



# **COE Continuous Improvement COMMITTEE**

## **Activity Report**

Term T181

### **COMPUTER ENGINEERING**

**Program**

at

**King Fahd University of Petroleum & Minerals**  
**DHAHRAN, SAUDI ARABIA**

**February, 2019**

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## Summary

This report gives a brief summary of the ABET related activities at the Computer Engineering Department in the academic term 181. The continuous improvement committee (CIC) has coordinated the assessment of three student outcomes (SOs 1, 3, and 5). The CIC has also revised the rubrics for assessing these three SOs. This report details the assessment process, results, observations, recommendations, and immediate corrective actions.

## 1. Introduction

Table 1 below show ABET activities planned for the current accreditation cycle semester wise. Starting from T181, the new course mapping to SOs for assessment purposes is summarized in Table 2. Following the new plan, the CIC arranged for the assessment of SOs **1, 3, 5** in 181. SO1 was assessed in COE 241 Data Communications, COE 306 Embedded Systems, and 485 Senior Design Project. SO 3 was assessed in COE 399 Summer Training, COE 351 COOP, and COE 485. SO 5 was assessed in COE 300 Principles of COE Design, COE 399 and COE 351. Instructors of these courses were informed by the CIC at the beginning of T181 about the assessment of these SOs in their courses. They were given the assessment tools (Rubrics, section 2) and were asked to prepare assessment plans. These plans were reviewed, modified when necessary and ratified by the CIC. Instructors submitted their assessment results to the SO coordinators in the CIC, who in turn consolidated the assessment results for each SO. Section 3 of this report summarizes the assessment results for the three student outcomes that were assessed in T181 including a compilation of corrective actions that will be applied starting in T182.

**Table 1: Planned CIC activities for the current ABET accreditation cycle (151-202).**

Term	151	152	161	162	171	172	181	182	191	192	201	202
CIC Activity	Corrective Actions		SO b, c, k assessment	Curriculum revision	SO i, j, f, h assessment	SO 1,3, 5 assessment	SO 2,4,6,7 assessment	SO 2,4,6,7 assessment	Corrective actions		SO 1,3,5 assessment	SO 2,4,6,7 assessment

## 2. New SO Assessment Rubrics

The CIC has developed new rubrics to assess the new SOs. The new rubrics have been approved by the COE council and were used in 181. The new Rubrics are in the Appendix.

## 3. T181 Assessment Results

The COE department adopts the following criteria for judging a student’s achievement of an outcome based on rubric scores (out of 4):

- Achieved (A): Score > 2.5,
- Marginally Achieved (M): Score: ≈ 2.5
- Need Improvement (NI): Score < 2.5

An important measure used to evaluate the overall achievement of a certain student outcome is the percentage of students who achieved 60% (i.e. 2.5/4) or more in the rubrics. This determines the urgency of corrective actions; any percentage less than 70% warrant corrective actions. We also keep an eye on the maximum and minimum rubric scores; larger spread is indicative of either an outcome delivery/injection problem, an assessment problem, or both.

### 3.1 SO 1 (Engineering Problem Formulation) Assessment results

#### Outcome Activity Report

Student Outcome	1	Semester	181
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Prepared by:	Dr. Marwan Abu-Amara	Date:	27/12/2018
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#### 1. Summary of Course Reports:

Course	Number of Students	Average Outcome Score	Assessment Method*	Evidence Provided	Comments*	Proposed Corrective Actions*
COE 485	12	2.6	Examiners fill in the rubric based on the final report.	The final report	This outcome is barely achieved. Students had problems formulating the problem, coming up with the specs and constraints and select an appropriate solution. This batch of students was significantly below the average of previous batches.	- Basic COE courses (e.g. COE 344) need to emphasize basic concepts more.
COE 306	20	2.83	Assessed by instructor using quizzes, and an assignment on designing and implementing an embedded car anti-theft system.	Quizzes, and assignments	In general, this outcome is considered achieved by the majority of students. Some students scores are low as they have not been doing the assignments or missing quizzes.	- No corrective actions were proposed.
COE 241	21	3.5	Assessed by instructor using	Assignment and final	This outcome is clearly achieved. Problems used require the understanding and	- No corrective actions were proposed.

			assignment and final exam questions.	exam questions	utilization of a number of relationships governing many physical system parameters. Most students seem to have been able to capture and apply the concept effectively.	
<b>Total</b>	<b>53</b>	<b>3.04</b>	<b>Weighted Average</b>			

## 2. Comments:

Your overall Comments on Outcome Achievement, Weaknesses in certain outcome aspects, Weaknesses in certain courses, Score > 2.5: Achieved (A), Score:  $\approx$  2.5: Marginally Achieved (M), Score < 2.5: Need Improvement (NI)

- The outcome has been adequately **achieved**.
- Albeit that the scores above are for different sets of students, it seems that as students progress through the program, the students have more difficulty formulating the problem, coming up with the specs and constraints, and selecting an appropriate solution.

## 3. Corrective Actions:

- Further improvement can be achieved by emphasizing how to formulate a problem, how to come up with the specs and constraints, and how to select an appropriate solution in core COE courses as well as COE depth elective courses.

### 3.2 SO 3 (Communication Skills) Assessment results

#### Outcome Activity Report

Student Outcome	3	Semester	181
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Prepared by:	Dr. Louai Al-Awami	Date:	12/1/2019
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#### 1. Summary of Course Reports:

Course	Number of Students	Average Outcome Score	Assessment Method*	Evidence Provided	Comments*	Proposed Corrective Actions*
COE 485	12	2.2	Examiners fill in the rubric based on the final report.	The final report	This outcome is not achieved. Students had serious problem organizing and communicating their thoughts, ideas, and efforts. This batch of students was significantly below the average of previous batches.	The department needs to look deeply on the root cause of this significant decline in students' communication abilities. What has changed? Did courses such as COOP/Summer training and COE 300 that require oral/written communications changed?
COE 350/351	11	3.4	Examiners fill in the rubric based on the final report.	The final report	No comments were provided.	No corrective actions were proposed.
COE 399	5	2.9	Examiners fill in the rubric based on the final report.	The final report	No comments were provided.	No corrective actions were proposed.
<b>Total</b>	<b>28</b>	<b>2.79</b>	<b>Weighted Average</b>			

## **2. Comments:**

Your overall Comments on Outcome Achievement, Weaknesses in certain outcome aspects, Weaknesses in certain courses, Score > 2.5: Achieved (A), Score:  $\approx$  2.5: Marginally Achieved (M), Score < 2.5: Need Improvement (NI)

- The outcome has been achieved.
- However, the majority of students seem to lack various writing skills and tools.
- Some recommendations are suggested below.

## **3. Corrective Actions:**

- Addressing weakness in communication skills should be at the university level. Suggestions include the introduction of a writing-center to help students with their writing skills and possibly recommending changes to the Technical English program.
- Certain skills in communications come with time and experience. Students need to be encouraged to use English throughout their interactions at the collage. Also, participating in non-curricular activities where English is used should help.
- Writing communication deficiencies have been communicated to the COE 300 instructor, and the Summer and COOP coordinator. Examining student reports in these course revealed that students needed more feedback to improve. These instructors understood the problem and will attempt to rectify it.

### 3.3 SO 5 (Professional Ethics) Assessment results

#### Outcome Activity Report

Student Outcome	5	Semester	181
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Prepared by:	Dr. Ali Alsuwaiyan	Date:	Feb. 10, 2019
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#### 1. Summary of Course Reports:

Course	Number of Students	Average Outcome Score	Assessment Method*	Evidence Provided	Comments	Proposed Corrective Actions
COE 300	10	3.03	Examiners fill in the rubric based on project plans, meeting minutes, observation of interaction, and final report.	The project plans and final reports	This outcome is achieved. Most of the students suffer from relatively weak skills in project management. However, the student sample is not large enough to draw a definite conclusion.	- No corrective actions were proposed.
COE 350	5	2.93	Examiners fill in the rubric based on the final report and company evaluation forms.	The final reports and evaluation forms	This outcome is achieved.	- No corrective actions were proposed.
COE 399	11	3.5	Examiners fill in the rubric based on the final report	The final reports and evaluation forms	This outcome is achieved.	- No corrective actions were proposed.

			and company evaluation forms.			
<b>Total</b>	<b>26</b>	<b>3.23</b>	<b>Weighted Average</b>			

**2. Comments:**

**Your overall Comments on Outcome Achievement, Weaknesses in certain outcome aspects, Weaknesses in certain courses, Score > 2.5: Achieved (A), Score: ≈ 2.5: Marginally Achieved (M), Score < 2.5: Need Improvement (NI)**

- The outcome has been adequately achieved.
- The low number of students in each course makes hard to draw definite recommendations and corrective actions.

**3. Corrective Actions:**

- None.

**Appendix : Rubrics for Assessing the new SOs 1, 3, and 5**

**SO1:** *an ability to **identify**, **formulate**, and **solve** complex engineering problems by **applying** principles of **engineering, science, and mathematics**.*

Indicator	Score (1 - 4)	Exemplary (4)	Proficient (3)	Apprentice (2)	Novice (1)
<b>Engineering problem identification and formulation</b>		Captures the complete set of design specifications for an engineering problem.	Captures most of the design specifications for an engineering problem but misses some of the design specifications.	Captures some of the design specifications for an engineering problem but misses most of the design specifications.	Unable to capture the design specifications for an engineering problem.
<b>Applying concepts, governing math or physics equations and algorithms to solve an engineering problem</b>		Applies correct concepts, chooses correct governing equations and optimum algorithms (or methods) to solve an engineering problem.	Applies correct concepts, chooses correct governing equations but use sub-optimum algorithms (or methods) to solve an engineering problem.	Applies some correct concepts and chooses some correct governing equations but makes mistakes.	Applies incorrect concepts and/or chooses incorrect governing equations, or cannot solve problems.

**SO3: an ability to communicate effectively with a range of audiences.**

Outcome	Score (1 - 4)	Exemplary (4)	Proficient (3)	Apprentice (2)	Novice (1)
<p><b><u>Oral Communication:</u></b></p> <p><b>1. Presentation skills:</b></p> <ul style="list-style-type: none"> <li>- clear voice and tone</li> <li>- interaction with audience</li> <li>- eye contact</li> <li>- body language</li> </ul>		Speaks fluently and effectively with excellent tone and pace, interacts with audience, and uses proper eye contact and body language.	Speaks clearly and effectively with proper tone and pace, interacts - at times - with audience, and uses moderate eye contact and body language.	Speaks fairly with moderate tone and pace, uses little interaction with audience, and uses little eye contact and body language.	Speaks poorly with improper tone and pace, doesn't interact with audience, and uses no eye contact or body language.
<p><b>2. Presentation Material and Organization:</b></p> <ul style="list-style-type: none"> <li>- outline</li> <li>- structure</li> <li>- visual aids</li> <li>- transition</li> <li>- evidence and conclusion</li> <li>- questions</li> </ul>		Presents and follows an excellent outline and organization, makes smooth transitions, uses visual aids effectively, presents convincing evidences and conclusions, and answers questions effectively.	Presents and follows an satisfactory outline and organization, makes adequate transitions, uses visual aids reasonably, presents some convincing evidences and conclusions, and answers questions moderately.	Presents a fair outline and organization, makes uneven transitions, uses some visual aids improperly, presents few convincing evidences and conclusions, and answers questions barely.	Presents a poor outline and organization, makes rough transitions, uses visual aids poorly, presents no convincing evidences or conclusions, and answers questions poorly.
<p><b><u>Written Communications:</u></b></p> <p><b>1. Language</b></p> <ul style="list-style-type: none"> <li>- spelling</li> <li>- grammar</li> <li>- punctuation</li> <li>- sentence structure</li> </ul>		Makes rare or no spelling and/or grammatical mistakes, excellent use of punctuation, and smooth and well-structured sentences.	Makes few spelling and/or grammatical mistakes, proper use of punctuation, and moderately smooth and structured sentences.	Makes noticeable mistakes in spelling, grammar and/or in the use of punctuation, and uses weakly structured sentences.	Makes substantial mistakes in spelling, grammar and/or in the use of punctuation, and uses poorly structured sentences.
<p><b>2. Organization</b></p> <ul style="list-style-type: none"> <li>- organization</li> <li>- abstract</li> <li>- visual aids</li> <li>- bibliography</li> </ul>		Follows a clear organization, uses an effective and accurate abstract, uses visual aids effectively, and cites all sources properly.	Follows an acceptable organization, uses a good abstract, uses visual aids with varying effectiveness, and cites most sources properly.	Follows a less than acceptable organization, uses an inaccurate abstract, uses visual aids barely, and cites some sources.	Follows a poor organization, uses an inaccurate or no abstract, uses visual aids ineffectively, and does not cite most sources.
<p><b>3. Effectiveness</b></p> <ul style="list-style-type: none"> <li>- readability</li> <li>- motivation</li> <li>- problem description</li> </ul>		Produced a smoothly readable document, with a catching motivation and problem description,	Produced a readable document, with adequate motivation and problem description, some rigorous	Produced a partially readable document, with fair motivation and problem description, some mistakes	Produced a barely readable document, with poor motivation and problem description, frequent

<ul style="list-style-type: none"> <li>- rigor</li> <li>- documentation</li> <li>- conclusion</li> </ul>		rigorous use of scientific concepts and/or equations, a complete documentation, and sounding conclusions.	use of scientific concepts and/or equations, adequate documentation, and fair conclusions.	in the use of scientific concepts and/or equations, partial documentation, and partially convincing conclusions.	mistakes in the use of scientific concepts and/or equations, poor documentation and poor conclusions.
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**SO5:** *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.*

Outcome	Score (1 - 4)	Exemplary (4)	Proficient (3)	Apprentice (2)	Novice (1)
<b>Contributions</b>		Routinely provides useful ideas when participating in the group and in classroom discussion. <u>A leader who contributes a lot of effort.</u>	Usually provides useful ideas when participating in the group and in classroom discussion. <u>A strong group member who tries hard!</u>	Sometimes provides useful ideas when participating in the group and in classroom discussion. <u>A satisfactory group member who does what is required.</u>	Rarely provides useful ideas when participating in the group and in classroom discussion. May refuse to participate.
<b>Problem-solving</b>		Actively looks for and suggests solutions to problems.	Refines solutions suggested by others.	Does not suggest or refine solutions, but is willing to try out solutions suggested by others.	Does not try to solve problems or help others solve problems.
<b>Working with others</b>		Almost always listens to, shares with, and supports the efforts of others. Tries to keep people working well together.	Usually listens to, shares, with, and supports the efforts of others. Does not cause "waves" in the group.	Often listens to, shares with, and supports the efforts of others, but sometimes is not a good team member.	Rarely listens to, shares with, and supports the efforts of others. Often is not a good team player.

<p><b>Teamwork</b></p>		<ol style="list-style-type: none"> <li>1. The project was carried out by more than TWO members</li> <li>2. The work load and variety on each member seems fair</li> <li>3. Leadership role being assumed by each member for different tasks is evident</li> <li>4. Scheduled meetings minutes are Always recorded and the contribution of each team members are identified</li> </ol>	<ol style="list-style-type: none"> <li>1. The project was carried out by more than TWO members</li> <li>2. The work load and variety on each member seem fair</li> <li>3. Leadership role being assumed by each member for different tasks is NOT apparent</li> <li>4. Scheduled meetings minutes are Usually recorded and the contribution of each team members are identified</li> </ol>	<ol style="list-style-type: none"> <li>1. The project was carried out by more than TWO members</li> <li>2. The work load and variety on each member does not seem to be fair or at least one member has been assigned trivial non-technical tasks (e.g. writing the report)</li> <li>3. Scheduled meetings minutes are Often recorded and the contribution of each team members are NOT identified</li> </ol>	<ol style="list-style-type: none"> <li>1. The project was carried out by more than TWO members</li> <li>2. The work load and variety on each member does not seem to be fair or at least one member has been assigned trivial non-technical tasks (e.g. writing the report)</li> <li>3. Scheduled meetings minutes are Rarely recorded and the efforts are scattered.</li> </ol>
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