ABET OUTCOMES

مخرجات ابت الخاصة بالحقيبة التدريسية للمواد النظرية

إعداد

د. أحمد عدنان عبد الجبار

مدير شعبة الجودة / قسم الهندسة الميكانيكية

OUTCOME " 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"

- **Performance Indicators:**
- 1. Ability to define/identify requirements
- القابلية على تعريف وتحديد الاحتياجات المطلوبة
- 2. Ability to develop a design space or conduct trade studies
- القابلية على تطوير مجال التصميم أو إجراء الدراسات التجارية
- 3. Ability to identify and apply design constraints and standards
- القدرة على تحديد وتطبيق القيود والمعايير للتصميم
- 4. Ability to obtain and effective solution that satisfies the requirements
- القدرة على الحصول على حل فعال يلبي المتطلبات

Assessment tools (Interview and/or Student design report)

SCORING RUBRIC "A SCORING GUIDE USED TO EVALUATE THE QUALITY OF STUDENTS' CONSTRUCTED RESPONSES"

	4- Exceeds	3- Meets	2-Progressing	1-Below
Identifying requirements	Can explain how all stated and implied requirements are considered and show a compliance matrix	Can explain how all customer requirements are considered and show a compliance matrix	Can explain that some customer requirements stated in the RFP are considered during the design process	Can not explain what customer requirements are taken into consideration in the design process
Developing a design space or conducting trade studies	Fully understands design space and trade studies and their importance to the design process as a means to optimize the design.	Understands what design space is and major design parameters included. Trade studies are completed	Understands what a design space is or why it is important to conduct trade studies, but does not understand how to identify key design parameters	Does not understand design space nor need to conduct trade studies.
Applying design constraints and standards	Can explain how the design addressed all relevant constraints and standards and exceeded many.	Can explain how the design addressed all relevant constraints or standards	Some design constraints and standards were considered, but at least one key constraint or standard was not	Design constraints and standards were not considered
Obtaining an effective solution that satisfies requirements	Can explain how the design meets or exceeds all requirements and an innovative approach was taken which yielded a superior solution	Can explain how the design meets all design requirements and is better than other possible solutions	Explains that the design has minor shortcomings regarding requirements	Explains that the design has a major flaw that makes it unsafe or fails to meet a major performance requirement

QUESTIONNAIRE FOR OUTCOME (C):

Because a student interview will constitute the assessment tool, the next task is to develop a scoring rubric that will then help determine interview questions to determine if students have attained the performance indicators. A rubric similar to this could be used to evaluate the student reports that presumably demonstrate the ability.	
Performance Indicator 1	**- What are design requirements of your design project?** **- Who determines design requirements?** **- Name one method of determining requirements based on customer's needs.** **- What is the potential impact of neglecting all or some of the design requirements?**
Performance Indicator 2	**- What is the definition of "design space?"** **- How does the design engineer determine the design parameters that should be used to define the design space? How did you do this for your design project?** **- Describe a trade study. What is the object of a trade study? Give examples of trade studies you conducted for your design project.** **- Define a "major design parameter." What were the major design parameters for your design project?**
Performance Indicator 3	**- What are constraints and what are they constraining?** **- Are constraints different than "major design parameters?" Give examples of constraints for your design project.** **- What are engineering standards? Give examples that you used in your design project.**
Performance Indicator 4	**- Describe an acceptable design point with regards to constraints, requirements and standards** **- What does a design engineer do if the application of one constraint has a drastic adverse affect on the design?** **- What could be the impact of a design point that ignores certain constraints? Certain standards? Certain requirements?**

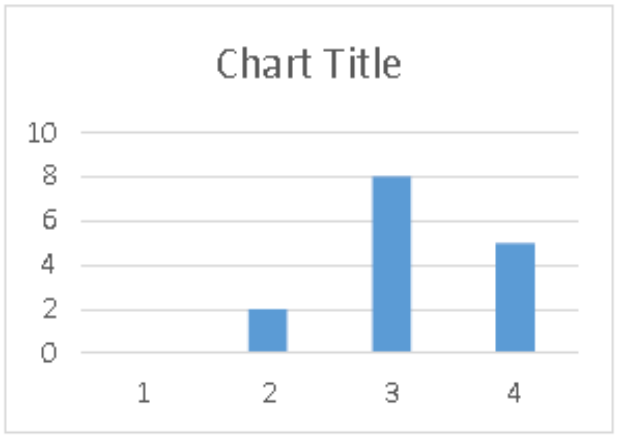
EXAMPLE

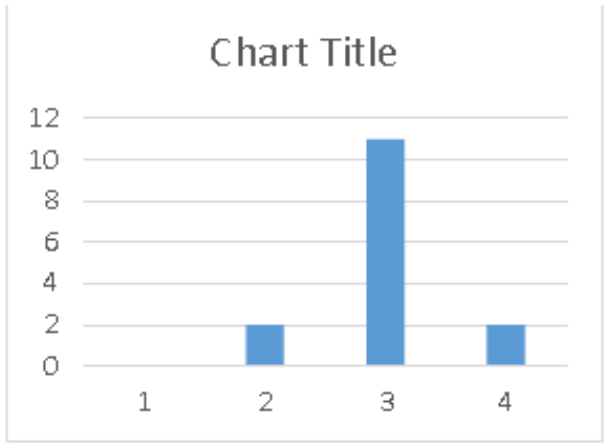
- Assume we have 36 students.
- Any class with Design say Eng. Design II
- Now a simple gob or home work must evaluated according to performance indicator by ¼ of degree points for each one.
- So according to Rubric table let us assume the students groups indicators were as follow:

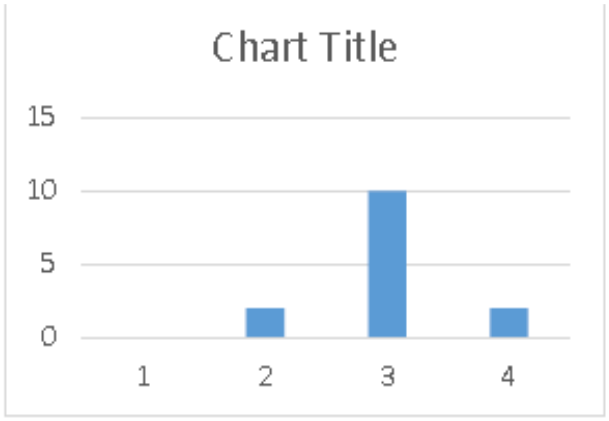
	4- Exceeds	3- Meets	2-Progressing	1-Below	
Identifying requirements	IIIII IIIII IIIII	IIIII IIIII III	IIIII	III	(15*4+13*3+5*2+3*1)/36=3.111
Developing a design space or conducting trade studies	IIIII IIIII IIIII I	IIIII IIIII IIIII	III	II	(16*4+15*3+3*2+2*1)/36=3.25
Applying design constraints and standards	IIIII IIIII IIII	IIIII IIIII IIIII I	IIIII	I	(14*4+16*3+5*2+1*1)/36=3.194
Obtaining an effective solution that satisfies requirements	IIIII IIIII IIIII I	IIIII IIIII IIIII I	II	II	(16*4+16*3+2*2+2*1)/36=3.277

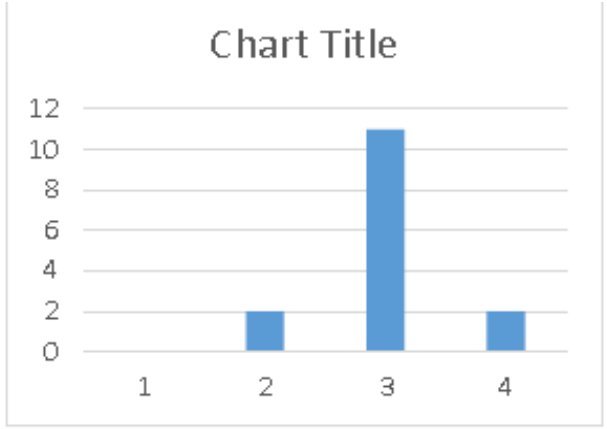
- Average = (3.111+3.25+3.194+3.277) / 4 = 3.208
- So the final grad for outcomes C = 3.208/4

PERFORMANCE INDICATOR CHARTS RESULT









- **Students Works Rating:**
- Lecturer should also made a students works rating which is a number of 1~ 4 of their understanding for the performance indicator.
- Then calculating the Average (x of 4) and final grade (x/4)
- It's related to lecturer to do students works rating chart and it should loke like the performance indicator one.
- SD " Standard deviation is needed for both. Hint/ you could use the web to do it easily. Also it is good if less than 1

STUDENT AND FACULTY EVALUATIONS OF LEARNING OUTCOMES

Students Outcomes	Students Rating	SD	Instructor Rating	SD	Instructor Comments
C	Assume 3.222	0.45	3.208	0.305	Acceptable difference
Assessment of Changes/Improvements Made this year, 2016/2017			No improvement is made		
Changes/Improvements That Will Be Made Next Time the Course is Offered			We hope that next year will be improved by:		