

Construction Engineering ABET-EAC preparation

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ABET's Criteria for Accrediting Engineering Programs

- Criterion **1**. Students
- Criterion **2**. Program Educational Objectives
- Criterion **3**. Student Outcomes
- Criterion **4**. Continuous Improvement
- Criterion **5**. Curriculum
- Criterion **6**. Faculty
- Criterion **7**. Facilities
- Criterion **8**. Institutional Support

ABET C2. PEOs

Program Educational Objectives are broad statements that describe what graduates are expected to attain within a few years graduation. PEOs are based on the needs of the program's constituencies.

ConE PEOs

Graduates (3-5 yrs out) of the Bachelor of Science in Construction Engineering program at Texas A&M University-Commerce will...

- Engage in life-long growth within the construction profession as evidenced by, but not limited to, continuing education, participation in professional societies and conferences, industry certifications, or graduate education.
- Serve as a catalyst for technology within the construction profession as evidenced by, but not limited to utilization of industry accepted project controls software, responsibility for developing recommendations for industry accepted systems, or serving as a liaison between company, vendors, and technology user groups.
- Meet professional requirements necessary for engineering licensure.

ABET C₃. Student Outcomes

- Student Outcomes describe what students are expected to know and be able to do by the time of graduation. These relate to the knowledge, skills, and behaviors that students acquire as they progress through the program.
- SOs should be defined in order for faculty to have a common understanding of the expectations for student learning and to achieve consistency across the curriculum, as measured by performance indicators. Performance indicators represent the knowledge, skills, attitudes or behavior students should be able to demonstrate by the time of graduation that indicate competence related to the outcome.

ConE Student Outcomes

■ ABET's SO (a) thru (k)

- (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) an ability to function on multidisciplinary teams
- (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, economic, environmental, and societal context
- (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.

ABET C4. Continuous Improvement

- The program must regularly use appropriate, documented processes for assessing and evaluating the extent to which 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.
- **Assessment:** generating meaningful data to evaluate the attainment of SOs and PEOs
- **Evaluation:** interpreting the data & evidence accumulated through assessment processes and results in decisions and actions regarding program improvement

ABET C5. Curriculum

The curriculum requirements specify subject areas appropriate to engineering but do not prescribe specific courses. The faculty must ensure that the program curriculum devotes adequate attention and time to each component, consistent with the outcomes and objectives of the program and institution. The professional component must include:

(a) one year of a combination of college level mathematics and basic sciences (some with experimental experience) appropriate to the discipline. Basic sciences are defined as biological, chemical, and physical sciences.

(b) one and one-half years of engineering topics, consisting of engineering sciences and engineering design appropriate to the student's field of study. The engineering sciences have their roots in mathematics and basic sciences but carry knowledge further toward creative application. These studies provide a bridge between mathematics and basic sciences on the one hand and engineering practice on the other. 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.

(c) a general education component that complements the technical content of the curriculum and is consistent with the program and institution objectives.

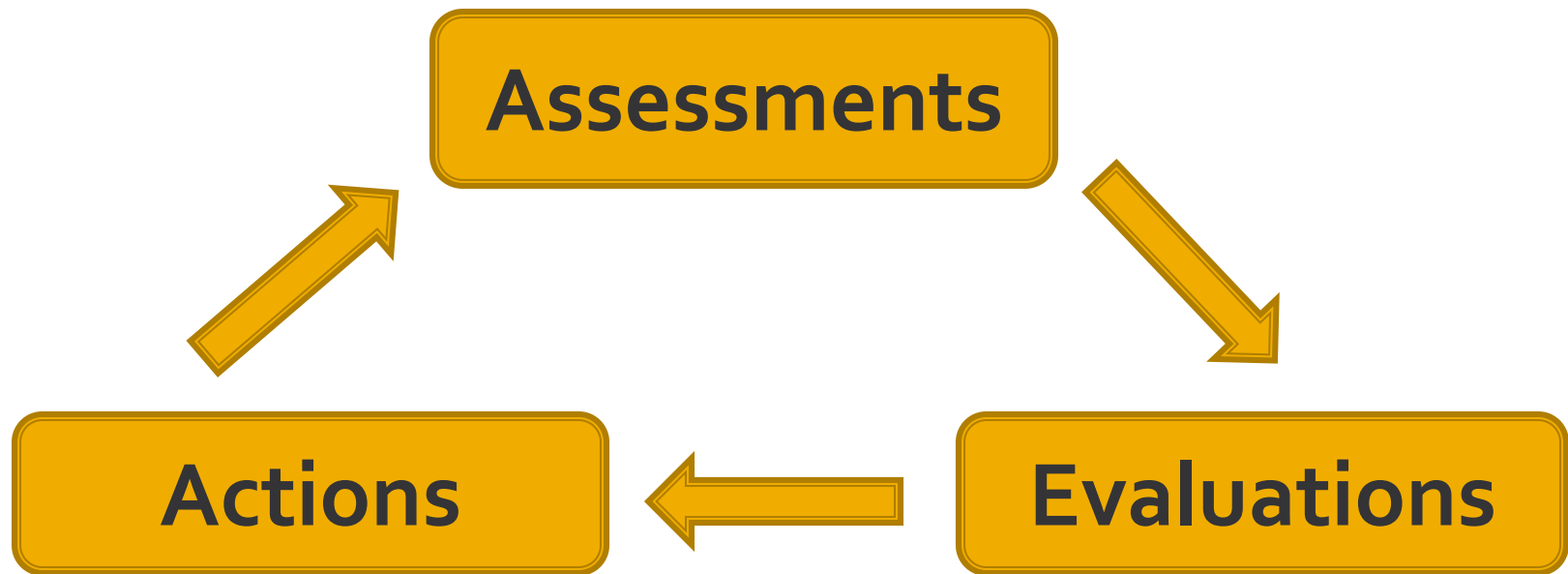
ABET ConE curriculum

The program must prepare graduates to apply knowledge of mathematics through differential and integral calculus, probability and statistics, general chemistry, and calculus-based physics; to analyze and design construction processes and systems in a construction engineering specialty field, applying knowledge of methods, materials, equipment, planning, scheduling, safety, and cost analysis; to explain basic legal and ethical concepts and the importance of professional engineering licensure in the construction industry; to explain basic concepts of management topics such as economics, business, accounting, communications, leadership, decision and optimization methods, engineering economics, engineering management, and cost control.

ABET C6. ConE faculty

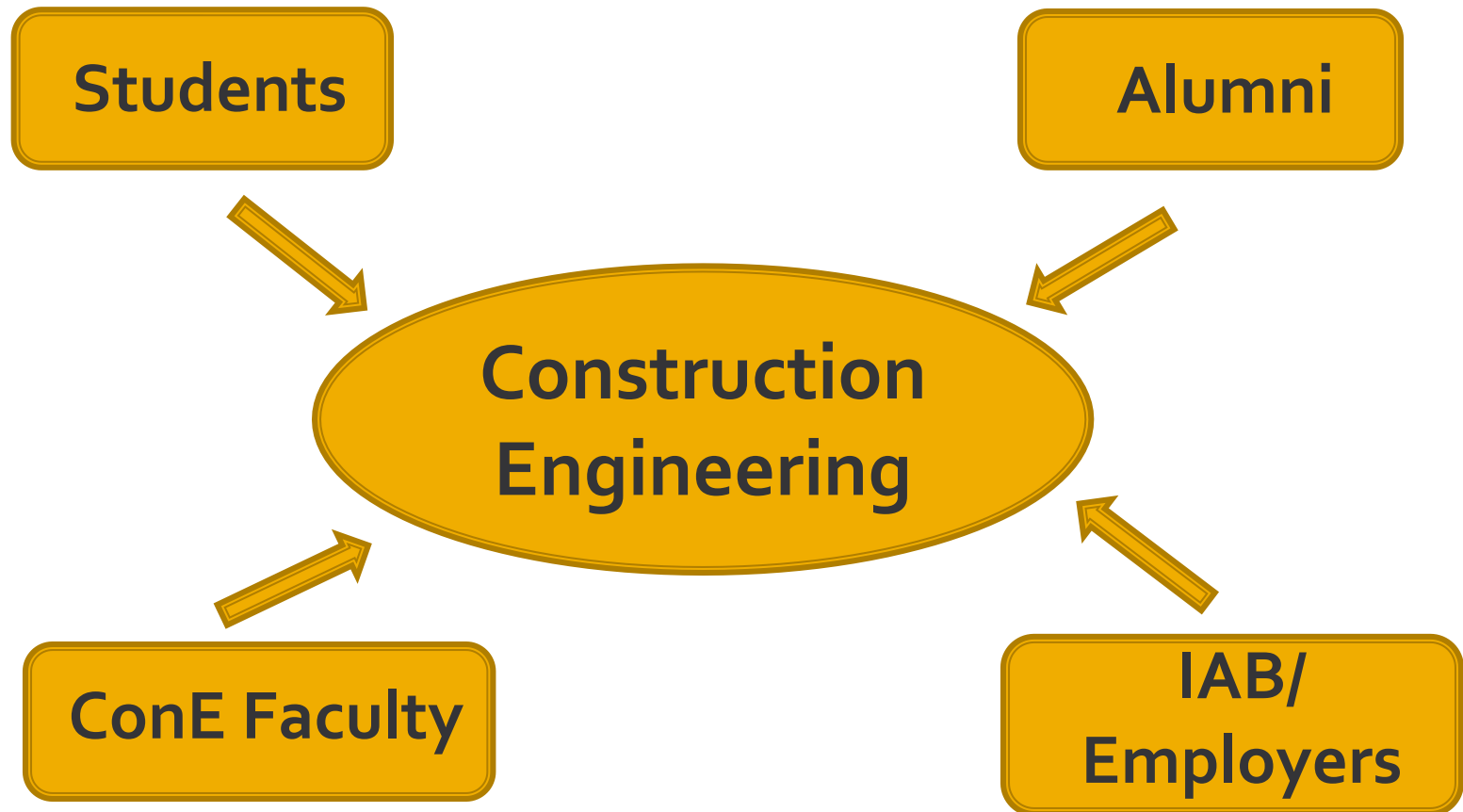
The program must demonstrate that the majority of faculty teaching courses that are primarily design in content are qualified to teach the subject matter by virtue of professional licensure, or by education and design experience. The faculty must include at least one member who has had full-time experience and decision-making responsibilities in the construction industry.

ConE Continuous Improvement

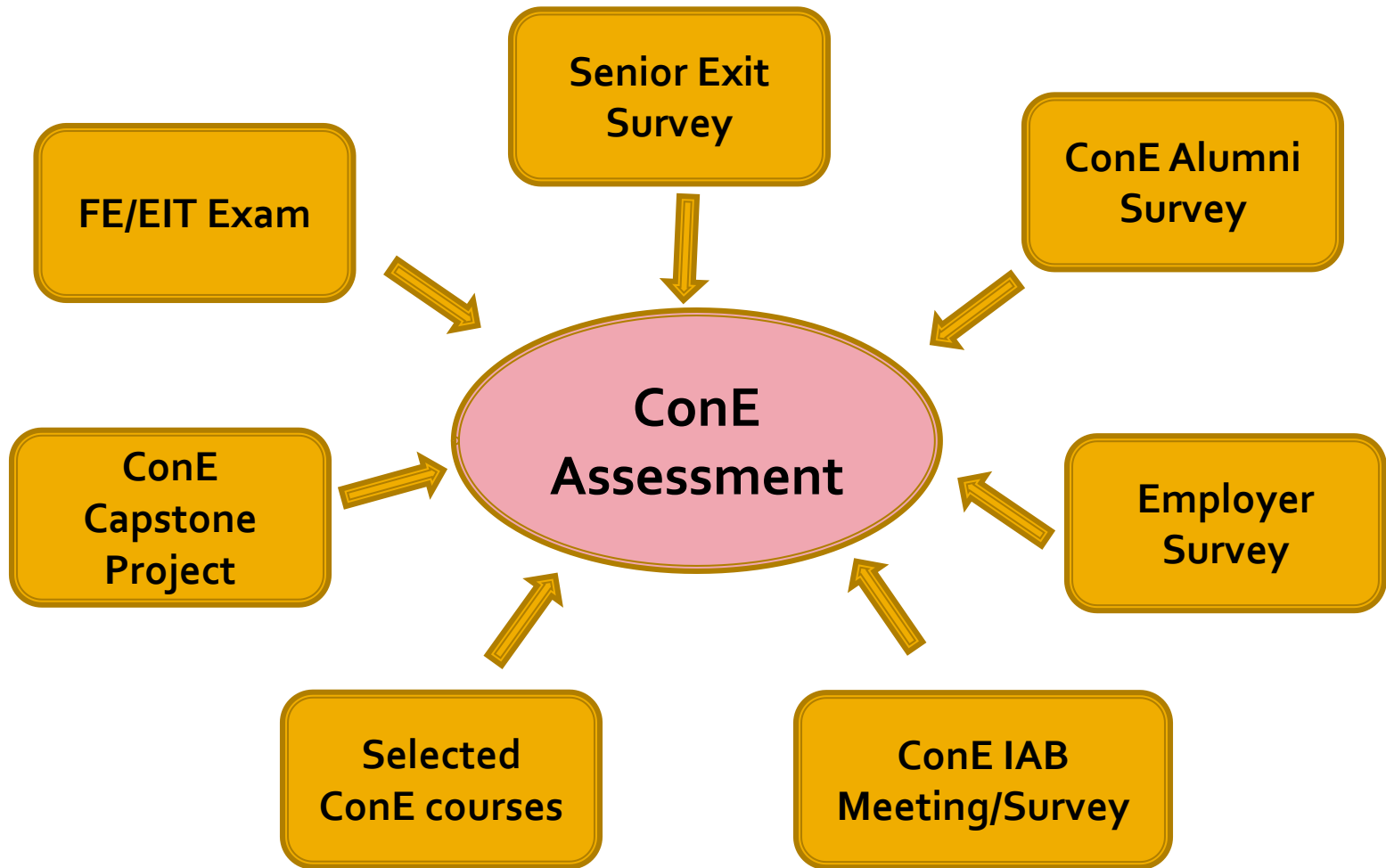


“Identified stakeholders should be involved in periodic A-E-A”

ConE Program Constituencies



ConE Assessment Tools



Alignment of ConE PEOs and SOs

ConE Program Educational Objectives	Student Outcomes										
	Criterion 3. (a)	Criterion 3. (b)	Criterion 3. (c)	Criterion 3. (d)	Criterion 3. (e)	Criterion 3. (f)	Criterion 3. (g)	Criterion 3. (h)	Criterion 3. (i)	Criterion 3. (j)	Criterion 3. (k)
Engage in life-long growth within the construction profession as evidenced by, but not limited to, continuing education, participation in professional societies and conferences, industry certifications, or graduate education								✓	✓	✓	✓
Serve as a catalyst for technology within the construction profession as evidenced by, but not limited to utilization of industry accepted project controls software, responsibility for developing recommendations for industry accepted systems, or serving as a liaison between company, vendors, and technology user groups			✓	✓		✓	✓			✓	✓
Meet professional requirements necessary for engineering licensure	✓	✓	✓		✓	✓		✓	✓		✓

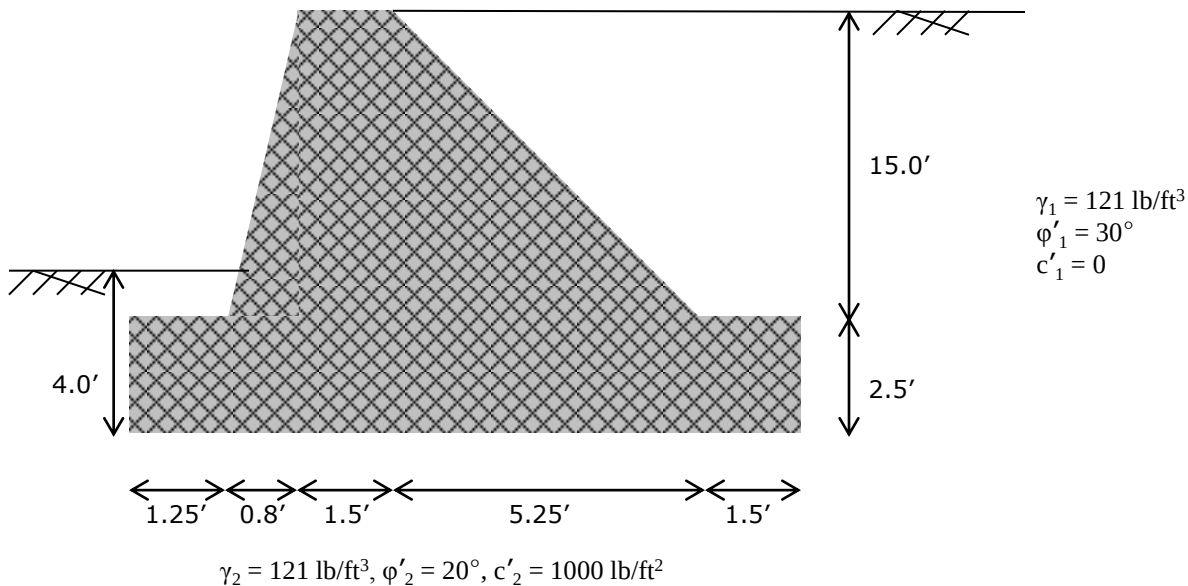
ConE SOs / Course Crosswalk

[illegible]

ConE SO (a) assessment

an ability to apply knowledge of mathematics, science, and engineering

ConE 432 Soil Engineering; a gravity retaining wall



ConE SO (b) assessment

An ability to design and conduct experiments, as well as to analyze and interpret data

Lab Report Grading Rubric					
Student's Name:				Score:	/ 100
Criteria	Comment			Point	
Cover page	Title, Name, Group No. & partners, Date, etc.				5
Introduction	Background, objectives and its scope				20
Test Procedure	Material properties, equipment, procedures				15
Data Analysis and Results	Presentation of data (table & graph) Units, Sample calculations				20
Conclusions and Discussion	Summary of results Comparison with typical values or predictions Reasons for discrepancy, sources of error				25
References					5
Appendices	Raw data and any necessary documents				5
Grammar, Spelling, Units					5

ConE SO (h) assessment

The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.

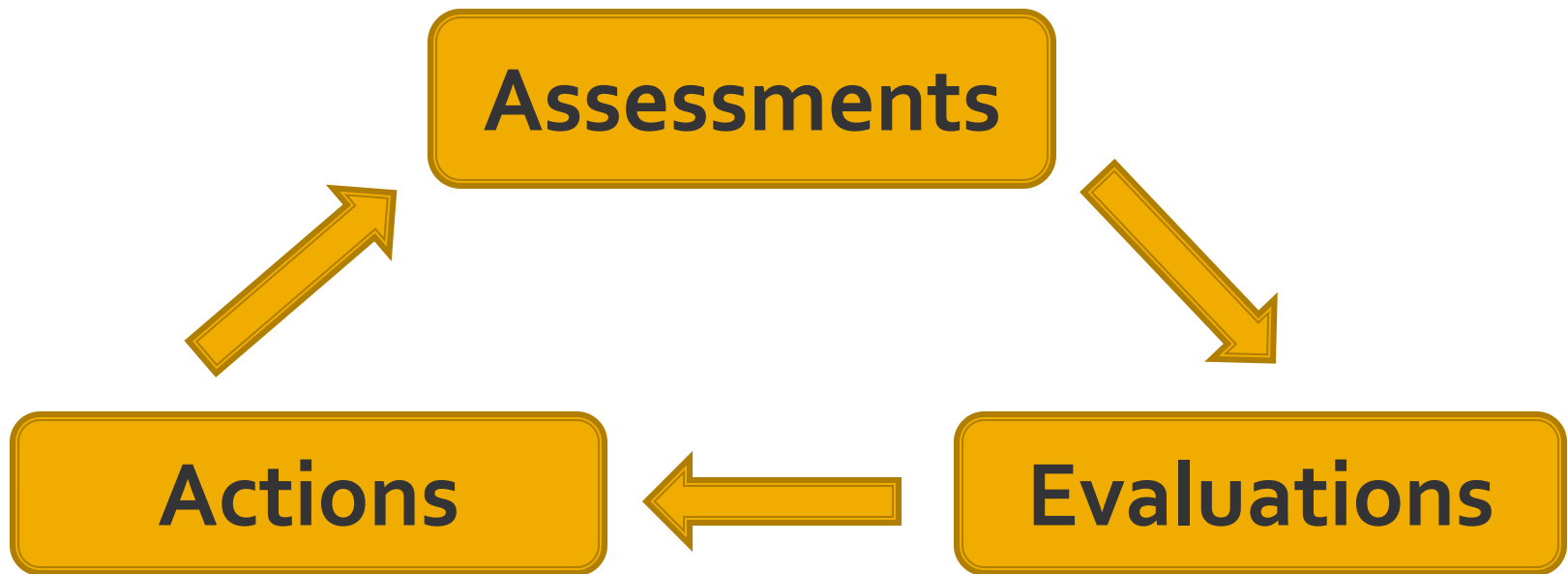
ConE 431 Sustainable Construction Methods and Processes

A proposed infrastructure project is discussed in the class. The students are asked to study the impacts of the project from an economic, environmental, and societal perspective.

A Breakdown of the Skills	Level of Achievement		
	4	3	2
Study Economic Impacts	Identifies relevant factors and can collect relevant information and data necessary for completing the study with limited or minimal guidance	Identifies relevant factors and can collect relevant information and data necessary for completing the study with guidance	Relevant factors were not correctly identified and/or relevant information and data necessary to complete the study were not sufficiently collected
Study Environmental Impacts	Identifies relevant factors and can collect relevant information and data necessary for completing the study with limited or minimal guidance	Identifies relevant factors and can collect relevant information and data necessary for completing the study with guidance	Relevant factors were not correctly identified and/or relevant information and data necessary to complete the study were not sufficiently collected
Study Societal Impacts	Identifies relevant factors and can collect relevant information and data necessary for completing the study with limited or minimal guidance	Identifies relevant factors and can collect relevant information and data necessary for completing the study with guidance	Relevant factors were not correctly identified and/or relevant information and data necessary to complete the study were not sufficiently collected

ConE Continuous Improvement

Yes, again !!!



Question ?

