

# ASSESSMENT

## Introduction

The department will use six sigma theory to implement the assessment process. DMAIC (Define-Measure-Analyze-Improve-Control) forms the 5 steps to improve and enhance our programs.

A comprehensive 3-dimensional assessment approach is taken, which includes course-level assessment, program-level assessment, and department-level assessment. The total outcome of the assessment efforts is to answer the following four questions: 1. What should we teach? 2. How much have we taught what we claimed we will teach? 3. How did we teach? And 4. How did students learn? “How did student learn” is the most important question we have to answer.

At the course level, we will use an FCAR (Faculty Course Assessment Report) tool as the measuring method. We intend to answer the questions 2, 3 and 4 at this level. At the program level, we will use the exit survey, graduate survey, and employer survey as well as the industrial advisory board as the measuring methods, questions 1, 3, and 4 will be answered by this level of assessments. At the department level, we will use industrial advisory board meeting and department annual report as the measuring methods. Both qualitative and quantitative assessments will be required in this level, which will provide general guidance of how the department was performing and strategic directions of the future developments.

We are currently in the process of developing a comprehensive Entrance/Exit exam for each program. The process may take a few years to be relatively perfect for providing an objective assessment tool to measure “how did students learn”. Once that completes, it will further improve our assessment process.

The assessment approach relates the TAC/ABET accreditation criteria in the following way:

1. TAC/ABET program specific objectives are excellent guidelines for us to determine what should we teach.
2. The TAC/ABET program specific outcomes as well as general outcomes (a to k) are mapped into the courses in each program.
3. Course-level assessment will provide highly correlated measures of the program specific outcomes.
4. Program-level assessment will provide direct measures of general outcomes.

## **Program Level Student Learning Outcomes**

(TAC/ABET Criteria 3)

For baccalaureate degree programs,

- 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 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;
- c. an ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes;
- d. an ability to design systems, components, or processes for broadly-defined engineering technology problems appropriate to program educational objectives;
- 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 nontechnical 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.

MAPPING:  
B.S. CONSTRUCTION TAC/ABET OUTCOMES 3(a)-3(K) to Courses

<b>COURSES</b>	<b>NAME OF COURSE</b>	<b>a</b>	<b>b</b>	<b>c</b>	<b>d</b>	<b>e</b>	<b>f</b>	<b>g</b>	<b>h</b>	<b>i</b>	<b>j</b>	<b>k</b>
CET 105	Construction Materials	X	X				X		X			
CET 254	Construction Methods and Equipment	X	X	X					X	X		
CET 256	Bituminous, Concrete, and Soils	X	X	X			X					
CET 260	Mechanics of Materials	X	X	X			X					
CET 305	Mechanical & Electrical Installations	X	X	X	X	X	X	X				
CET 308	Analysis of Structures	X	X				X					
CET 358	Structural Steel & Wood Design	X	X		X		X					
CET 360	Construction Management	X	X			X			X	X	X	X
CET 408	Design of Concrete & Masonry Structures	X	X		X	X	X			X	X	X
CET 454	Construction Estimating	X	X			X	X	X	X	X	X	X
CET 458	Soil Mechanics and Foundations	X	X	X	X		X					
CET 480	Construction Planning and Scheduling	X	X			X	X		X			X
CET 485	Selected Topics in Construction	X	X			X	X	X	X	X	X	X
EGT 202	Surveying I	X	X	X		X	X					
EGT 205	Computer Aided Drafting I	X	X				X	X			X	
EGT 215	Computer Aided Drafting II	X	X				X	X			X	
EGT 260	Statics	X	X				X					
EGT 350	Technical Report Writing					X		X		X		
EGT 356	Fluids and Hydraulics	X	X				X					
EGT 370	Financial Aspects of Engineering Projects	X	X			X	X		X			

**MAPPING:**  
**B.S. ELECTRONICS TAC/ABET OUTCOMES 3(a)-3(K) to Courses**

<b>COURSES</b>	<b>NAME OF COURSE</b>	<b>a</b>	<b>b</b>	<b>c</b>	<b>d</b>	<b>e</b>	<b>f</b>	<b>g</b>	<b>h</b>	<b>i</b>	<b>j</b>	<b>k</b>
EET 100	Electrical Circuits I	X	X	X			X			X		
EET 200	Electrical Circuits II	X	X	X			X			X		
EET 202	Digital Logic	X	X	X			X					
EET 206	Introduction to Microcomputers	X	X	X			X					
EET 212	Introduction to Semiconductor Devices	X	X	X			X			X		
EET 312	Electronic Amplifiers and Integrated Cir	X	X	X			X			X		
EET 342	Analog Communications Systems	X	X	X			X	X	X			
EET 372	Programmable Logic Controllers	X	X	X	X		X			X	X	
EET 412	Oper. Amplifiers & Linear Integrated Cir	X	X	X	X		X					
EET 422	Electrical Power Technology	X	X				X			X		
EET 452	Automation and Process Control Technology	X	X	X	X		X	X	X		X	X
EET 482	Integrated Systems Project	X	X	X	X	X	X	X	X		X	X
EGT 102	Programming for Engineering Technology	X	X				X			X		
EGT 103	Electronics Eng. Tech Fundamentals	X	X		X	X	X	X	X	X	X	X
EGT 205	Computer Aided Drafting I	X	X				X	X			X	X
EGT 350	Technical Report Writing					X		X		X		
EGT 490	Engineering Technology Internship		X			X	X	X	X	X	X	X

## **CET Course Level Student Learning Outcomes**

Aa. utilizing modern instruments, methods and techniques to implement construction contracts, documents, and codes;

Ab. evaluating materials and methods for construction projects;

Ac. utilizing modern surveying methods for construction layout;

Ad. determining forces and stresses in elementary structural systems;

Ae. estimating material quantities and costs; and

Af. employing productivity software to solve technical problems.

Ba. producing and utilizing design, construction, and operations documents;

Bb. performing economic analyses and cost estimates related to design, construction, and maintenance of systems in the construction technical specialties;

Bc. selecting appropriate construction materials and practices;

Bd. applying principles of construction law and ethics;

Be. applying basic technical concepts to the solution of construction problems involving hydraulics and hydrology, geotechnics, structures, construction scheduling and management, and construction safety; and

Bf. performing standard analysis and design in at least one recognized technical specialty within construction engineering technology that is appropriate to the goals of the program.

MAPPING:  
B.S. CONSTRUCTION LEARNING OUTCOMES to Courses

<b>COURSES</b>	<b>NAME OF COURSE</b>	<b>Aa</b>	<b>Ab</b>	<b>Ac</b>	<b>Ad</b>	<b>Ae</b>	<b>Af</b>	<b>Ba</b>	<b>Bb</b>	<b>Bc</b>	<b>Bd</b>	<b>Be</b>	<b>Bf</b>
CET 105	Construction Materials	X	X			X				X			X
CET 254	Construction Methods and Equipment	X	X					X	X			X	X
CET 256	Bituminous, Concrete, and Soils	X	X							X		X	X
CET 260	Mechanics of Materials	X	X		X					X		X	X
CET 305	Mechanical & Electrical Installations	X	X				X	X	X				X
CET 308	Analysis of Structures				X		X	X				X	X
CET 358	Structural Steel & Wood Design				X			X				X	X
CET 360	Construction Management	X	X			X		X	X	X	X	X	X
CET 408	Design of Concrete & Masonry Structures				X		X	X				X	X
CET 454	Construction Estimating	X	X			X	X	X	X	X	X	X	
CET 458	Soil Mechanics and Foundations	X	X		X			X	X			X	X
CET 480	Construction Planning and Scheduling	X	X			X	X	X	X	X	X	X	
CET 485	Selected Topics in Construction	X	X		X	X		X	X	X	X	X	X
EGT 202	Surveying I	X	X	X			X	X			X	X	X
EGT 205	Computer Aided Drafting I	X					X	X					
EGT 215	Computer Aided Drafting II	X					X	X					
EGT 260	Statics				X			X				X	
EGT 350	Technical Report Writing	X					X	X			X	X	
EGT 356	Fluids and Hydraulics				X							X	X
EGT 370	Financial Aspects of Engineering Projects	X				X	X	X	X			X	

## **EET Course Level Student Learning Outcomes**

Aa. the application of circuit analysis and design, computer programming, associated software, analog and digital electronics, and microcomputers to the building, testing, operation, and maintenance of electrical/electronic(s) systems.

Ab. the applications of physics or chemistry to electrical/electronic(s) circuits in a rigorous mathematical environment at or above the level of algebra and trigonometry.

Ba. the ability to analyze, design, and implement control systems, instrumentation systems, communications systems, computer systems, or power systems.

Bb. the ability to apply project management techniques to electrical/electronic(s) systems.

Bc. the ability to utilize statistics/probability, transform methods, discrete mathematics, or applied differential equations in support of electrical/electronic(s) systems.

**MAPPING:**  
**B.S. ELECTRONICS LEARNING OUTCOMES to Courses**

<b>COURSES</b>	<b>NAME OF COURSE</b>	<b>Aa</b>	<b>Ab</b>	<b>Ba</b>	<b>Bb</b>	<b>Bc</b>
EET 100	Electrical Circuits I	X	X			
EET 200	Electrical Circuits II	X	X			X
EET 202	Digital Logic	X				X
EET 206	Introduction to Microcomputers	X	X	X		X
EET 212	Introduction to Semiconductor Devices	X	X			
EET 312	Electronic Amplifiers and Integrated Cir	X	X			
EET 342	Analog Communications Systems	X		X		X
EET 372	Programmable Logic Controllers	X	X	X	X	
EET 412	Oper. Amplifiers & Linear Integrated Cir					
EET 422	Electrical Power Technology	X	X	X	X	
EET 452	Automation and Process Control Technology	X		X	X	
EET 482	Integrated Systems Project	X		X	X	X
EGT 102	Programming for Engineering Technology	X				
EGT 103	Electronics Eng. Tech Fundamentals				X	
EGT 205	Computer Aided Drafting I	X				
EGT 350	Technical Report Writing				X	
EGT 490	Engineering Technology Internship			X	X	