ABET OUTCOMES

مخرجات ابت الخاصة بالحقيبة التدريسية للمواد النظرية

إعداد

د. أحمد عدنان عبد الجبار

مدير شعبة الجودة / قسم الهندسة الميكانيكية

OUTCOME “ B “AN ABILITY TO DESIGN AND CONDUCT EXPERIMENTS AS WELL AS ANALYZE AND INTERPRET DATA”

- **Performance Indicators:**
- **1. Knowledge of experimental approaches**
- الإلمام بالحلول العملية
- **2. Knowledge of data collection methods**
- معرفة كيفية جمع البيانات
- **3. Experience conducting experiments independently (not “canned” experiments)**
- القدرة على استنباط وتطبيق التجارب العملية بشكل مستقل وليس الجاهز منها فقط
- **4. Ability to analyze and interpret data**
- القابلية على تحليل وربط البيانات

Assessment tools (Simulation and/or lab reports for independent experiment)

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

	4- Exceeds	3- Meets	2-Progressing	1-Below
1. Knowledge of approaches	Given a hypothetical situation: Can cite several experimental approaches	Given a hypothetical situation: Can cite one experimental approach	Given a hypothetical situation: Can cite experimental approaches but none that satisfy the situation	Given a hypothetical situation: Cannot cite any experimental approaches
2. Knowledge of data collection methods	For the given hypothetical situation: Can cite several ways of obtaining raw data necessary to satisfy the situation and can discuss the pros and cons of each	For the given hypothetical situation: Can cite at least two ways of obtaining raw data necessary to satisfy the situation but can not discuss the pros and cons of each	For the given hypothetical situation: Can cite ways of obtaining raw data, but none that will work to satisfy the situation	For the given hypothetical situation: Cannot cite any ways of obtaining raw data necessary to satisfy the situation
3. Experience	Has practical experience designing, conducting experiments and analyzing and interpreting data independently	Has been part of a team that has practical experience designing, conducting experiments and analyzing and interpreting data	Has participated in experiments that were designed and set up by someone else, but were conducted by the student and where the student analyzed and interpreted results	Has never conducted an experiment nor analyzed or interpreted experimental results
4. Ability to analyze and interpret data	Given a set of data; Can describe how to convert into engineering units, graph, determine trends, can discuss accuracy and uncertainty of the data	Given a set of data; Can describe how to convert into engineering units, graph, determine and discuss trends, but is unable to discuss accuracy or uncertainty	Can convert raw data to engineering units and graph, but can not adequately discuss errors, uncertainty, or trending.	Can not start the task of analyzing or interpreting data

QUESTIONNAIRE FOR OUTCOME (B):

This is tool is envisioned to be a "simulation" where the assessor provides certain elements of the experiment and the student then answers questions to determine how one would proceed for each performance indicator.	
Performance Indicator 1	Given the situation, identify as many experimental approaches as you can to obtain the necessary data to solve the problem. Briefly discuss each one and assume that you have no resource constraints.
Performance Indicator 2	Given the situation, identify as many ways to obtain the needed data as possible. Discuss the pros and cons of each
Performance Indicator 3	Describe your personal experience in actually designing and conducting an experiment and then analyzing and interpreting the results.
Performance Indicator 4	Given this raw data, how would you reduce it to engineering units and how would you interpret the results based on the given graph of data. Include discussion about accuracy and uncertainty of the data.

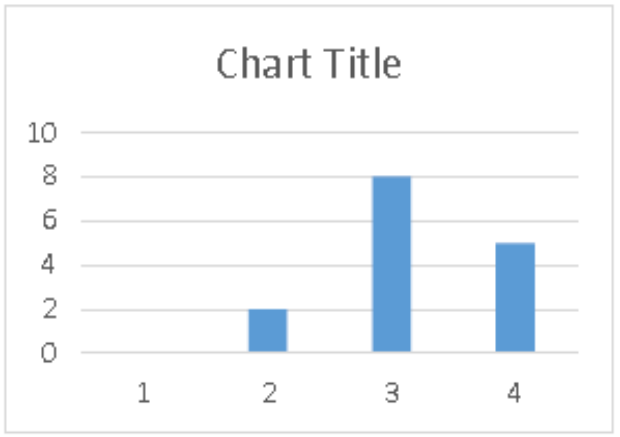
EXAMPLE

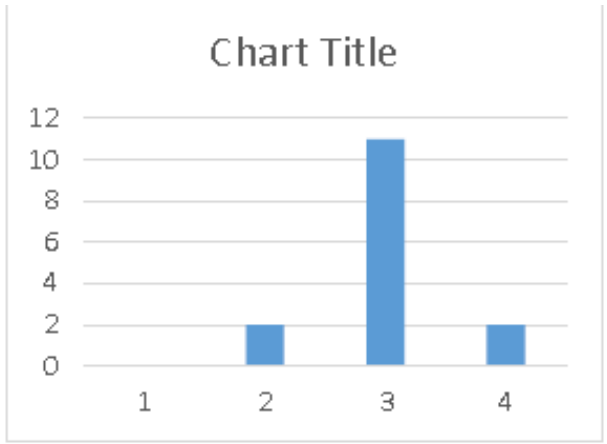
- Assume we have 6 groups with 6 students each.
- Any class with lab. say Strength of Material
- Now a simple gob or home work must evaluated according to performance indicator by ¼ of degree points for each one.
- So according to Rubric table let us assume the students groups indicators were as follow:

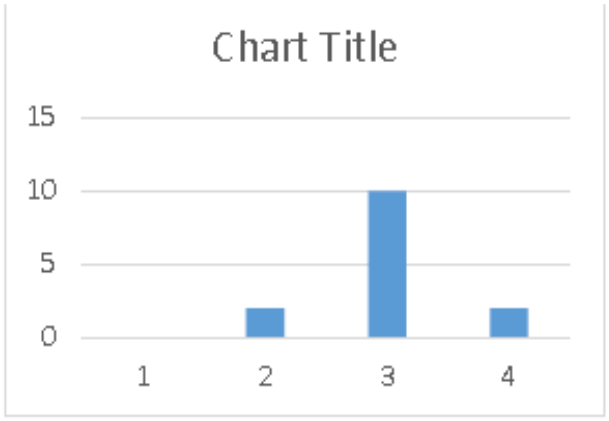
	4- Exceeds	3- Meets	2-Progressing	1-Below	
Knowledge of approaches	IIIII IIIII IIIII	IIIII IIIII III	IIIII	III	(15*4+13*3+5*2+3*1)/36=3.111
Knowledge of data collection methods	IIIII IIIII IIIII I	IIIII IIIII IIIII	III	II	(16*4+15*3+3*2+2*1)/36=3.25
Experience	IIIII IIIII IIII	IIIII IIIII IIIII I	IIIII	I	(14*4+16*3+5*2+1*1)/36=3.194
Ability to analyze and interpret data	IIIII IIIII IIIII I	IIIII IIIII IIIII I	II	II	(16*4+16*3+2*2+2*1)/36=3.277

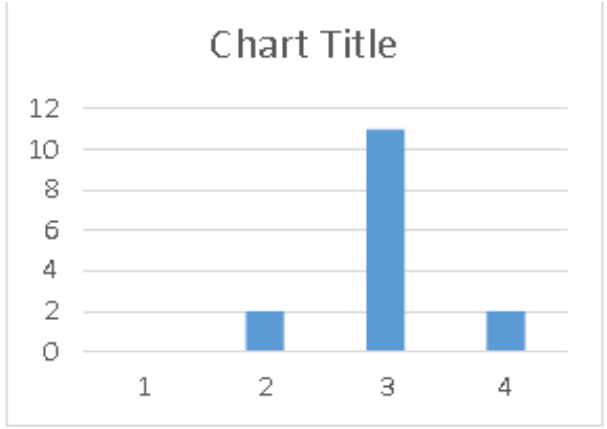
- Average = (3.111+3.25+3.194+3.277) / 4 = 3.208
- So the final grad for outcomes B = 3.208/4

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
B	Assume 3.115	0.55	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:		