CET\_4811 Capstone Project Report Template

# The final version of the report is due in Blackboard / CET\_4811 / Assignments by the last class session.

***<Title Page>*  Project Title**

Project Picture

Group Members’ Names

Course Name and Number / Semester and Year / Instructor’s Name

***<Page 2>*  Table of Contents**

***<Page 3>*  Project Summary (one to two pages).**

Block diagram of project.

Brief description of overall operation with the help of block diagram.

Real-world applications and benefits of the project.

**<*Page 4*> Project Management Plan (one to two page).**

Properly completed Gantt chart showing project management plan with brief description.

***<Remaining pages>*  Detailed description of the project, divided into following sections:**

1. Mechanical design (include mechanical design diagrams and pictures).
2. Electrical design (include schematic diagram(s)).
3. Software design (include flow chart and source code listing with comments).
4. Appendix: Datasheets of mechanical and electrical components.

(Detailed guidelines for these sections of the report are provided on next page)

***<Last Page>*  References.**

(List all sources of information used in designing and building the project. Some examples are mechanical, electrical and programming books, magazines or magazine articles, datasheets, web sites, etc. Also list the names of stores or web sites where project components were bought or obtained.)

**Besides the technical content, the report will also be graded for:**

* spellings and grammar
* report format (margins, page numbers etc.)
* source code format (mono space font, code block alignment, inclusion of comments)
* presentation and aesthetics.

**Section A: Mechanical design**

* List of mechanical components and their source(s).
* Description of the mechanical structure or construction steps.
* Include pictures to show intermediate stages of construction.
* Size (length, width, height) and weight measurements.
* Problem(s) or difficulties encountered during construction.
* What was done to solve the problem(s).

**Section B: Electrical design**

* Divide the Electrical design information and description into following sub-sections.
* Include information about any trouble-shooting done to detect and fix problems.
* Use the information from appropriate datasheets mentioned below.
* Include the datasheets in an appendix at the end of the report.

1. **Embedded controller**

* Description and electrical specifications of the micro-controller, single-board computer or special purpose embedded controller used in the project.
* *Reference: micro-controller and / or embedded controller datasheet.*

1. **Input sensors**

* Description and theory of operation of the input sensors used in the project. (Examples: switch, photo-resistor, photo-transistor, IR detector, IR receiver, ultra-sonic distance sensor, Hall-effect sensor, Reed-switch, microphone, thermistor, temperature sensor …)
* *Reference: Input sensor datasheet(s).*

1. **Output actuators and devices**

* Description and theory of operation of the output actuators and devices used in the project. (Examples: LCD display, LED display, speaker, relay, DC motor, stepper motor, servo motor …)
* *Reference: Output actuator or device datasheet(s).*

1. **Input and output interface circuits**

* Schematic diagram(s) and description of input and out interface circuit(s). (Examples: voltage divider, resistor bridge, operational amplifier, comparator, transistor amplifier, opto-coupler, power transistor, h-bridge circuit …)
* *Reference: Component or sub-circuit datasheet(s) where appropriate.*

1. **Data communication and network interface**

* Schematic diagram(s) and description of data communication and network interface circuit(s). (Examples: RS-232, RS-485, SPI, I2C, USB, Ethernet, WiFi, Bluetooth, Zig-Bee, smart phone …)
* *Reference: Data communication and network interface sub-circuit datasheet(s) where appropriate.*

1. **Power system**

* Schematic diagram(s) and description of power supply circuit(s). (Examples: power adapter, voltage regulator, current regulator, batteries, battery chemistry, battery capacity, battery chargers …)
* *Reference: Power supply sub-circuit datasheet(s) where appropriate.*

**Section C: Software design**

* Complete source code listing of all test and control programs with comments.
* For source code listings, use mono-space font such as Consolas and proper indentation.
  + To apply automatic indentation use Ctrl-T command in Arduino IDE.
* A high level UML activity diagram (flow-chart), or block-diagram of the control program(s).
* Describe the operation of the control program with the help of source code listing and activity diagram.
* Include information about any troubleshooting done to detect and fix software problems.

**Section D: Appendix: Datasheets of mechanical and electrical components.**