Engin 103	Topics:
September 27, 2011	Differences between Science & Engineering
	A design example
back to e-syllabus	CW2
	Project 1
	Logbook questions

Differences between Science and Engineering:

Copy this page and fill in your team response below. Then save as a web page: name "engsci.**html**" and upload to your *files* folder.

Indicate at least one difference between your engineering field (as assigned in Project 0) and a related science subject such as Physics (including mechanics, thermodynamics, electricity and magnetism, static, fluids), Chemistry, Biology, Computer Science. Please try to be specific. Since they are not the same thing, avoid words like "engineering science", or "engineering is a branch of physics". Since they have different missions, avoid comparisons such as one is generally better than the other, etc.

Team #	Difference between Engineering and Science	Rating
		(1-5)
1		
<u>2</u>		
<u>3</u>		
<u>4</u>		
<u>5</u>		
<u>6</u>		
<u>7</u>		
<u>8</u>		
9		
<u>10</u>		

Team #	Explain any connection between what you said above and any	Rating
	difference between the outcomes of a science/math homework	(1-5)
	and an engineering project	
1		
<u>2</u>		
<u>3</u>		
<u>4</u>		
<u>5</u>		
<u>6</u>		
<u>7</u>		
<u>8</u>		
<u>9</u>		
<u>10</u>		

Section ()1	
Tea	.m #	Difference between Engineering and Science
Section 1	Section 2	
<u>′</u>	<u>[</u>	
2	2	Science deals with systems as perfect systems and some uncertainties are
		negligible but on the other hand engineering deal more realistic with
	-	systems and never neglect an uncertainty.
5	<u>3</u>	Scientists are interested in now and why things occur. Engineers are
		processes (systems, Engineering you cannot approximate, it has to have
		processes/systems. Engineering you cannot approximate, it has to be
		that influence the answer, on the other hand engineer doesn't
1	1	One difference between Science and Engineering is that Engineering is
-	-	more application based while Science is more focused on research. For
		example a scientist would perform research to develop new concepts and
		ideas on how the world around them works while an engineer uses the
		concepts developed by scientists and apply it to real life projects to get a
		task completed. One such example would be the specific differences
		between a field in the sciences and a field in engineering. While doing
		physics experiment testing the force of gravity on an object, the tester
		should always come to the conclusion that gravity effects all objects the
		same. This differs from engineering because an engineer in the field of
		civil engineering will have many different solutions to the same project,
		and they need to decide which solution fits them best in comparison to
		costs and problems that may arise.
<u>5</u>	<u>5</u>	Engineering is taking the theories that were created using science and
		applying them to help solve real-world problems. In addition, engineers
		may apply several different theories or ideas to a problem, in order to help
		solve it. (approximation vs. precision)
<u>6</u>	<u>6</u>	Science is collecting and analyzing data and measurements, but
		engineering is designing, optimizing, and improving systems and
		apparatuses. Science is about general ideas and engineering applies it to a
2	2	specific situation. Engineering is design and building.
_	<u> </u>	Engineers are responsible for applying the concepts of math and science to design and build and a science trying to understand the nature and how the
		world works, by building models and testing their prediction
		world works, by building models and testing then prediction
8	8	
9	9	Science is perception of something and Engineering is study and building
		of something
10	<u>10</u>	
. <u> </u>		·]
Tea	.m #	Explain any connection between what you said above and a difference
Section 1	Section 2	between the outcomes of a science/math homework and an
		engineering project
<u>1</u>	<u>1</u>	

<u>2</u>	<u>2</u>	A math H.W is basically a concept H.W and it lacks application or
		realistic applications, but engineering project applies different science
		concept to deliver a realistic or real life application with different aspects.
<u>3</u>	<u>3</u>	For science homework, you have to use the scientific method (hypothesis,
		testing, etc) as for mathematics; you are given formulas which you can use
		to find the solution to a given problem. Engineers find solution to a given problem.
<u>4</u>	<u>4</u>	While doing a science or math homework, the goal of the homework is to
		come to a universal solution on the problem that other people would also
		come to. This differs from an engineering project because an engineering
		project uses the science skills and applies it to a task, where the solutions
		can be different, yet equally effective. For example, while doing a math
		problem like $2+2$, the person should always come to the conclusion of 4.
		An engineering project like the rebuilding of ground zero had many plans
		that they could choose from before selecting the final plan that they
		decided to turn into the memorial in the end. Different problems came up
		during the project that the engineers had to account for and no matter how
		many memorials that an engineer would be included in building, different
		plans would be used and different problems would arise.
5	5	
6	6	Engineering applies science and math for design and creation of a new or
-	-	existing apparatus. Engineering will use the ideas from science and math
		and develop something new or improve it, but science and math homework
		will have a set answer to them.
<u>7</u>	<u>7</u>	
<u>8</u>	<u>8</u>	
9	9	You get a specific answer which is either right or wrong whereas in
		Engineering there is more than one answer or outcome.
<u>10</u>	<u>10</u>	
Section ()2	
Tea	ım #	Difference between Engineering and Science
Section 1	Section 2	

Tea	am #	Difference between Engineering and Science	
Section 1	Section 2		
<u>1</u>	<u>1</u>	Science is the methodology and study of a particular subject while	
		engineering is the applied use of science to solve problems.	
		Aerodynamics and jet propulsion is a science and aerospace engineering is	
		the applied use of science.	
2	<u>2</u>	Science is what we know and engineering is how we apply it. For	
		example, in biomedical engineering the fundamental of biology are	
		applied to medical field to develop medical tools like MRI's and imaging	
		of XRAY's.	
<u>3</u>	<u>3</u>	Applying chemical properties to understand, design, and build	
		products/tools in a practical and non-theoretical way.	
4	4	Physics is an example of Science, that gives or discovers formulas that	
		provide a base point & civil engineering is the application of that	
		knowledge into designs such as bridges and structures	

<u>5</u>	<u>5</u>	Computer engineer design and build. Computer engineer might design
		chips, computer systems. Computer science deals more with
		programming.
6	6	Science provides theoretical basis for engineering, while engineering is the
	_	practical application.
7	7	Geologists are focused primarily on studying the underground and natural
<u> </u>	<u> </u>	underground structures such as aquifers and geological and geophysical
		engineers are focused on using such studies to solve practical problems
		such as tanning into an aquifer or building an underground structure
0	0	Such as tapping into an aquiter of outduing an underground structure.
<u>o</u>	<u>o</u>	machinery/working ports, while Machanias forward on how the machinery
machinery/working parts, while Mechanics focuses on how the		machinery/working parts, while Mechanics focuses on now the machinery
		actually works and operates.
<u>9</u>	<u>9</u>	Materials engineering lays mostly on research and experiments with
		different materials that already exist. Computer science and math are
		virtual and logical paths that lead to artificial products as an outcome.
		Working and experimenting with materials is actually a physical activity
		and the outcome is a tangible product.
<u>10</u>	<u>10</u>	
Т	eam #	Explain any connection between what you said above and a difference
Section 1	Section 2	between the outcomes of a science/math homework and an
		engineering project
1	1	Math and science are used by an engineer to finish a project where
		classwork allows you the tools to learn theories and a project allows you
		to apply theories into the project.
2	2	In science and math homework you are practicing the fundamental skills
		while engineering projects require application of those skills to real life
		situations. Math and science homework would be to learn while in a
		engineering project they would create.
3	3	Engineering project results in something tangible using principles from
<u> </u>	-	math and science, whereas math/science homework results in ideas on
		paper. Engineering projects may result in the discovery of a new or better
		way to use pre-existing scientific ideas
4	4	Without the study of Science, the Engineering of new designs would not
Ŧ	<u> </u>	be able to progress into an implementation. The difference between the
		outcomes: Science and Math are formulated answers, based off of past
		research: an Engineering project is the application of such formulas in that
		there is a topic research analysis implementation and evaluation of the
		deta
5	5	Uala Sojango homowork is yory abstract and wouldn't domand any
2	2	science nonework is very abstract and wouldn't demand any
		manufacturing process. An Engineering project is more concrete. The
		engineering project starts with designing but tests have to come afterwards
<u> </u>		to make sure the design is efficient and well-working.
<u>6</u>	<u>6</u>	Science/ Math homework gives you understanding of a concept, whereas
		engineering assignment teaches you how to use the concepts that you
1		learned in science and math for practical application.

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<u>7</u>	<u>7</u>	Science homework is focused primarily on the discovery of laws which
		affect the universe; if it deals with the creation of structures, it only does
		so as an obstacle to discovering those laws. For example, a science
		student might build a measurement apparatus and discuss its advantages
		and disadvantages for their purpose but they will receive have the
		and disadvantages for their purpose, but they will fallery have the
		construction of that structure as their end goal.
		Engineering, on the other hand, is focused primarily on the building of
		structures; an engineering student might study certain laws of science, but
		they will rarely have such studies as their end goal. The end goal of an
		engineering project is to build a usable structure.
8	8	While homework for a mechanics class might have you explain how a
<u>•</u>	<u>•</u>	nine nonework for a meenanes class might have you explain now a
		piece of machinery works of the forces acting on each part, a mechanical
		engineering project might have you test the function of the piece of
		machinery and come up with a new way to use it or a enhanced design to
		improve its functionality.
9	9	The outcomes of engineering project homework are: knowledge about the
		nature and its subjects and how to manipulate them. The outcome of math
		or science homework is logical thinking and learning naths of how to
		apply science and math in different tasks
		appry science and main in different tasks.
	4 4	

back

A Design Example

Science	Engineering
Theory	Applications
Uses math, equations	Uses math, equations, and
Build knowledge	physical tools
	Build devices with practical
	applications
Math/Physics homework	Engin 103 projects
One solution	Many solutions





Examples of a system could be a catapult (X=initial height of a weight; Y=range for a clay ball), a pendulum (X=period; Y=length needed to produce that period), or a car on an inclined ramp (X=ramp angle; Y=distance traveled in 2s). When random factors affecting the system are controlled (task of the engineering design team), it can be described with an equation or model, that is, using this model it is possible to predict the output given an input. back Engineering 103 -UMass Boston **CW 2** (Class Work #2) Why do we have cycles in engineering design? Draw a flow chart with four most 1) important steps in an engineering design cycle, in the correct order. 2) Draw a flow chart for an in-out system. Label the input and output variables as X and Y, respectively, and explain what are they for at least two simple systems based on gravity. Given a value for an input X, is it possible to determine exactly the value of the output, ves or no, explain why. In each team, students working together at a computer numbered between 1 and 10 will submit file cw2_XX_a.html and folder cw2_XX_a_files, students working at a computer numbered between 11 and 20 will submit file cw2 XX b.html and folder cw2 XX b files, to the files folder in the server. Replace XX by 01 if team 1, etc. Include your names within the files. _ 0 👹 paintintro.bmp - Paint File Edit View Image Colors Help 4 🗆 - NO 1 Draw a box Q Output Y Input X System Draw a line \square Y' = f(X) \frown Insert text For Help, click Help Topics on the Help Menu.



LOGBOOK: example of a logbook page

-Use a quadrille notebook; number all pages; date all entries

-Write your notes for all activities, thoughts, problems and solutions, and learning conclusions related to Engin 103. You should write down progress, outcomes, and conclusions on projects and teamwork; conclusions from class work (including LabVIEW) and homework.

-In addition you should answer in the logbook all questions listed in these notes in blue, as shown below:

11) Explain at least one difference between your engineering field (as assigned in Project 0) and a related science subject such as Physics (including mechanics, thermodynamics, electricity and magnetism, static, fluids), Chemistry, Biology, Computer Science. Please try to be as specific as you can. Avoid phrases like "engineering science", or "engineering is a branch of physics". Avoid comparisons such as one is generally better than the other,

etc. Is there any instance in which an engineering advancement helps discover new science? Explain.

12) Write your answer to CW2 here.

back