Circuits Final Project fall 2022- Stage I: Conceptual Design

1. **State what function(s) your circuit must achieve and highlight its real-world importance**. This is high level thinking. To help get you started – and fill in details and be more specific as appropriate - here are some examples specific to each project:
   - **EMG arm**: "Measure a muscle flexing and convert that impulse into a preprogrammed movement of multi-joint robot arm. This type of system is used to restore basic daily function in upper limb amputees."
   - **Music and lights**: this might be "take as input a music signal, break it up into frequency bands of xyz, then illuminate lights according to the intensity in each frequency band. This system is generates a pleasing audivisual effect; similar systems may be found at (whatever venu/artist)"
   - **Desert Island/black box flight recorder**: Might be multiple to consider here, such as 1) "AM radio receiver will be implemented to listen to evacuation instructions"; 2) Beacon locator should locate a transponder oscillating at a frequency of x Hz3) Implement voice/data recorder with xyz sensor readings. This system is a simplified system used on airplanes…here are a few classic (and tragic) case studies and what we learned from recovering the black box…"
   - **Muon detector**: This system should measure and record detection of muons using …. Muons are important particles to track because…."
   - **Solar Panel Tracker**: "Monitor the intensity of solar rays in the following directions using xyz part. This array of light intensity data will be used to compute the approximate location of the sun. Motors will corresponding rotate to move the solar panel to a position of maximal irradiance vs time. We will quantify the gain in power generation tracking the sun vs not."

2. **Develop the Circuit diagram**
   - This is the blueprint for what you will actually build.
   - Suggest thinking of your system as multiple functional blocks that will be interconnected
   - Choose and state component values used and state in lay-circuits language rationale for them. E.g. "We chose a cutoff frequency of X Hz, thus using the f = 1/2piRC we chose R and C as follows…"

3. **Create Bill of Materials (BoM)**
   - Make a table in Excel listing all components required. See and follow the [example here from the CosmicWatch project](#).
   - Every component in the circuit diagram should be a line item in the BoM
   - Highlight components you need to buy – e.g. not in stock in the Circuits lab or elsewhere in the Phys-Engn Dept.
   - For each item that needs to be purchased, identify a vendor and part number. We will work together to order these as quickly as possible.