

New changes in ABET criteria

Department of Electrical and Telecommunication Engineering

An-Najah National University

2019/2020

New Definitions (New Language)

- **Basic Science (Old)** – Basic sciences are defined as biological, chemical, and physical sciences.
- **Basic Science (New)** – Basic sciences are disciplines focused on knowledge or understanding of the fundamental aspects of natural phenomena. Basic sciences consist of chemistry and physics and other natural sciences including life, earth, and space sciences.

Computer science is not considered a basic science.

- **College-Level Mathematics (Old)**: Not explicitly defined in current criteria.
 - **College-Level Mathematics (New)** – College-level mathematics consists of mathematics that requires a degree of mathematical sophistication at least equivalent to that of introductory calculus.
- ***For illustrative purposes, some examples of college-level mathematics include calculus, differential equations, probability, statistics, linear algebra, and discrete mathematics.

Pre-calculus and remedial math are not considered college-level math.

- **Complex Engineering Problems (Old)**: Not explicitly defined in current criteria.
- **Complex Engineering Problems (NEW)** – Complex engineering problems include one or more of the following characteristics: involving wide-ranging or conflicting technical issues, having no obvious solution, addressing problems not encompassed by current standards and codes, involving diverse groups of stakeholders, including many component parts or sub-problems, involving multiple disciplines, or having significant consequences in a range of contexts.
- Only one of the above characteristics is needed.
- Programs have freedom to choose where they assess and evaluate complex problems.

- **Engineering Design (old)** – Engineering design is the process of devising a system, component, or process to meet desired needs. It is a decision making process (often iterative), in which the basic sciences, mathematics, and the engineering sciences are applied to convert resources optimally to meet these stated needs.
- **Engineering Design (New)** – Engineering design is a process of devising a system, component, or process to meet desired needs and specifications within constraints. It is an iterative, creative, decision-making process in which the basic sciences, mathematics, and engineering sciences are applied to convert resources into solutions. Engineering design involves identifying opportunities, developing requirements, performing analysis and synthesis, generating multiple solutions, evaluating solutions against requirements, considering risks, and making trade-offs, for the purpose of obtaining a high-quality solution under the given circumstances.

The definition of Engineering Science is essentially unchanged.

Engineering Science – Engineering sciences are based on mathematics and basic sciences but carry knowledge further toward creative application needed to solve engineering problems. These studies provide a bridge between mathematics and basic sciences on the one hand and engineering practice on the other.

- **Team (Old)**: Not explicitly defined in current criteria.
- **Team (New)** – A team consists of more than one person working toward a common goal and should include individuals of diverse backgrounds, skills, or perspectives.
- Indicates the importance of considering the team background, skills and perspectives.

Current Language
EAC Criteria effective 2017-18 and 2018-19 Cycles

New Language
Approved by the EAD October 20, 2017
Applicable beginning in the 2019-20 cycle

Criterion 3. Student Outcomes

The program must have documented student outcomes that prepare graduates to attain the program educational objectives.

Student outcomes are outcomes (a) through (k) plus any additional outcomes that may be articulated by the program.

(a) an ability to apply knowledge of mathematics, science, and engineering
 (e) an ability to identify, formulate, and solve engineering problems

(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) an ability to function on multidisciplinary teams

(f) an understanding of professional and ethical responsibility
 (h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
 (j) a knowledge of contemporary issues

(g) an ability to communicate effectively

(i) a recognition of the need for, and an ability to engage in life-long learning

(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Criterion 3. Student Outcomes

The program must have documented student outcomes that support the program educational objectives. Attainment of these outcomes prepares graduates to enter the professional practice of engineering. Student outcomes are outcomes (1) through (7), plus any additional outcomes that may be articulated by the program.

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics

6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions

2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors

5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives

4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts

3. an ability to communicate effectively with a range of audiences

7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

Implied in 1, 2, and 6

Definition: Program educational objectives are broad statements representing the expected achievements graduates from a program are supposed to attain few years after graduation (usually 3 to 5 years and more)

• **The Program educational objectives for Electrical engineering was revised, where slit change was made**

PEO1: Demonstrate competency in the design, analysis and implementation of modern electrical systems.

PEO2: Compete effectively in a world of rapid technological changes, and become leaders, entrepreneurs, and innovative managers or educators in the broad context of electrical engineering.

PEO3: Adapt to different roles and responsibilities in multicultural working environment by respecting diversity, professionalism within the organization and society at national and international levels.

PEO4: Successfully pursue graduate degrees and become consultants in their respective fields

Definition: Program educational objectives are broad statements representing the expected achievements graduates from a program are supposed to attain few years after graduation (usually 3 to 5 years and more)

• **The Program educational objectives for Telecommunication engineering was revised and no changes were made**

PEO 1: Demonstrate competency in the design, analysis, optimization, and implementation of modern Telecommunication systems.

PEO 2: Compete effectively in a world of rapid technological changes, and become leaders, entrepreneurs, and innovative managers or educators in the broad context of Telecommunication engineering.

PEO 3: Adapt to different roles and responsibilities in multicultural working environment by respecting diversity, professionalism within the organization and society at national and international levels.

PEO 4: Successfully pursue graduate degrees and become consultants in their respective fields