ICS 3111 Project Development Guidelines

Use the following research questions as your guideposts to model, design, simulate, interact, measure input/output relations and to justify your projects.

Q1: Briefly describe the background of your project referring to the project synopsis which you downloaded from **https://nevonprojects.com/microcontroller-based-projects/**

Q2: Using a pencil, a plain paper, and a ruler sketch the block diagram of your system, and list down all the parts/ components/ sub-circuits that constitute the assembly of your system

Q3: For each of the components/ parts/ sub-circuits, in Q2, explain its specific principle of operation, theory, types and sub-circuit connections/ diagrams

Q4: Considering the flow of input/ output signals that you've logically established in the block diagram of Q2, and the parts in Q3, synthesize and architect the detailed circuit diagram, illustrating the connection of various controller pins to the terminals of the interfaced parts

Q5: Does the hardware circuit diagram developed in Q4 require a controller software/ coding for processing the inputs to actuate the system output functions? (Y/N). If yes, establish and write down the sequence of steps, from "start to stop" and give a flowchart for the required code.

Q6: Using a suitable microcontroller platform such as Arduino, or Raspberry Pi, or ARM, develop the code to meet the requirements you have outlined in Q5. Carry out the debugging and ensure there are no errors once you run the code in the selected platform.

Q7: Model the hardware circuit diagram of Q4 in a simulation software and transfer the code developed in Q6 into the controller over the simulation platform. Run the simulation and observe the input-output logic realized.

Q8: Analyze different cases of results based on different inputs to the simulation of Q7. Do the results obtained meet the requirements that you expected while conceptualizing the project? (Y/N). If not, what caused the discrepancies?

Q9: Design and draw the PCB layout plan for your project using the simulation software

Q10: Add one more structured research question into this list of research questions and provide a solution to it, for instance, regarding a more improved version of your product.