Outcome-Based Assessment

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What are Outcomes?

- Educational targets.
- Must be
  - Explicit: known to students and instructors.
  - Relevant: to graduates' professional & civic lives.
  - Hierarchical: move from broad abilities to specific student behavior.
  - Observable.

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Grades and Assessment

- Provide a convenient measure of performance on assignments.
- Summative assessment rather than specific indicator of areas of competency.
- No specific feedback to students on areas that need improvement.
- Not always a good indicator of "what students can do and how well they can do it".

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What is Outcome-Based Assessment?

Classic adaptive management approach comprising four components

1. Define educational targets (outcomes).
2. Help students achieve targets (teach).
3. Check if target are met (assessment).
4. Change actions to ensure meeting targets.

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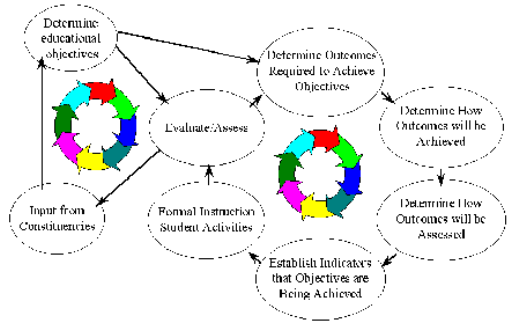
The Two Loops of EC2000



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ABET 2000 Outcomes

Graduates must have

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

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ABET 2000 Outcomes (cont.)

e. an ability to identify, formulate, and solve engineering problems.
f. an understanding of professional and ethical responsibility.
g. an ability to communicate effectively.
h. the broad education necessary to understand the impact of engineering solutions in a global and societal context.

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ABET 2000 Outcomes (cont.)

i. a recognition of the need for, and an ability to engage in life-long learning.
j. a knowledge of contemporary issues.
k. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

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Assessing Program Outcomes

- Use two forms to assess program outcomes:
  - Long form
  - Short Form
- Forms completed by the instructor.

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Long Form

- Key classes only (EE 191, 220, 370, 490, 491, ENGR 301, Internship)
- Coverage of outcomes 0-4: 0 not covered, 4 heavily covered.
- a-k outcome assessment: percentage of students who fully meet, substantially meet, or fail to meet the program outcome.
- Based on student performance on relevant assignments.

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Short Form

- Completed for all classes (other than the key classes),
- Coverage of outcomes 0-4: 0 not covered to 4 heavily covered.

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Use of Forms

- Curriculum Map: summarize coverage of a-k in the curriculum using the scores (0-4) for each course.
- Outcome score:
  - Score of x% = percentage of students that fully or substantially meet expectations.
  - Average the scores for each program outcome (a-k) using all the data from all the key courses.

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Correction

- If the curriculum map shows that an outcome is not adequately covered.
- If any average outcome score drops below 90%

1. Inform EE Curriculum Committee
2. Curriculum Committee proposes changes.
3. Discussion and approval by faculty.

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EE Program Objectives

1. **Depth.**
2. **Breadth.**
3. **Professionalism.**

- Approved by the constituencies of the EE Department
- Periodically contact the constituencies to review program objectives.

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Depth

Graduates apply knowledge in the practice or the advanced study of electrical engineering, including its scientific principles, rigorous analysis, and creative design.

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Breadth

Graduates apply knowledge including information on the most important current issues in electrical engineering for productive careers in the public or private sector or for the pursuit of graduate education.

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Professionalism

Graduates communicate clearly and work ethically and professionally in teams in a complex modern environment and engage in life-long learning to adapt to change in the requirements of their profession.

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Assessing Objectives

- Survey of recent graduates.
- Questions: have the objectives been met?
- Relate questions to one or more objective.
- Score = percentage of responses of strongly agree or somewhat agree.
- Average score for each objective.

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Correction

- Deficiency = average score for a program objective less than 80%
- If a deficiency is detected

1. Inform EE Program Curriculum Committee
2. Curriculum Committee proposes changes.
3. Approval by faculty.

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Conclusions

- ABET Accreditation.
- Outcome-based assessment.
- EE Program outcomes.
- EE Program objectives.
- Assessment plan for EE Program.

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