) will work with the Team Chair to set a date for the visit and approve the Program Evaluators. It is important to keep in mind town events, festivals or other holidays that may make travel or obtaining accommodations difficult. Most visits occur from late September through early December.

The first face to face meeting is when ABET invites a representative of the institution to the Commission Meeting in mid-July. This meeting provides training, panel discussion and most importantly time to discuss the Self-Study with the Team Chair. Team Chairs will often seek clarification and additional materials during this meeting that will make the visit go much smoother. In July and August the PEVs are able to carefully and thoroughly review the Self-Study. Generally about a month before the visit, most Team Chairs will hold a conference call with the PEVs to discuss preliminary findings. Ask your Team Chair if preliminary findings will be discussed with your program coordinator.

In preparing for the visit, recommend hotel accommodations close to campus and a few unique local restaurant options. Historically finding a restaurant that is open on Sunday night can be tricky. It is a nice idea to suggest a couple of options for Monday's dinner as well. As your program will be well prepared the team will not have a lot of report writing to do Monday night so a nice restaurant recommendation will be appreciated. Tuesday afternoon the team will want to order subs or salads and have them delivered to the team room while they prepare for the exit meeting.

The next step is the visit, when the team arrives on campus. Parking is generally not a concern on Sunday but finding the one open door to the program's building often is. Most teams walk around the building at least once looking for the open door. Printing a campus map and marking it with the best campus entrance, Sunday parking lot, Monday and Tuesday parking lot and entrance door is a really nice courtesy. The team will need a couple of parking passes for Monday and Tuesday if your campus requires them.

Generally the team is met at the entrance and is led to their work room. The lockable conference room becomes home for the team and after introductions and an initial presentation is best left private. Meeting program evaluators outside the team work room is generally preferred. Each team chair has different preferences but most want the room to contain: display materials, computer and printer, shredder, white board, internet access and access to coffee.

The team has two main tasks on Sunday. The first is to tour the facilities. Programs are generally very proud of their facilities and it is important to see that modern equipment is being used and well maintained however, the tours must be kept short. Program evaluators need time to look through all the display materials. Display materials generally consist of student samples supporting the Student Outcomes, Industrial Advisory Board notes if not included in the Self-Study, text books used in the curriculum and sample student project work. Program Coordinators need to explain the organization of the display materials to Program Evaluators and then plan to be available until 4 or 5pm to answer questions if necessary.

On Monday the Team Chair will speak with the administration to verify: adequate institutional support and leadership, sufficient resources for the students and to retain faculty and facilities. For Program Evaluators Monday offers an important opportunity to talk with faculty, students and industrial advisory board members. Having someone available to direct the team around campus in the morning is appreciated; some institutions have an energetic student available to help out. A meeting with students is generally arranged in a lab or classroom setting where evaluators can insure proper advising is taking place and that classes are available and facilities are well maintained. Evaluators meet industrial advisory board members during lunch and insure they are influential in curriculum decisions. The program faculty members are interviewed either individually or in a group. Program evaluators will also spend time in the work room writing their report. A good team will have a draft report completed Monday night. Program coordinators should be available as much as possible on Monday so they can answer questions and provide last minute materials to shore up shortcomings.

The team will spend Tuesday morning creating their final report and incorporating any last minute materials generated by the program Monday night. One important goal of the Program Evaluators is to avoid surprises in front of the Institution President, so they will review the findings with the program coordinator prior to the Exit Meeting. At the Exit Meeting, each Program Evaluator reads his or her findings and leaves a copy with the program. There is no discussion during the exit meeting, just a time to read the findings.

The team will leave preliminary Findings. From this point on, the work of the Program Evaluators is usually complete. The draft report generated by the Team Chair goes through a lot of hands and cycles to insure fairness, accuracy and consistency with other universities. The important events to the program from this point are:

- 1) Immediate contact with Team Chair if there is an “error in fact”. This does not include any quick fixes, just correction to incorrect statements.
- 2) The program receives a draft copy of the report one or two months after the visit. The program has 30 days to respond to the Findings and address shortcomings.
- 3) The Team Chair includes the program response in the final report for the full commission meeting in July.

- 4) The full commission votes on accreditation action for all programs in July. Shortly after the meeting the final report and accreditation action are sent to the college.

It is important to understand the evolution of the report. A PEV will write a preliminary report before the visit. During the visit findings will be added and removed from the report. If a finding is resolved during the visit it, will not be included in the Team Chair's report. A few weeks after the visit the Team Chair creates the draft report using the findings generated by the PEVs. The draft will be edited by three different editors insuring correct application of the criteria and policies. The findings read by the PEVs may change in severity during this process. Once the draft is received by the institution the findings will not be removed from the report, even if resolved. Any resolution will be added to the report. This is why it is important to solve as many shortcomings as possible before the team leaves campus. Sometime in February or March the final report is written which includes the findings and responses from the institute. The editing process is repeated with the three editors double-checking actions taken by the program. The draft report is added to a single report with all other institutions visited that year. The program should continue working on solutions to the findings and send them to the Team Chair a reasonable time before the July meeting. Although not currently written in the policy, May 15th is a reasonable deadline. May 15th will allow the Team Chair and editors enough time to properly review the new evidence and include it in the draft report given to the commission. Material not entered in the draft report can be added to the report during the July meeting with commission agreement. The commission then, using all the information, votes on the accreditation action and the final report is generated.

Some tips on having a successful ABET accreditation

First and foremost, know the Accreditation Criteria and Policies and Procedures. In all the author's visits, the programs that had Team Chairs and Program Evaluators on staff at their Institutions were by far the most successful. These programs knew the Accreditation Criteria. Put simply, there are two documents that contain all the criterion, policies and procedures that your program must satisfy to be successfully accredited. Both documents can be found at the ABET site under the Accreditation tab under "Accreditation Criteria and Supporting Documents" [6].

The first document is the Accreditation Policy and Procedure Manual (APPM) which contains lots of definitions and procedures for all ABET actions. The ABET website does a pretty good job of breaking down most of the procedures and the Self-Study template refers to the sections of the document as needed so briefly skimming this document is sufficient.

The second document is the Accreditation Criteria and is definitely the more important of the two to an institution. There are four sets of criteria, one for each commission. This paper's focus is on the Engineering Technology Accreditation Commission (ETAC) criteria. The 33 page "ETAC Criteria, 2015 – 2016 Criteria for Accrediting Engineering Technology Programs" can initially look daunting however the General Criteria is only about two pages long. The other

pages contain 29 different Program Criteria for every program ETAC accredits. So in very important document you really only need to study three pages. Download the Accreditation Criteria!

Program Evaluators use the criteria to assess your self-study. Team Chairs remind the PEVs that any Finding they find must be supported by an exact sentence in criteria. That's it; it's in black and white. A program that is familiar with these documents will know exactly what is expected by ABET as they seek accreditation and will not be misled by interpretation or myth.

Second, develop a plan to meet the most often cited criteria, Criteria 2, 3, 4 and the Program Criteria. Prepare early, prepare often like we expect our students to do. Because these criteria are so important and to show the reader how little reading is involved, the ETAC Criteria 2, 3 and 4 will be quoted in this paper.

General Criterion 2 covers the Program Education Objectives (PEOs). Criterion 2 states "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." These are your program's mission statement describing what your graduates will be able to do in five plus years after graduation. Programs generally put their PEOs on their program website to meet the publishing requirement. Although all constituents are required to review the PEOs, faculty and the IAB are generally the most important. An easy method for documenting IAB involvement is through a post-meeting survey where members are asked to ensure they meet their needs. In 2013 – 2014 ABET removed the requirement to demonstrate graduate attainment of the PEOs leaving only the requirement for regular validation.

General Criteria 3, 4 and the Program Specific Criteria work closely together. In fact, done correctly General Criterion 3 is combined with the Program Specific Criteria. General Criterion 4 requires a continuous improvement process for Criterion 3 requiring a program to assess and evaluate student attainment of Criterion 3. Since the Program Specific Criteria also required demonstration of student attainment it makes sense to combine the Program Specific Criteria and Criterion 3. Demonstration of student attainment must be done through detailed assessment and evaluation and not simply by saying students take a course.

Criterion 3, Student Outcomes: states "The program must have documented student outcomes that prepare graduates to attain the program educational objectives. There must be a documented and effective process for the periodic review and revision of these student outcomes." Criterion 3 continues to list the famous "a thru k" Student Outcomes for baccalaureate programs. The list is slightly different and shorter for associate degree program including "a thru i". The paper will refer to "a thru k" with the understanding a program will simply pick the correct list. Criterion 3

requires a program to have student outcomes that include “a thru k”. Many programs are now simply adopting the listed “a thru k” outcomes as their student outcomes. Even programs that originally defined their own student outcomes are changing to “a thru k” which removes a lot of complexity. As previously mentioned programs must also include the Program Specific Outcomes listed at the end of the General Criteria. Because Criterion 3 does not mention the Program Specific Criteria many programs overlook them.

It is important to select the proper Program Specific Criteria using the program name printed on a student’s transcript. A program named Electrical Engineering Technology would use the “Program Criteria for Electrical Engineering Technology and Similarly Named Programs”. Similarly a program named Electromechanical Engineering Technology would use the “Program Criteria for Electromechanical Engineering Technology and Similarly Named Programs” which again is straight forward. The correct selection of criteria for a program with options is often misunderstood. If the program offers a degree in Electrical Engineering Technology with a Mechanical Option, the program would still use the Electrical Engineering Technology program criteria. The program must insure that all graduates, with or without the option, can demonstrate all the Electrical Program Specific Criteria with the option being an additional unassessed portion of their degree. Many programs have incorporated their program specific criteria by continuing their Criterion 3 lettering with l, m, n... or PS1, PS2, PS3... and assigning the Program Specific Criteria to these letters.

Criterion 4 states “The program must regularly use appropriate, documented processes for assessing and evaluating the extent to which the student outcomes are being attained. The results of these evaluations must be systematically utilized as input for the continuous improvement of the program.” When developing a process to demonstrate the student outcomes, programs generally overdo it. Assessment is defined as “...one or more processes that identify, collect, and prepare data to evaluate the attainment of student outcomes.” If a program defines two different courses where each outcome is attained, the program has met the Criterion with a safety margin even if something goes wrong in one of the courses. If a course assessment helps demonstrate a second outcome it can be reused. If a course is used by several programs the assessment can be share in all programs. ABET’s definition continues to state “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.” ABET considers student surveys where they are asked if they felt they learned a topic to be indirect. Focus on direct measures such as actual test questions, lab reports and other graded student work were program improvements implemented when the metric is not attained. PEVs are looking for improvements to the program so it is OK if the students fail to reach a metric as long as a conscious effort is made to rectify the weakness. What is important is that the evaluation shows that improvement is needed and that the program documents what changes it has made to the course. Having a form for each assessment is highly recommended. The form should include the following sections: 1) quote the student outcome, 2) describe the measurement method, 3)

describe the metric, 4) professor's assessment, and 5) the evaluation and recommended improvement.

Some of the other common problems Program Evaluators often see result in findings in Criterion 1. Program Evaluators will look closely at student transcripts and talk with students to make sure they are being advised properly. If students are taking classes without the proper prerequisites, out of sequence or graduating without all the required courses a finding will result. Criterion 1 requires that "Students must be advised regarding curriculum and career matters". If it is determined that the problem is actually because need courses are not being offered Criterion 6 will be cited. Criterion 6 requires that "The faculty serving in the program must be of sufficient number to maintain continuity, stability, oversight, student interaction, and advising." The other areas of the Criteria are straight forward and only cited when missing. The Criteria is clear and programs will not be surprised when a finding is cited. Examples in the remaining criteria could be: a program will be cited if they have failed to meet with their Advisory Committee (Criterion 5 Curriculum), have labs with broken equipment (Criterion 7 Facilities), or do not have the institutions support (Criterion 8 Institutional Support). That's it. All the criteria have been discussed. There are no other surprises. A well prepared program has nothing to fear and can only benefit from input the experienced ABET team can offer. As educators we know the value of being well prepared and that procrastination leads to stress and failure. If we as educators can follow the advice we give our students and prepare early, we too will be successful.

Conclusion

To reduce the stress of an accreditation visit you need to prepare a couple of years in advance and read the criteria. A simple analogy to teaching seems relevant at this point. As educators we dream of a class where all the students read the book and do their homework. Program Evaluators have similar dreams about upcoming visits. The visiting team is interested in helping your program improve and learning some new things by watching what you do. They are your friends, your colleagues and often industry experts. This paper has attempted to clarify some of the confusing points in the criteria and share some common pitfalls. The myths associated with accreditation are easily dismissed by reading and understanding a few documents. By reading the criteria and using the tips in this paper your program will have a successful and low stress visit.

References

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