Assalamu Alaikum Dr. Tarek Sheltami, Chairman of COE Curriculum Committee March 12, 2009

As you know the COE ABET committee started the continuous improvement process of the POs in T081. Based on Rubric Data analysis, the COE ABET committee decided to improve the Engineering Design Component (Outcome C) through the courses COE 400, COE 485, and COE 351. A number of action steps were conducted in T081 to improve the Engineering Design Component in the above courses. The action conducted needs to be applied from now on as part of the above courses.

For this, the COE ABET committee recommends to the COE curriculum Committee the following curricular actions to be applied as soon as possible as part of the Continuous Improvement process for Improving the Engineering Design Component in the COE Program:

1. **Addressing Engineering Design in COE 400, COE 485, and COE 351:** It is recommended to revise the syllabus of COE 400, COE 485, and COE 351 to adapt either of the following approaches:

    1. Lecture the students on a Case Study on Engineering Design (or similar material) to expose the students to the Engineering Design Process within the framework of each course.

    2. Deliver at least two lectures be provided by the instructor to emphasize the Program Outcome C "Engineering Design Component". Example of such presentations can be found at URL: http://jjackson.eng.ua.edu/courses/capstone/lectures/

    For COE 351, the coordinator needs to deliver the above presentations or at least communicate with the COOP students and send them presentations and guidelines to be used in the course of their COOP training and final report. The course grading and rubric assessment carried out in the above courses should assess the extent to which the students are applying the concept learned in the above lectures. For each of the above courses, the student needs to be informed about the basis of course grading in connection with the above presented engineering design framework. Please see the ABET definition ABET for "Design a System, Component, or Process": http://www.foundationcoalition.org/home/keycomponents/assessment_eval/outcome_c.html

2. **Extending the Engineering Education to Junior level:** To develop a culture of Engineering education at the COE, the engineering design concepts must be progressively implemented at different program levels. The approach used is to start with the 400-level. This has been initiated by the action of the COE ABET committee in T081 which has been somehow implemented in T081 in the above course. This recommendation is to address the introduction of some engineering design concepts at the 300-level. Specifically in the course COE 305 "Microprocessors" and COE 344 "Computer Networks". Please see the attached table and more specifically column labeled 300-level which describes at what level and depth it is recommended to address the Engineering Design. You are requested to implement in COE 405 and COE 344 the recommended action listed in the Table below under column "300-level".

Thank you for your prompt action.

Dr. Mayez Al-Mouhamed
COE ABET Committee

Plan for Progressive Introduction of Engineering Design (Design a System, Component, or Process)

Elements of Engineering Design	200 Level	300 Level (proposed for T082)	400 Level (Conducted in T081)
1. **Identifying a need** (There is a need for solving this problem!, what is this need!)			**Identify the need for solving the problem and domain of application**
2. Defining the problem (The design task will be completed if I solve a specific problem, What is this problem**)**	**Word definition of the problem.**	**Word definition of the problem. Use of Notebooks in all activities.**	**Word definition of the problem. Use of Notebooks in all activities.**
3. **Conducting research** (How and where to search the library, ebooks, datasheets, manufacturer web, etc to find relevant material to solve the problem!)			**Searching similar problems (wording) and proposed solutions**
4. Narrowing the research (knowing the problem to be solved I need to filter Software/Hardware components that may help in building a solution)			**Knowing relevant examples be able to identify a few similar systems**
5. **Analyzing set criteria** (knowing the problem, its specifications, and its relevant components found, I need to find out whether some components meet the problem specifications or not!)		**Analysis of problem specifications and identify components meeting some of the above**	**Analysis of problem specifications and identify components meeting some of the above**
6. **Finding alternative solutions** (determine a few possible solutions using found components for the above problem, I need to identify each of these possible solutions!),	**Using different approaches or components. Use of Notebooks.**	**Combining components to find different solutions.**	**Combining components to find different solutions**
7. **Analyzing possible solutions** (knowing the problem (specifications) and possible solutions I need to find out whether some solutions meets the problem specifications or not!)		**Pruning possible solutions which do not meet the specifications**	**Pruning possible solutions which do not meet the specifications**
8. **Making a decision** (given two or more possible solutions I need to select one feasible and economical solution)	**Selecting an economical solution**	**Selecting a the most economical feasible solution**	**Selecting a the most economical feasible solution (ethics, environmental)**
9. **Presenting the product** (I need to describe my solution in writing using whatever needed as diagrams, graphics, drawing, etc.)			**Technical description of the design**
10. **Communicating** (prepare a written report in which each task will be broken down into: Identifying a need, Defining the problem, Conducting research, Narrowing the research, Analyzing set criteria, Finding alternative solutions, Analyzing possible solutions, and Making a decision.)	**A simple report describing above steps.**	**A report defining the problem, specification, analysis of components vs specification, solutions, solution analysis, and decision**	**A report defining the problem, specification, analysis of components vs specification, solutions, solution analysis, and decision**