**Evaluation Matrix**

The final design is selected from the candidate designs through an evaluation process. Although we will be using the Pahl & Beitz systematic approach to evaluate designs, it is important to know that there are many other methods that could be used. In this approach you assign weights to all Evaluation Criteria based on their level of importance, with more important criteria having higher weights. The sum of the weights should equal 1. In a later class, you will use this table to evaluate design candidates by assigning numerical values and calculating their weighted values.

* Every team must include Cost and Safety as Evaluation Criteria. There should be at least one criterion per team member (ex. 6 person team will have 6+ criteria).
* Assign weights to each criterion based on how important you feel it is for your project and to your project CEO. The Weighting Factors should add up to 1.0.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | **Design Candidate 1** | | **…** | **Design Candidate n** | |
| **Criteria** | **Weighting Factor** | **Numerical Value** | **Weighted Value** | **…** | **Numerical Value** | **Weighted Value** |
| Cost | #.# |  |  | … |  |  |
| Safety | #.# |  |  | … |  |  |
| Criterion 3 | #.# |  |  | … |  |  |
| Criterion 4 | #.# |  |  | … |  |  |
| Criterion 5 | #.# |  |  | … |  |  |
| … | #.# |  |  | … |  |  |
| … | #.# |  |  | … |  |  |
| **Total** | 1.0 |  |  |  |  |  |

**Justifications for Evaluation Criteria**

You need to think carefully about what Evaluation Criteria you consider and how much weight you assign. This can greatly affect the outcome of the evaluation process and the design features that are incorporated into the final design.

* Provide a justification for why your team chose each criterion. Why is it an important thing to consider for your project and evaluate future designs on? What would happen if it wasn’t considered? What impact may that have? How much weight did you assign the criterion and why?

**Requirements Structure**

The requirements structure is multi-tiered. At the highest level are the system requirements that are given by the Project CEO and are the foundation for your project. The next level consists of what can be thought of as subsystems. Notice that no design implementation is shown at either the system or subsystem levels. Each block is a function, process, capability, or activity. The same is true of the requirements that you write. You do not start the design during the requirements phase of the project.

* Replace the box with the words “Given High Level Project Requirements” with the name of your project and an abbreviation for it. Example: Prosthetic Hand (HAND).

**Subsystem Level:**

**2**

**System Level:**

**1**

* Your team may add to second level of the Requirements Structure; however, you must provide a justification for any topic that is added. Is there something that is essential to your project that cannot be described as Structure, Function or User Interface? See the Mr. Roboto requirement structure for an example of this.

**Project Requirements**

There must be at least one requirement for each of the subsystem components in the Requirements Structure. All requirements allocated to a subsystem component must be traceable to one of the system level requirements that are given by the project CEO (i.e. Parent Requirement). Follow the format shown below:

Parent Requirement

(For subsystem components only)

System/Subsystem Level

[FUN 2.3] The prosthetic shall function for 16 hours when fully charged. {HAND 1.1}

System/ Subsystem Component Abbreviation

Requirement # for System/ Subsystem Component

Additionally, the reader should have a clear idea of why that requirement is important to the project and how it relates to a system level requirement. You do not want to over constrain the project by including unnecessary requirements; therefore, you should only have written requirements for the ESSENTIALS. To prove this to the reader, you should explain why the requirement is important to the project (how it relates to a system level requirement) and provide citations to defend values and other specific limits that were chosen. Additionally, you should provide clear definitions of commonly used terms.

* Start by generating a list of as many requirements as you can think of. Don’t assign any designations until you have a list with **at least 2 subsystem requirements for every team member.**
* Once you have a list, assign a subsystem level abbreviation and number.
* Refer all subsystem level requirements to a system level requirement (Parent Requirement). There may not always be an obvious relationship but pick one that you can make a case for.
* Following each requirement, **write a short explanation** (~2 sentences) to explain why the requirement is important and relevant to the project. If specific values are used in the requirement, you need to state what those values represent and cite sources appropriately.
* A definition list should be provided before the list of requirements.
* Include a Reference Page for all cited material.

**System Requirements**

[HAND 1.1] Provide a prosthetic that allows for adequate hand performance, equivalent to that of a human hand.

…

**Subsystem Requirements**

…

[FUN 2.3] The prosthetic shall function for 16 hours when fully charged. {HAND 1.1}

* To have adequate hand performance, equivalent to that of a human hand, the prosthetic must function for a typical workday. A day is 24 hours and 8 hours of sleep is recommended for people 14 years and older (Olson, 2019); therefore, the typical workday is 16 hours.

…

# **References**

Olson, E. (2019, June 06). *How many hours of sleep are enough for good health?* Retrieved from Mayo Clinic: https://www.mayoclinic.org/healthy-lifestyle/adult-health/expert-answers/how-many-hours-of-sleep-are-enough/faq-20057898