ME328 Machine Design Project
DID#2 - Establishing Criteria
Individual (not team, yet)

As your lead engineer, I am suggesting you spend about 30-60 minutes on this assignment (undisturbed/no distraction time).

Since the goal of the design work is to create a product that satisfies the criteria, the criteria define the ideal finished product. If the criteria are not properly defined, then the finished product will not meet the customer needs. Students of engineering have much experience solving problems with clearly defined criteria (almost every homework problem), but little experience defining the criteria. So how should you proceed?

The first task is to think "big picture" about all of the factors which may (or may not) be appropriate. On the ME Student Reference page is a link under project management titled "design considerations" (URL: http://faculty.up.edu/lulay/MEStudentPage/DesignConsiderations.pdf). These are not criteria, but rather are 'topics' that you should consider when creating criteria. In addition to functional criteria (defining what the device needs to do), almost every mechanical engineering design should consider budget factors, serviceability (how easy it is to fix and maintain the object), etc. So, you should consider all of the things in the "Design Consideration" link and from those, create specific criteria. What else should you know before creating criteria? See link on the ME Student Ref page (link: Evaluating alternatives, developing criteria, URL: http://faculty.up.edu/lulay/MEStudentPage/evaluatingalternatives.pdf

For most projects, criteria will be created for the whole project itself as well as for subsets. For example, Hyster-Yale will establish criteria for a new lift truck (aka "fork lift"). There would then be more detailed criteria for various aspects – for example, there could be criteria for the drive-train itself (engine and transmission). There may also be criteria for various phases of a project – such as the ME328 project and for most capstone projects. It needs to be clear in your mind what the ultimate goal is (a winch for use in Uganda or other parts of sub-Saharan Africa), as well as your task at hand (a functioning proof of concept based on limited materials – a Lego Mindstorm kit). DID #2 requires you to create 2 different criteria tables; one for KG #2 and one for KG #3 as described next.

Knowledge Gap (KG) #2: Define the criteria for the Uganda winch project (this project will not be completed in ME328, but assume it will be completed after ME328).
To fill this knowledge gap, as an individual create what you believe are the top 8-15 criteria for the final project (designing the transmission for a winch to be used in rural Uganda).

Knowledge Gap (KG) #3: Define the criteria for the demonstration phase of this project (work to be completed this semester).
To fill this knowledge gap, as an individual create what you believe are the top 8-15 criteria for the demonstration phase of this project (designing the transmission to pull a plow in *Lulay Sisters* test facility).

As always (almost always?), you are encouraged to work with others, but what you submit is your own work – so you must believe it and understand it – your name goes on it, ***you own it*!**

Do the best you can in creating clear (quantified if possible) criteria with the limited knowledge you currently have. If you cannot quantify, then at least qualify well. For example, you may not be able to determine budget at this point, but you can safely assume budget will be a factor. Be sure to use tables similar to the following:

Table 1 – INCLUDE APPROPRIATE DESCRIPTION

#	Criteria	Priority	Description

number each criterion in sequence (#1 at the top…). The most important criteria go at the top, the least important at the bottom.

Criteria: a clear and concise description

Priority: Essential, High, Low are about as detailed as you need to be. Remember "essential" means the design is a <u>total failure</u> if it does not meet that criterion so the description needs to be very clear. "Not cost a lot of money" could not be essential, however, "not cost more than $100 to produce" could be ($101 could be too much).

Description: be as clear as you can be. Do the best you can. Perhaps criteria will become clearer later on and can be redefined.

Examples of criteria *descriptions*:

Not clear:	Not weight very much
Somewhat clear:	Easy to lift by one person
Clear:	Weigh less than 40 pounds

And yes, you must follow the intent of the stand problem solving format --- it is all about communication. (It must be clear what you are doing and why). This does not mean there needs to be lots of words.

Criterion: singular
Criteria: plural