Interdisciplinary Capstone Design
Budget

Assignment Goal

To create a *complete* financial estimate (or summary) of your capstone design project, capturing all prior and forecasted expenses required to complete the project as planned.

Learning Outcomes

As a result of completing this assignment, you should be able to:
- Estimate the total expenses required to complete the project.
- Outline a comprehensive financial plan that includes when past expenses have occurred and when future expenses are expected to occur.
- Demonstrate ongoing monitoring of the project budget to confirm it is on track to be within target.

Relevant ABET Learning Outcomes

1. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
2. An ability to communicate effectively with a range of audiences.
3. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.

Rationale

In the real world, every project must have an estimated budget before the project is officially approved and initiated. Once a project is approved and underway, we need to have a mechanism to track all expenses and project all future expenses to ensure that the project will remain within the target budget and be successful. This approach is an "industry representative" method to accomplish this very concisely.

Task

Working in your capstone team, you are assigned to draft and maintain a detailed budget summary throughout the duration of your project.

The suggested approach for **drafting** your first budget at the beginning of the project is:
1) Identify if any special equipment will need to be purchases for the project. For most capstone projects, there is NO special equipment required.
2) Determine if any travel will be required for the project. If so:
   - Identify travel destinations and how often (or when) travel is likely to occur.
   - Estimate the cost of each travel event, accounting for the following as necessary:
     - Motor pool vehicle (~$60/day)
     - Vehicle fuel (~$20 per 100 miles)
     - Hotel accommodations (~$125 per room per night)
     - Meal(s) (~$75 per team each)
3) Estimate the different materials you will need to build your prototype, including:
   - Raw materials: steel, aluminum, plastics, 3D printing material, etc.
   - Catalog parts: bearings, motors, shafts, gears, etc.
   - Electrical components: Arduino, Raspberry Pi, wiring, etc.
   - Hardware: Fasteners, Adhesives, etc.
4) Apply an estimated cost for each of the anticipated materials
   - In beginning, make your estimates conservative
   - For early estimating, lump together small parts (e.g. All Fasteners = $50)

Once you have an approved budget in place to start the project, you MUST maintain the budget document frequently through the duration of the project. The suggested approach for **maintaining** your budget is:

1) <u>Choose</u> one team member to be the "owner" of the budget.
2) <u>Review</u> the status of the budget during your team meetings at least monthly (although weekly is not an unreasonable frequency).
3) <u>Ensure</u> all past expenses are recorded (exact amounts) at the approx. time they occurred
4) <u>Update</u> the expenses projected to occur in the future based on the most current information available about the project.
   a. What expectations are the same or different and need modified?
   b. Has the timing for when you expect to spend money been changed?

<u>Related Logistics:</u>

a) Every time you submit a "Purchasing Request", you should present an updated budget summary to your lead instructor for approval, which includes the proposed purchase. This will enable the instructor to confirm the requested purchase fits within the project plan.
b) At the end of the project, you will have a detailed summary of every expense that occurred throughout the project, and the amount you came in UNDER budget.

Assessment

Teams should plan to present the budget summary (past and future expenses) at every project milestone, including:
- Snapshot Days
- Concept Reviews
- Engineering Release Reviews
- Final Project (EXPO) presentations

Each of these milestones include assessment criteria for Project Management and Documentation of the project.