AC 2012-5052: SYNERGIES OF CONVERGING ABET, ATMAE, AND INSTITUTIONAL ACCREDITATION PROCESSES

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Synergies of Converging ABET, ATMAE and Institutional Accreditation Processes

Michael J. Dyrenfurth and Kathryne A. Newton

Abstract

The challenges of achieving and maintaining accreditation for undergraduate programs in engineering technology disciplines such as those served by the Accreditation Board for Engineering and Technology (ABET) and the Association of Technology Management and Applied Engineering (ATMAE) are well known, and are often perceived to be made more complex when complicated by additional requirements for accreditation standards for the Higher Learning Commission (HLC). The challenges are to some degree multiplied when a department is accredited by all three – particularly when these occur within a short time window of two years.

Purdue University's Department of Technology Leadership and Innovation formerly named Industrial Technology Department, in the College of Technology faced this challenge and met it successfully during the 2008-2010 time frame. During the accreditation assessment, self-study and documentation phases some opportunities for synergism were found to have resulted in increased efficiencies in pursuing the differing accreditation requirements. The purpose of this paper is to share how the use of shared learning outcomes and technology created some advantages for the accreditation process. Also discussed are the challenges and disadvantages of pursuing multiple accreditation processes.

Introduction & Context

Purdue University is a mid-western research- and doctoral-extensive land grant university of approximately 44,000 students on its main campus. The university is organized into eleven colleges or schools. One of these, the College of Technology, houses the Technology Leadership and Innovation Department (formerly Industrial Technology Department) which serves as the locus for the activity reported in this paper. Overall, the institution is accredited by the Higher Learning Commission[4] which is a member of the North Central Association of Colleges and Schools (NCA), one of six regional institutional accreditors in the United States.
The Technology Leadership and Innovation Department was created in 2010 by merging the Industrial Technology Department with the Organizational Leadership and Supervision Department. The programs offered by these two prior departments, in addition to the HLC institutional accreditation, were also variously accredited by NCATE, ATMAE and ABET. The new department continues to offer all of the programs that were previously offered by the separate component departments. This includes three engineering technology-relevant options (routes to the degree) to its students. The first is the Industrial Technology option which focuses students on operations and industrial technology positions in business and industry. The second option is the Industrial Distribution option which focuses students onto supply chain management technology in business and industry. The third option is actually a combination of the first two (IT & ID) for those students who desire to develop both sets of competencies. Additionally, the department’s NCATE accredited Engineering/Technology Teacher Education program prepares educators for the state and nation’s school systems and the ATMAE accredited Organizational Leadership and Supervision major program prepares leaders and supervisors for business and industry.

The department’s faculty is the largest of the CoT’s seven departments and as might be expected is quite diverse in terms of faculty background, experience (business, industry and education), as well as gender. Ethnic and racial diversity is a noted exception to the strengths of the other forms of diversity represented by the faculty, although several faculty are citizens of other nations. The greater majority of the faculty possess doctoral degrees and they are very active in graduate education and advisement of masters and PhD students. The faculty are also active in discovery (i.e., scholarship) and engagement. Given their extensive awareness of contemporary industrial and business practice it is not surprising that these faculty are committed to the concept of quality and a continuous improvement program that makes accreditation activities more efficient.

In recent times, the department has developed its first TAC ABET accreditation self-study (successful) and an ATMAE re-accreditation for its industrial technology programs and a first time ATMAE accreditation (successful) for its --- program. Attentive readers will note that this history means that one set of programs, namely the industrial technology ones, is accredited by both ABET and ATMAE. In addition all programs, as well as the balance of the CoT and the University itself successfully
underwent HLC\textsuperscript{[4]} reaccreditation. Three such extensive evaluative assessments in three years necessitated that the faculty evolve some ways of systematizing the continuous improvement and quality assurance procedures.

Purdue University's Department of Technology Leadership and Innovation formerly named Industrial Technology Department, in the College of Technology faced this challenge and met it successfully during the 2008-2010 time frame. During the accreditation assessment, self-study and documentation phases some opportunities for synergism were found to have resulted in increased efficiencies in pursuing the differing accreditation requirements. The purpose of this paper is to share how the use of shared learning outcomes and technology created some advantages for the accreditation process. Also discussed are the challenges and disadvantages of pursuing multiple accreditation processes.

**Purpose of the Paper**

The purpose of this paper is to share the experiences of the faculty as they evolved a more efficient way of collecting quality information, reflecting on it and subsequently documenting it in the various self-studies and other evaluative systems required by the various accreditation bodies. Additionally, the authors desire to:

- Highlight the key lessons learned
- Advance suggestions for others who seek accreditation efficiencies
- Solicit input from colleagues who have also worked to this end.

**Conceptual Overview**

Contemporary accreditation procedures have moved far away from imposing an arbitrary set of distant standards and requirements. Currently, they call for a much more tailored way of looking at how well an institution and/or its programs develop graduates who are effective in terms of the career path/profession they pursue. Outcomes have become much more important than inputs. Continuous improvement procedures with documentation of how their loop has actually been closed are expected.

Figure 1 depicts an overview of the way that faculty viewed and approached the task of addressing the three (HLC, ABET, & ATMAE) accreditation. Key data sources, categories of accreditation criteria are shown cutting across the departments three routes though its degree program.
Methodological Specifics

The original accreditation preparation methods employed by the faculty were rather conventional in that they followed the best practices guidelines and experience as promulgated by the accreditation agencies during their training and professional development session. It helped considerably that the faculty already had before them the model of one successful ATMAE accreditation cycle – albeit one with different criteria and procedures. But, when it came time to develop the department’s first TAC ABET self-study the scope of that effort triggered the faculty to seriously consider how technology might be employed to facilitate data collection and self-study preparation. To this end, the faculty employed a shared network drive and cloud services that permitted simultaneous editing. Constant Contact® was used to facilitate communication with, and
surveying of, students, alumni and employers, and this was augmented by web-based data collection and more.

The data sources employed included:

1. University Catalog
2. Registrar Database
3. COT Promotional materials
4. Departmental Promotional Materials
5. Exit survey of new graduates
   a. Industrial Technology
   b. Industrial Distribution
   c. Organizational Leadership
6. Alumni survey 3-5 years out
   a. Industrial Technology
   b. Industrial Distribution
   c. Organizational Leadership
7. Graduate transcript data
   a. Industrial Technology
   b. Industrial Distribution
   c. Organizational Leadership
8. Departmental course syllabi
9. Departmental programs of study
10. Laboratory descriptions
11. Industrial Technology Industrial Advisory Board records
12. Industrial Distribution Industrial Advisory Board Records
13. Advisory Board Records
14. Industrial Advisory Board surveys
15. Course required performances
   a. Specific assignments
   b. Specific test questions
   c. Sample student work
16. Other student surveys (e.g., Steve’s)
17. Course evaluation data
18. Employer survey data
19. Student Portfolios
20. University Strategic Plan
21. COT Strategic Plan
22. Industrial Technology Strategic Plan & Related materials, e.g., a SWOT analysis
23. Faculty vita

As the various accreditations followed each other in relatively quick succession, the department’s faculty recognized several opportunities that made the synergies that form the theme of this paper possible. The first was that a single set of outcomes could serve the purposes of several programs, i.e., actually differing routes through the one Bachelor of Science Degree that was awarded to each of the department’s graduates. The differentiation that served to distinguish between the Industrial Technology and Industrial Distribution routes for example was deemed to occur by course selection and course content and not by differing program outcomes. This decision alone made for a tremendous savings of time. Appendix A, which presents a side by side compilation of the various accreditation standards and guidelines, demonstrates the basis for the above-mentioned synergy.
The second major synergy was achieved by a considerable move towards standardization in the collection of data from the various sources listed in the previous table. Survey mechanisms were standardized by the means of Constant Contact®. A single syllabus format was designed to meet the needs of all accreditation agencies, and documentation file formats were generated to also serve all. One less than obvious aspect of this standardization is the acculturation of faculty to an ongoing mode of data collection and reflection with respect to performance. Essentially the accreditation processes of the various accreditation agencies are quite similar. They all involve reflective establishment of key goals/outcomes/objectives with due consideration of institutional and departmental missions in the light of client/student needs and aspirations. Subsequently systematic measurement and data collection is called for and this is always followed by thoughtful analysis and then action.

The Department has a strong commitment to continuous improvement, both in the curriculum and in non-curricular aspects of the program. The administration and faculty of the department have practiced continuous improvement essentially since the department began, although it has not always been formally documented as such. The quest for ongoing advancement is exemplified by such procedures as strategic planning, including strengths, weaknesses, opportunities and threats (SWOT) analysis for all aspects of the department’s operation. The Department’s Strategic Plan identifies goals that seek to improve the Department’s national and international standing in the areas of Learning, Engagement, and Discovery which are consistent with visions of the CoT and the University’s new Strategic plans.

The actual work of accreditation, and there was a considerable amount of it, was largely distributed across the faculty but at various times was accomplished by key faculty committees which included an ABET Self-study Team, subcommittees examining the department’s strategic planning, and a Facilities Committee. The department faculty has ownership of and responsibility for the curriculum and together, it and the Curriculum Committee continually assess and evaluate the Industrial Technology, the Industrial Distribution, Engineering Technology Teacher Education, and --------programs.
The department’s strategic planning and assessment activity has been conducted employing the leadership of program-specific teams, with each generating input to the department faculty as a whole. They served as a resource to the faculty in preparing and updating the department’s SWOT analysis and subsequently the strategic, continuous improvement, and assessment plans and to the ABET Self-Study team. The latter team consisted of the Department Head and three faculty members. Together with the balance of the faculty as available and interested at various times, they generated the survey documents, collected key data elements, and prepared components of their assessment and self-study for faculty review and comment.

Overall, the department’s continuous improvement and assessment processes depend on a regular use of a variety of valid data sources that permit triangulation of findings and that generate meaningful quantitative as well as rich qualitative data.

**Assessment of the Initiative**

With the initial experience of the three accreditations behind the faculty by one year, and in the face of an already impending re-accreditation by one of the agencies (ABET), it is an opportune time for reflection on what has occurred and to plan for the future. This was actually the impetus for the genesis of this paper. The authors’ personal assessment deriving from this period is essentially positive in that we believe the experience was clearly a success for the department. It required the faculty’s careful consideration of three different sets of accreditation criteria which necessarily required meetings and interactions that needed to be carved out of a busy faculty’s schedule and which, had accreditation not been desired, would probably not have occurred.
There is still work to be accomplished in increasing the systematization of data collection, analysis and collective reflection on its findings and their meaning. In the context of our newly created department, what the faculty learned and did with respect to three separate accreditations now has to be revised to include an additional program (---). Fortunately, the accreditation agency (ATMAE) serving this program is the same as one of the two that were used for Industrial Technology’s program accreditation.

Next Steps and Recommendations

What is the future for this new department? Given its creation, which resulted in the bringing together into one organizational unit four already effective and successful programs, the opportunity to capitalize on new synergies is the first priority. How can the
faculty better employ their combined strengths to enhance the current programs and evolve new ones that meet their constituencies and client needs even more effectively?

The department is currently evolving a framework for technological innovation and commercialization that may well serve to answer the previous question. In doing so, the accreditation of any new program initiative will be considered during its planning stages. Fortunately, both ABET and ATMAE accreditation procedures are amenable to new/innovative programs, although the former’s requirement for the existence of program graduates defers its accreditation decision until this requirement can be demonstrated. Given that the ATMAE’s process does not have this requirement, the advantage to the department is that there will not be a period during which any new program(s) might not be accredited.

Based on the experience of the past years, it seems appropriate to recommend that colleagues considering multiple accreditations do pursue that path despite the resource demands in terms of faculty time, technology and money for professional development. However, the advantages of increased purposeful and collective reflection that results in real program improvement, positive faculty contributions and enhanced marketing clout should be appreciated.

References


### Appendix A: Accreditation Standards & Guidelines Extracted from their Respective Sources

<table>
<thead>
<tr>
<th>TAC ABET General Criteria 2012-2013 Criteria for Accrediting Engineering Technology Programs</th>
<th>HLC Accreditation Criteria</th>
<th>ATMAE Standards for Accreditation – Baccalaureate Degree Programs</th>
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</thead>
</table>
| Criterion 1. Students Student performance must be evaluated. Student progress must be monitored to foster success in attaining student outcomes, thereby enabling graduates to attain program educational objectives. Students must be advised regarding curriculum and career matters. The program must have and enforce policies for accepting both new and transfer students, awarding appropriate academic credit for courses taken at other institutions, and awarding appropriate academic credit for work in lieu of courses taken at the institution. The program must have and enforce procedures to ensure and document that students who graduate meet all graduation requirements. | Criterion One Mission and Integrity
Criterion Statement The organization operates with integrity to ensure the fulfillment of its mission through structures and processes that involve the board, administration, faculty, staff, and students.
Core Component - 1a The organization’s mission documents are clear and articulate publicly the organization’s commitments.
Core Component - 1b In its mission documents, the organization recognizes the diversity of its learners, other constituencies, and the greater society it serves.
Core Component - 1c Understanding of and support for the mission pervade the organization.
Core Component - 1d The organization’s governance and administrative structures promote effective leadership and support collaborative
Core Component - 1e The organization upholds and protects its integrity. | The objective of accreditation is to ensure that programs in Industrial/Engineering Technology and Applied Engineering which are accredited meet or exceed established standards. Consideration will be given to both the qualitative and quantitative criteria set forth in these standards.  
6.1 Preparation of Self-Study Report----------
Self-Analysis: The Self-Study Report shall follow the guidelines and be completed by a representative portion of the institution’s administrative staff, teaching faculty, and students.  
6.2 Philosophy and Objectives---------------------
6.2.1 Mission: The department, college, and institutional missions shall be compatible with the approved definition of Industrial/Engineering Technology and Applied Engineering.  
6.2.2 Program Definition: The program of study definition and purpose shall be compatible with the approved definition of Industrial/Engineering Technology and Applied Engineering.  
6.2.3 Program Acceptance: Each program of study shall be understood and accepted by appropriate individuals and representative groups within the internal university community. |
| 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 and effective process, involving program constituencies, for the periodic review and revision of these program educational objectives. |  |  |
| Criterion 3. Student Outcomes 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 |  |  |

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6.2.3 Program Acceptance: Each program of study shall be understood and accepted by appropriate individuals and representative groups within the internal university community.
For purposes of this section, broadly defined activities are those that involve a variety of resources; that involve the use of new processes, materials, or techniques in innovative ways; and that require a knowledge of standard operating procedures. Narrowly defined activities are those that involve limited resources, that involve the use of conventional processes and materials in new ways, and that require a knowledge of basic operating processes.

B. For baccalaureate degree programs, these student outcomes must include, but are not limited to, the following learned capabilities:

a. an ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities;

b. an ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes;

c. an ability to design systems, components, or processes for broadly-defined engineering technology problems appropriate to program educational objectives;

d. an ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes;

e. an ability to select and apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require the application of principles and applied procedures or methodologies;

f. an ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes;

g. an ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes;

h. an ability to select and apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require the application of principles and applied procedures or methodologies;

i. an ability to design systems, components, or processes for broadly-defined engineering technology problems appropriate to program educational objectives;

Core Component 2a The organization realistically prepares for a future shaped by multiple societal and economic trends.

Core Component 2b The organization’s resource base supports its educational programs and its plans for maintaining and strengthening their quality in the future.

Core Component 2c The organization’s ongoing evaluation and assessment processes provide reliable evidence of institutional effectiveness that clearly informs strategies for continuous improvement.

Core Component 2d All levels of planning align with the organization’s mission, thereby enhancing its capacity to fulfill that mission.

Criterion Three: Student Learning and Effective Teaching

Criterion Statement The organization provides evidence of student learning and teaching effectiveness that demonstrates it is fulfilling its educational mission.

Core Component 3a The organization’s goals for student learning outcomes are clearly stated for each educational program and make effective assessment possible.

Core Component 3b The organization values and supports effective teaching.

Core Component 3c The organization’s goals for student learning outcomes are clearly stated for each educational program and make effective assessment possible.

Core Component 3d All levels of planning align with the organization’s mission, thereby enhancing its capacity to fulfill that mission.

6.2.4 Program Goals: Each program of study shall have: (1) clearly written short and long range goals and objectives, which are consistent with the program mission statement; and (2) plans for achieving them.

6.3 Program of study

6.3.1 Program Name: Each program of study and/or program option shall have appropriate titles consistent with the approved ATMAE definition of Industrial/Engineering Technology and Applied Engineering.

6.3.2 Program Level: The program of study shall lead to the baccalaureate degree, and not less than the junior and senior years of baccalaureate level study shall be offered by the institution seeking accreditation.

Appropriate lower division requirements may be offered by the same institution or may be transferred from other institutions such as community colleges and technical institutes.

6.3.3 Program Definition: The program of study may have more than one option, specialization, or concentration; but specific course requirements for each option shall be clearly specified, and the requirements for all program options shall meet or exceed appropriate ATMAE standards.

6.3.4 Program Emphasis: Primary emphasis in the program of study shall reflect the current technology and management of industry.

6.3.5 Foundation Requirements: Program of study shall be a minimum of 120 semester
e. an ability to function effectively as a member or leader on a technical team;
f. an ability to identify, analyze, and solve broadly-defined engineering technology problems;
g. an ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature;
h. an understanding of the need for and an ability to engage in self-directed continuing professional development;
i. an understanding of and a commitment to address professional and ethical responsibilities including a respect for diversity;
j. a knowledge of the impact of engineering technology solutions in a societal and global context; and
k. a commitment to quality, timeliness, and continuous improvement.

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<th>Criterion 4. Continuous Improvement</th>
<th>Core Component 3b The organization values and supports effective teaching.</th>
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<td>The program must regularly use appropriate, documented processes for assessing and evaluating the extent to which both the program educational objectives and the student outcomes are being attained. The results of these evaluations must be systematically 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.</td>
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<tr>
<th>Criterion Four: Acquisition, Discovery, and Application of Knowledge</th>
<th>Core Component 3c The organization creates effective learning environments.</th>
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<tr>
<td>Criterion Statement The organization promotes a life of learning for its faculty, administration, staff, and students by fostering and supporting inquiry, creativity, practice, and social responsibility in ways consistent with its mission.</td>
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<th>Core Component 3d The organization’s learning resources support student learning and effective teaching.</th>
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<tr>
<th>Criterion 5. Curriculum</th>
<th>Core Component 4a The organization demonstrates, through the actions of its board, administrators, students, faculty, and staff, that it values a life of learning.</th>
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<tr>
<td>The curriculum must effectively develop the following subject areas in support of student outcomes and program hours (or equivalent) and must meet the minimum foundation requirements shown in Table 6.1. Programs may exceed the maximum foundation requirements specified in each area, but appropriate justification shall be provided for each program and/or program option that exceeds the maximum limits. A specific list of courses and credit hours that are being counted toward each curricular category shall be included in the Self-Study Report.</td>
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<tr>
<th>6.3.6 Course Sequencing</th>
<th>There shall be evidence of appropriate sequencing of course work in each program of study to ensure that advanced level courses build upon concepts covered in beginning level course work.</th>
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<th>6.3.7 Application of Mathematics and Science</th>
<th>Appropriate applications of the principles of mathematics and science shall be evident in technical and management course work.</th>
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<th>6.3.8 Computer Applications</th>
<th>The program of study shall include instruction on computer application software, and the use of computers for information retrieval and problem solving.</th>
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<th>6.3.9 Communications</th>
<th>Oral presentations and technical report writing shall be evident in both technical and management course requirements.</th>
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<th>6.3.10 Industrial Experience</th>
<th>Each program of study shall include appropriate industrial experiences such as industrial tours, work-study options/cooperative education, and/or senior seminars focusing on problem-solving activities related to industry. Industrial experiences shall be designed to provide an understanding of the</th>
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</table>
The Integration of Content Baccalaureate degree programs must provide a capstone or integrating experience that develops student competencies in applying both technical and non-technical skills in solving problems.

Cooperative Education When used to satisfy prescribed elements of these criteria, credits based on industrial environments and what industry expects of students upon employment.

6.3.11 Competency Identification: Student competencies shall be identified for each program of study, including all options, which are relevant to current employment opportunities available to graduates.

6.3.12 Competency Validation: Validation of program of study outcomes/student competencies shall be an on-going process and shall be accomplished through a combination of external experts, industrial advisory committee(s), and follow-up studies of program graduates. Documentation of this validation shall be provided in the Self-Study.

6.3.13 Program Development, Revision, and Evaluation: Program of study development, revision, and evaluation shall involve currently enrolled students, faculty, program graduates, and representative employers.

6.3.14 Transfer Course Work: Institution and/or department policies shall be used to evaluate course work transferred from other institutions. All programs/options, including those with a significant amount of transfer course work, must meet the minimum credit hour foundation course requirements (Table 6.1) in each curricular category.

6.3.15 Upper Division Course Work: Students shall successfully complete a minimum of 15 semester hours of junior and/or senior level major courses at the institution seeking program accreditation.
must include an appropriate academic component evaluated by the program faculty.

Advisory Committee An advisory committee with representation from organizations being served by the program graduates must be utilized to periodically review the program’s curriculum and advise the program on the establishment, review, and revision of its program educational objectives. The advisory committee must provide advisement on current and future aspects of the technical fields for which the graduates are being prepared.

Criterion 6. Faculty Each faculty member teaching in the program must have expertise and educational background consistent with the contributions to the program expected from the faculty member. The competence of faculty members must be demonstrated by such factors as education, professional credentials and certifications, professional experience, ongoing professional development, contributions to the discipline, teaching effectiveness, and communication skills. Collectively, the faculty must have the breadth and depth to cover all curricular areas of the program.

The faculty serving in the program must be of sufficient number to maintain continuity, stability, oversight, student interaction, and advising. The faculty must have sufficient responsibility and authority to improve the program through definition and revision of program educational objectives and student outcomes as well as through the implementation of a program of study that fosters the attainment of student outcomes.

6.3.16 Program Publicity - Adequate and Accurate Public Disclosure: Institutions shall broadly and accurately publicize, particularly to prospective students: (a) Industrial/Engineering Technology and Applied Engineering program goals and objectives, (b) preadmission testing, evaluation requirements, and standards, (c) assessment measures used to advance students through the program(s), and (d) fees and other charges.

6.3.17 Legal Authorization: Only institutions legally authorized under applicable state law to provide degree programs beyond the secondary level, and that are recognized by the appropriate national or regional accrediting agency, are considered for ATMAE accreditation.

6.4 Instruction --------------------------------------------

6.4.1 Course Syllabi: Course syllabi must be presented which clearly describe appropriate course objectives, content, references utilized, student activities, and evaluation criteria. Representative examples of student’s graded work shall be available for coursework.

6.4.2 Reference Materials: Appropriate reference materials such as periodicals, audio-visual materials, websites, and computer application software (when appropriate) shall be utilized for each course or series of courses to supplement textbooks or course packs.

6.4.3 Program Balance: Appropriate laboratory activity shall be included in the program(s) and a reasonable balance must be maintained in course work between the practical application of “how” and the theoretical/conceptual emphasis of “why.”
Criterion 7. Facilities Classrooms, offices, laboratories, and associated equipment must be adequate to support attainment of the student outcomes and to provide an atmosphere conducive to learning. Modern tools, equipment, computing resources, and laboratories appropriate to the program must be available, accessible, and systematically maintained and upgraded to enable students to attain the student outcomes and to support program needs. Students must be provided appropriate guidance regarding the use of the tools, equipment, computing resources, and laboratories available to the program. The library services and the computing and information infrastructure must be adequate to support the scholarly and professional activities of the students and faculty.

Criterion 8. Institutional Support Institutional support and leadership must be adequate to ensure the quality and continuity of the program. Resources including institutional services, financial support, and staff (both administrative and technical) provided to the program must be adequate to meet program needs. The resources available to the program must be sufficient to attract, retain, and provide for the continued professional development of a qualified faculty. The resources available to the program must be sufficient to acquire, maintain, and operate infrastructures, facilities and equipment appropriate for the program, and to provide an environment in which student outcomes can be attained.

Program Criteria
Each program seeking accreditation from the Technology Accreditation Commission of ABET must demonstrate that it satisfies all Program

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<th>Table 6.1 - Program of Study</th>
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<tr>
<td><strong>Foundation Requirements Semester Hours</strong></td>
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<tr>
<td><strong>General Education</strong> - Humanities, English, History, Economics, Sociology, Psychology, Speech, etc.</td>
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<td><strong>Mathematics</strong> - Algebra, Trigonometry, Analytical Geometry, Calculus, Statistics, etc.</td>
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<td><strong>Physical Sciences</strong> - Physics, Chemistry, etc.*</td>
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<td><strong>Management</strong> - Quality Management, Quality Control, Production Planning and Control, Supervision, Finance/Accounting, Safety Management, Facilities Layout, Materials Handling, Legal Aspects/Law, Marketing, Leadership, Project Management, International Business, Team, and/or other courses consistent with the approved definition.</td>
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<tr>
<td><strong>Technical</strong> - Computer Integrated Manufacturing, Computer Aided Design, Electronics, Materials Science/Testing, Computer Science/Technology, Packaging and Distribution, Construction, Manufacturing Processes, and/or other courses consistent with the approved definition.</td>
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<tr>
<td><strong>Electives</strong></td>
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<td><strong>Minimum total semester hours</strong></td>
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*Life Sciences may be appropriate for
Criteria implied by the program title.

6.4.4 Problem-Solving Activities: Emphasis in instruction shall be focused on problem-solving activities which reflect contemporary industrial applications.

6.4.5 Supervision of Instruction: Appropriate supervision of instruction shall be evident throughout the program.

6.4.6 Scheduling of Instruction: The organization and scheduling of instruction shall allow adequate time for completion of appropriate homework assignments and laboratory problem-solving activities.

6.5 Faculty

6.5.1 Full-Time Faculty: Each program of study option shall have an adequate number of full-time faculty.

6.5.2 Minimum Faculty Qualifications: The review of program faculty qualifications shall include current faculty resumes providing clear evidence documenting the extent and currency of: (a) academic preparation, (b) industrial experience at the management/supervisory levels, (c) applied industrial experience related to the program content area(s), (d) current certifications/licensure related to the program content area(s), (e) membership and participation in appropriate professional organizations.
organizations, and (f) scholarly activities. The minimum academic qualifications for regular tenure track, or full-time, faculty members shall be a graduate degree in a discipline closely related to the instructional assignment.

6.5.3 Academic Preparation of Faculty: A minimum of fifty percent of the regular tenure track, or full-time, faculty members assigned to teach in the program of study content area(s) shall have an earned doctorate or appropriately defined terminal degree. Exceptions may be granted to this standard if the institution has a program in place that will bring the faculty demographics into compliance within a reasonable period of time.

6.5.4 Selection and Appointment Policies: Policies and/or procedures utilized in the selection and appointment of faculty shall be clearly specified and shall be conducive to the maintenance of high quality instruction.

6.5.5 Tenure and Reappointment Policies: Faculty tenure and/or reappointment policies and procedures shall be comparable to other professional program areas in the institution. Requirements in the areas of teaching, service, and scholarly activity shall be clearly specified for faculty in Industrial/Engineering Technology and Applied Engineering.

6.5.6 Faculty Loads: Faculty teaching, advising, and service loads shall be comparable to the faculty in other professional program areas at the institution. Consideration shall be given in faculty teaching load assignments to high contact hours resulting from laboratory teaching assignments.
### 6.6 Students

**6.6.1 Admission and Retention Standards:**
Admission and retention standards shall be used to ensure that students enrolled are of high quality. These standards shall compare favorably with the institutional standards. Sources of information may include admission test scores, secondary school rankings, grade point averages, course syllabi, course examinations, written assignments, and oral presentations.

**6.6.2 Scholastic Success of Students:**
Students in Industrial/Engineering Technology and Applied Engineering shall have scholastic success comparable to those in other professional curricula in the institution. Grading practices shall be comparable to other departments and/or programs in the institution.

**6.6.3 Placement of Graduates:**
The initial placement, job titles, job descriptions, and salaries of graduates shall be consistent with the program(s) goals and objectives. Industry’s reaction to graduates as employees must be favorable. Follow-up studies of graduates shall be conducted every two to five years. Summary statistics relating to follow-up studies of graduates shall be made available to the visiting team and the public. These statistics shall include placement rates as well as salary levels of program graduates.

**6.6.5 Student Evaluation of Program(s):**
Evaluations of the Industrial/Engineering Technology and Applied Engineering program(s) shall be made by its graduates on a regular basis (two to five years). Reactions and recommendations shall be considered in
6.6.6 Student Enrollment: Enrollment shall be adequate in each program area to operate the program(s) efficiently and effectively. The level of available financial and facility resources shall be considered as a constraint on the maximum number of qualified students to be admitted to the program(s). Enrollment trends shall be tracked, and factors affecting enrollment patterns shall be identified and analyzed. Enrollment projections shall be made which relate closely to short and long-range goals, as well as financial and physical resource needs.

6.6.7 Advisory and Counseling Services: Adequate and timely advising and counseling services shall be available to students.

6.6.8 Ethical Practices: Ethical practices shall be fostered, including reasonable student refund policies and nondiscriminatory practices in admissions and student employment.

6.7 Administration:

6.7.1 Program Administration: Programs in Industrial/Engineering Technology and Applied Engineering are expected to have an identifiable, qualified individual with direct responsibility for program coordination and curriculum development. This individual shall be a full-time employee of the institution.

6.7.2 Administrative Leadership: Individuals assigned to administer Industrial/Engineering Technology and Applied Engineering programs must demonstrate effective leadership and a high level of support.

6.7.3 Administrative Support: There must be
appropriate support for Industrial/Engineering Technology and Applied Engineering from the personnel holding leadership positions in the departments and colleges where the program is administratively located.

6.8 Facilities and Equipment -------------------------------

6.8.1 Adequacy of Facilities and Equipment:
Physical facilities and equipment, which are suitable to serve the goals and objectives of the program(s), shall be available for each program and option. Where facilities and equipment appear to be minimal to support a quality program(s), comparisons with support levels for other professional programs at the institution will be made by the visiting team.

6.8.2 Support for Facilities and Equipment:
Facility and equipment needs shall be reflected in the long range goals and objectives for the program(s) and option(s), and sources of potential funding shall be identified.

6.8.3 Appropriateness of Equipment:
Equipment shall be appropriate to reflect contemporary industry. Student use of equipment reflecting current technology practices shall be evident.

6.9 Computer Systems -----------------------------------------

6.9.1 Availability of Computer Systems:
Appropriate and current computer systems and software shall be available to both students and faculty. These systems must cover appropriate functions and applications in each program area. These systems may be on or off-site, as long as the systems are accessible to students and faculty.
6.9.2 Utilization of Computer Systems:
Evidence shall be available which indicates that students and faculty are making significant use of computer systems related to program curricula.

6.10 Financial Resources

6.10.1 Financial Support: The budget for the Industrial/Engineering Technology and Applied Engineering program(s) shall be adequate to support program objectives. When judging sufficiency, the visiting team shall make comparisons with the support levels given to other professional programs at the institution.

6.10.2 External Financial Support: There shall be evidence of external support for the program(s) in Industrial/Engineering Technology and Applied Engineering. However, this external support shall be treated as supplementary support, and is to be used to achieve and maintain a high level of program excellence. This external support shall not be used to displace funding support normally provided by the institution.

6.11 Library and Information Resources

6.11.1 Library and Internet Resources: The administrative unit containing the Industrial/Engineering Technology and Applied Engineering program(s) and/or the institutional library shall have access to technology resources, literature, and reference materials adequate to meet the curriculum and research needs of students and faculty.

6.11.2 Utilization of Library and Internet Resources: Evidence shall be available which
indicates that students and faculty are making adequate and appropriate use of library and reference resources.

6.12 Support Personnel
Support Personnel: Personnel such as teaching assistants, student workers, office professionals, and laboratory technicians shall be adequate to support program objectives.

6.13 Placement Services
6.13.1 Placement Services: Appropriate services shall be available to assist with the placement of program graduates. Placement of graduates shall be tracked and the effectiveness of placement services shall be evaluated by the administrative unit containing the Industrial/Engineering Technology and Applied Engineering program(s).

6.13.2 Cooperative Education/Internship: If cooperative education or internship is either a required or an elective part of the program, then appropriate services shall be provided to assist with the placement and supervision of students.

6.14 Industrial Advisory Committee(s)
6.14.1 Program Advisory Committee(s): An industrial advisory committee shall assist in the validation of program content. If more than one program of study or program option is available, then appropriately qualified industrial representatives shall be added to the committee or more than one committee shall be maintained. Policies shall be presented to indicate the: (a) procedures used in selecting
members, (b) length of appointment, (c) organization of the committee, (d) committee responsibilities, (e) frequency of meetings, and (f) methods of conducting business.

6.14.2 Advisory Committee Meetings: The industrial advisory committee(s) shall meet at least once each year, and minutes shall be kept of these meetings showing agenda items, actions taken, and recommendations made.

6.15 Educational Innovation: 

Educational Innovation: There shall be evidence that program objectives are based upon long-range planning related to the industries being served. Program content must be current in both content and delivery of instruction.

6.16 Assessment: 

Assessment Plan and Integration: An assessment plan shall be comprised of, but not limited to, the following for each program: (1) program mission statement, (2) program outcomes/student competencies, (3) evidence that the program incorporates these outcomes/student competencies, (4) assessment measures used to evaluate student mastery of the student competencies stated, (5) compilation of the results of the assessment measures, and (6) evidence that these results are used to improve the program.