

# A TWO Year Experience to Accreditation

St Louis Community College  
Mechanical Engineering Technology Program

ABET Symposium  
Tom McGovern  
Associate Professor  
St Louis Community College  
September 20, 2012



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## Who is Here?

Lets see what the representation in the room is:

- A) Faculty – 2 year college
- B) Faculty – 4 year college
- C) Administration – 2 year college
- D) Administration – 4 year college
- E) Staff – 2 year college
- F) Staff – 4 year college
- G) A group I did not think about



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## What is your Experience Level with ABET?

- A) We have completed an ABET cycle
- B) We are preparing for our visit
- C) We are in the middle of writing a Self Study
- D) We are considering ABET accreditation
- E) What is ABET?



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## Benefits of the ABET Process

- Accreditation
- Administrative support
- Company Needs - Employment
- Self evaluation



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## ABET Definitions

**Program Educational Objectives** – “broad statements that describe what graduates are expected to attain within a few years of graduation.”

**Student Outcomes** – Student outcomes describe what students are expected to know and be able to do “by the time of graduation.”

**Assessment** – Assessments “evaluate the attainment of student outcomes and program educational objectives.”

**Evaluation** – Evaluation interprets “the data and evidence accumulated through assessment processes. Evaluation results in decisions and actions regarding program improvement.”

Taken from:

**Criteria for Accrediting Engineering Technology Programs** Effective for Reviews during the 2012-2013 Accreditation Cycle



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## ABET – Criterion Overview

- Criterion 1 – The students -
  - Who are you teaching to?
- Criterion 2 – Program Educational Objectives
  - What will graduates be doing in 5 years?
- Criterion 3 - Student Outcomes
  - What will your graduates be able to do?
- Criterion 4 – Continuous Improvement
  - When and how will you evaluate and improve as needed?



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## ABET – Criterion Overview

- Criterion 5 – Curriculum
  - How are your student outcomes supported?
- Criterion 6 – Faculty
  - Who is teaching your students?
- Criterion 7 – Facilities
  - Where are your students being taught?
- Criterion 8 – Institutional Support
  - How is the program supported by the college?
- Program Criteria
  - Unique requirements to your specific technology degree



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## Which Criterion is the Most Challenging?

- A) Criterion 1 – The students
- B) Criterion 2 – Program Educational Objectives
- C) Criterion 3 - Student Outcomes
- D) Criterion 4 – Continuous Improvement
- E) Criterion 5 – Curriculum
- F) Criterion 6 – Faculty
- G) Criterion 7 – Facilities
- H) Criterion 8 – Institutional Support
- I) Program Criteria



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# ABET Help

Three key documents:

**Accreditation Procedure and Policy Manual, 2012-2013**

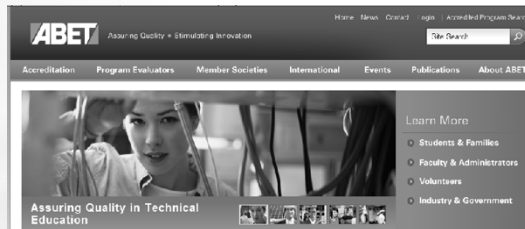
The rules for how accreditation will be done

**Criteria for Accrediting Engineering Technology Programs, 2012-2013**

The definition of what your program must demonstrate

**Self-Study Questionnaire Templates**

How you demonstrate meeting the Criterion



ABET's main website  
<http://www.abet.org/>



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# Team Effort

- ❖ Administration
  - President on down
- ❖ Data research
  - Graduation rates
  - Employment
  - Entrance cohorts
- ❖ Key areas
  - Student services
  - Instructional Resources
  - Math and Science chairs
  - Etc.
- ❖ DEPARTMENT
  - Start early
  - Piece by piece



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## Where it Starts: Mission Statement

St. Louis Community College expands minds and changes lives every day.

We create accessible, dynamic learning environments focused on the needs of our diverse communities.



Florissant Valley campus



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## About the College

- Four campuses at Florissant Valley, Forest Park, Meramec and Wildwood
- Three education centers in St. Louis County, north St. Louis City and downtown St. Louis
- Numerous satellite locations in area business, industrial, neighborhood and educational sites
- Corporate Center in Bridgeton
- Administrative Center, 300 South Broadway
- 3,854 full- and part-time employees



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# Engineering and Technology Department

Established in 1966      9 Full time faculty and 20 adjuncts

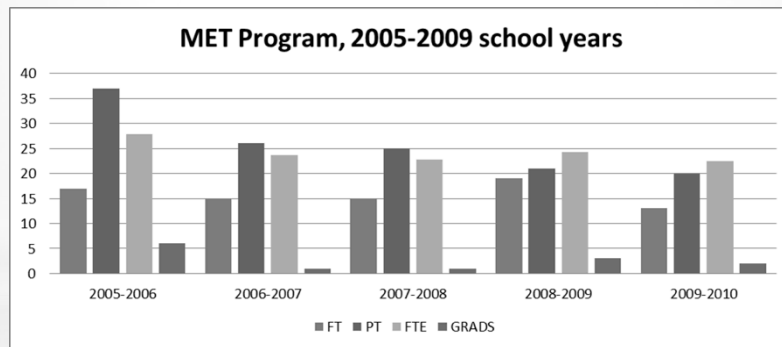
Program Title1	Day and evening	Modes Offered			Name of Degree Awarded	Designation on Transcript
		Co-op	Off Campus	Alternative Mode		
Engineering Science	X				Associate in Science	Engineering Science
Civil Engineering Technology	X				Associate in Applied Science	Civil Engineering Technology
Construction Management Technology	X				Associate in Applied Science	Construction Management Technology
Electrical/Electronic Engineering Technology	X				Associate in Applied Science	Electrical/Electronic Engineering Technology
Manufacturing Technology	X				Associate in Applied Science	Manufacturing Technology
Mechanical Engineering Technology	X				Associate in Applied Science	Mechanical Engineering Technology
Quality Technology	X				Associate in Applied Science	Quality Technology
Robotics Technology	X				Associate in Applied Science	Robotics Technology
Technology Teacher Education	X				Associate in Science	Technology Teacher Education



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## Mechanical Engineering Technology

- Accredited since 1972 with only a 3 year gap.
- Most recently evaluated in 2010-2011
- Reaccredited



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## MET Program Outcomes

- 1) Demonstrate an ability to identify, clarify and solve technical problems using applied knowledge of math, science and engineering.
- 2) Understand the importance of staying technically current and keeping pace with rapidly occurring changes in technology.
- 3) Apply creativity and continuous improvement in the design process.
- 4) Function cooperatively within multi-disciplinary teams.
- 5) Show an ability to work effectively in, and appreciate the value of a culturally diverse professional environment.
- 6) Practice effective oral and written communication.
- 7) Understand the impact of engineering and technology on global, societal and environmental issues.



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## ABET Criterion 3 – Student Outcomes

The student outcomes must include, but are not limited to, the following learned capabilities:

- a. an ability to apply the knowledge, techniques, skills, and modern tools of the discipline to narrowly defined engineering technology activities;
- b. an ability to apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require limited application of principles but extensive practical knowledge;
- c. an ability to conduct standard tests and measurements, and to conduct, analyze, and interpret experiments;
- d. an ability to function effectively as a member of a technical team;
- e. an ability to identify, analyze, and solve narrowly defined engineering technology problems;
- f. 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;



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## ABET Criterion 3 – Student Outcomes Continued

- g. an understanding of the need for and an ability to engage in self-directed continuing professional development;
- h. an understanding of and a commitment to address professional and ethical responsibilities, including a respect for diversity; and
- i. a commitment to quality, timeliness, and continuous improvement.
- 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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## What is the Relationship Between Program Outcomes and ABET Student Outcomes?

- A) Your Program Outcomes must be the same as the ABET Student Outcomes
- B) Your Program Outcomes have no relation to ABET Student Outcomes
- C) Your Program Outcomes can not be changed after the self study
- D) Your students must meet all of your Program Outcomes
- E) Your chosen Program Outcomes must encompass the ABET Student Outcomes



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# Link What You're Doing to ABET

Mechanical Engineering Technology Student Outcomes 2010 vs ABET criteria

<b>Program Outcome 1:</b> Demonstrate an ability to identify, clarify and solve technical problems using applied knowledge of math, science and engineering.	a	b	c	d	e	f	g	h	i	j	k
<b>Program Outcome 2:</b> Understand the importance of staying technically current and keeping pace with rapidly occurring changes in technology.	a	b	c	d	e	f	g	h	i	j	k
<b>Program Outcome 3:</b> Apply creativity and continuous improvement in the design process.	a	b	c	d	e	f	g	h	i	j	k
<b>Program Outcome 4:</b> Function cooperatively within multi-disciplinary teams.	a	b	c	d	e	f	g	h	i	j	k
<b>Program Outcome 5:</b> Show an ability to work effectively in, and appreciate the value of a culturally diverse professional environment.	a	b	c	d	e	f	g	h	i	j	k
<b>Program Outcome 6:</b> Practice effective oral and written communication.	a	b	c	d	e	f	g	h	i	j	k
<b>Program Outcome 7:</b> Understand the impact of engineering and technology on global, societal and environmental issues.	a	b	c	d	e	f	g	h	i	j	k

Note: Current ABET requirements only go to h for Associates programs



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# The "Aha!" Moment



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## Design Assessment Activities for the Program like a Course Design

Year and Semester (or Quarter)	Course (Department, Number, Title)	1) Solve technical problems	2) Staying technically current	3) creativity and improvement in design	4) function in teams	5) culturally diverse	6) effective communication	7) global, societal, environmental impact
1st Semester								
GE: 131	Engineering Tech. Orientation		X			X	X	X
ME: 151	Manufacturing Process I	X		X				X
GE: 101	Technical Computer Program	X	X			X	X	
EGR: 100	Engineering Drawing	X	X					
ENG: 101	College Composition I							
MTH: 144	Tech. Algebra & Trigonometry							

*Only part shown for clarity*



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## Select Assessments to Cover Outcomes

Outcome 5 Assessments:  
Orientation Ethics Challenge

Outcome 6 Assessments:  
GE:511 Project  
Processes II "Future Trends"  
Energy Conversions Paper

Outcome 7 Assessments:  
GE:511 Article reviews  
Processes II "Future Trends"  
Orientation – "Did you know"  
Energy Conversions Paper



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## Demonstrate What You are Doing



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## Supporting Materials



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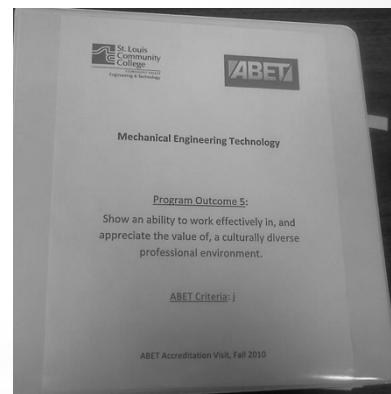
## Student Projects on Display



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## Example – Outcome 5

- Section 1 – Summary of Outcome
- Section 2 – Corrective Action
- Section 3 – Assessments
  - Yearly organization
  - Assignment summary for each
  - Rubrics for each
- Final section – supplemental
  - Shows depth
  - Not assessed



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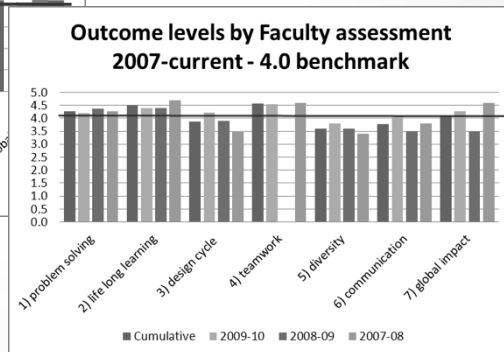
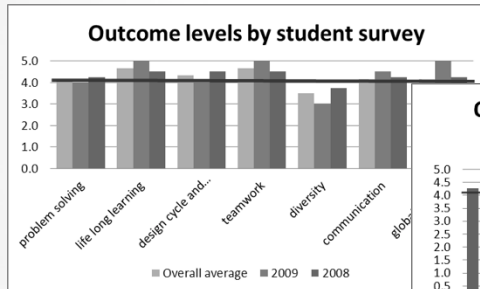
# Cycle of Evaluation

Outcome	Yearly Outcome review plan					2015-16
	2010-11	2011-12	2012-13	2013-14	2014-15	
1) Solve technical problems	x		x		x	
2) Staying current	x		x		x	
3) Creative and Improvement in Design	x		x		x	
4) Function in teams		x		x		x
5) Cultural Diversity		x		x		x
6) Effective Communication		x		x		x
7) Engineering Impact		x		x		x



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# Analyze the Data



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## Outcome 5 Evaluation Sample

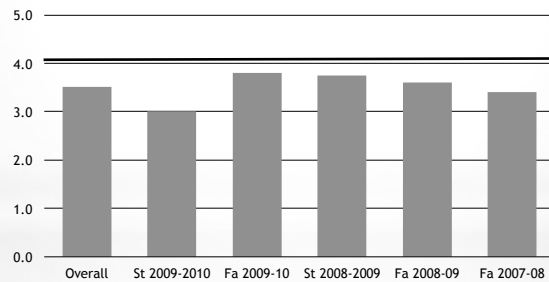
Assessment activities – completed by Faculty

Class Number: GE:131

Assignment: Ethics Challenge

Graduate Survey – completed by students/graduates

**Outcome 5 assessment by students,  
faculty and 3 year average**



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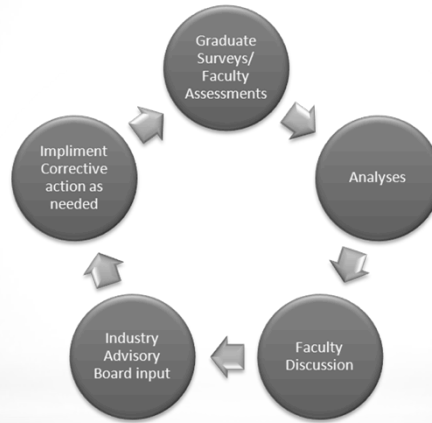
## What is the Effect of not Meeting a Program Outcome Benchmark?

- A) The program will not be accredited
- B) The program will have to change the Outcome benchmark so it is met
- C) The program must show a Corrective Action plan to improve the Student Outcome results
- D) There is no effect on the program for not meeting a benchmark



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## ABET Criterion 4 – Continuous Improvement



**Not just this year but every year!**



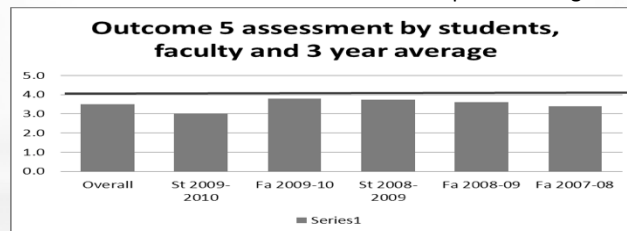
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## Outcome 5 - Corrective Action Sample

- Imposed from Self Study – DON'T WAIT TO START
- Included changes in binders for visit

Change 1 – more depth on Ethics Challenge  
Added an essay component

Change 2 – Modified assignment in Materials and Metallurgy  
Added cultural element to Materials Acquisition assignment



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## Team Visit - Preliminary Findings

**Deficiency** – indicates that a criterion, policy, or procedure is not satisfied.

**Weakness** – indicates that a program lacks the strength of compliance with a criterion, policy, or procedure and a remedial action is required to strengthen the compliance before next review.

**Concern** – indicates that a program currently satisfies a criterion, policy, or procedure. However, the potential exists for the situation to change to not meeting the criterion, policy, or procedure.

**Observation** – indicates a comment or suggestion which does not relate directly to accreditation action but is offered to assist the institution in its continuing efforts to improve its programs.

Process note: The Preliminary Findings are edited twice before being official as a DRAFT report .

**DON'T WAIT TO MAKE CHANGES**



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## MET Results

### Preliminary Findings:

<u>Finding 1</u> : Weakness based on lack of coverage of ethics.	Criterion 3 – Old Outcome I
<u>Finding 2</u> : Weakness based on lack of respect for diversity.	Criterion 3 – Old Outcome I
<u>Finding 3</u> : Weakness Social Studies and Humanities elective .	Criterion 3 - Old outcome J
<u>Finding 4</u> : Concern – students in the program	Criterion 8
<u>Finding 5</u> : Concern – Engineering/Technology clarity	Policy Issue
<u>Finding 6</u> : Observation – Physics 1 as pre-req to Mechanics – Statics	
<u>Finding 7</u> : Facilities – Outstanding Quality of labs and equipment	

### Draft Statement:

<u>Finding 1</u> : Weakness based on lack of coverage of ethics.	Criterion 3 – Old Outcome I
<u>Finding 4</u> : Concern – students in the program	Criterion 8
<u>Finding 5</u> : Concern – Engineering/Technology clarity	Policy Issue

All others were removed in editing process.



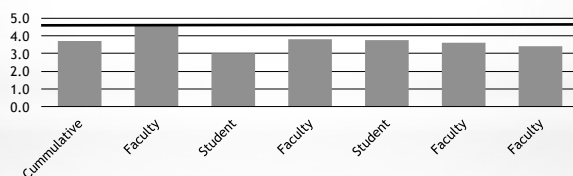
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## Due Process Response MET Outcome 5 example

- Begun after visit
- Clarified existing assignments
- Add 4 new assessments
- Updated Evaluation
- Complete before June

Outcome 5					
Item	2007	2008	2009	2010	Average
Orientation - Ethics	3.4	3.6	3.8	4.2	3.75
Fluid Power - Case Study				5	5
Strength of Materials Case Study				4.5	4.5
Manufacturing Process II Case study					
Dynamics Case Study					
Average	3.4	3.6	3.8	4.57	

**Outcome 5 Assessment - Cummulative,  
Faculty and Student Averages**



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## Final General Review

Commission meets in July to compare final reports  
Decisions posted by August 31st

**MET Results:**

**REACCREDITATION**

**No deficiencies or weaknesses**



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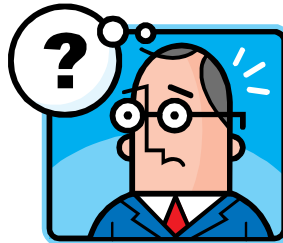
## How Did This Seminar Help?

- A) I am looking at the accreditation process totally differently
- B) I have a clearer idea of how to do accreditation
- C) I picked up a few ideas
- D) I did not get much from this
- E) Where were the donuts?



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## Questions?



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# Community College Differences

Student Body



Timeline

Degree Goals



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