***School of Electronic Engineering and Computer Science, Queen Mary University of London***

**FINAL YEAR PROJECT SPECIFICATION**

**Session 2016-17**

***This project specification must be undertaken in consultation with your supervisor. The feasibility of the project should have been assessed and the project aims should be clearly defined.***

***Submission of this document implies that you have discussed the specification with your supervisor.***

|  |
| --- |
| **Project Title** Miniature Hyperloop – **Motor Drive & Control Systems**  **Supervisor** [Dr Kamyar Mehran](https://intranet.eecs.qmul.ac.uk/people/showdetail/i/55120)  **Student name:** M.L. Hariras Tongyai |
| **Student Email:** [**ec14207@qmul.ac.uk**](mailto:ec14207@qmul.ac.uk) |

**Student Contact telephone number: +44 7481587578**

**PROJECT AIMS**:

*State the design, development or research challenge that the project aims to solve.*

This project aims to design an approach to the Hyperloop Alpha Proposal (open-source concept) and develop a new approach on a miniature scale exploring the feasibility, implications and factors effecting the Hyperloop system. The concept inspiration was taken from Hyperloop One and Space X’s competition for students to create and propose their own version which is the goal of this project.

The project will explore the appropriate mechanical system such as the motor system needed to achieve levitation and propulsion through either Air bearings or electromagnetic levitation develop in conjunction to a control system which should be able to regulate or control the motor system with a control panel/program communicating with the capsule via both Serial Communications and wireless communications (TCP).

At the end of the project a discussion about the real world application or reflection of the larger scale counterpart based on the developed system on the feasibility, implications, efficiency and effectiveness of the proposed Hyperloop System. A glimpse or brief introduction to indicate if the Hyperloop or any of its variation would an appropriate alternative or new mode of transportation in the future

**METHODOLOGY:**

*Describe the various steps that you intend to follow in order for you to achieve your project aims.*

1. **Research**
   1. Motor System
   2. Microcontrollers
   3. Maglev Trains
   4. Air Hockey & Hovercrafts
   5. GUI System
   6. 3D Printing Calibration & Best Practices
2. **Cost Estimation**
   1. All Components (Initial Estimation Available Refer to Hyperloop Cost Analysis spreadsheet).
3. **CAD/CAM**
   1. Blueprints/Orthographic Diagrams
   2. 3D Cad files of Capsules (Creo & .stl files)
   3. 3D Printing capsule and parts
4. **Software**
   1. **Microcontroller code**
   2. **Network (TCP Code)**
      1. Windows Software (Server)
      2. Microcontroller flashed code (Client)
5. **Hardware**
   1. **Capsule Circuits**
      1. Motors
      2. Microcontrollers
      3. Battery
   2. **Tube Stand**
   3. **Capsule Assembly**
6. **Experimentations**
   1. Capsule Subsystem
   2. Tube Subsystem
   3. Network Subsystem
7. **Evaluation** 
   1. Capsule Subsystem
   2. Tube Subsystem
   3. Network Subsystem
8. **Adjustments/Changes (Version 2.0 or +)**
   1. Capsule Design
   2. Motor System
   3. GUI-Update/Bug Fixes
9. **Presentation//Demo (Slides and Prototype)**
10. **Report (ALL)**

**PROJECT MILESTONES**

*Indicate what measurable/tangible components you will produce as part of this project. This may take the form of deliverable document(s) or developmental milestones such as a working piece of software/hardware.*

**Software:**

* GUI – Control Program (Windows – Visual Studio)
* Control System – On board control system – Particle Photon
* TCP over Wifi – on Board Microcontroller

**Hardware**

* 2 Meters Acrylic tube
* 1 3D printed Miniature Hyperloop Pod
* Capsule Internal Circuit (Microcontroller, Battery, Motor)
* Umbrellical Control Port (USB to PC as an Alternative to the Wifi System)

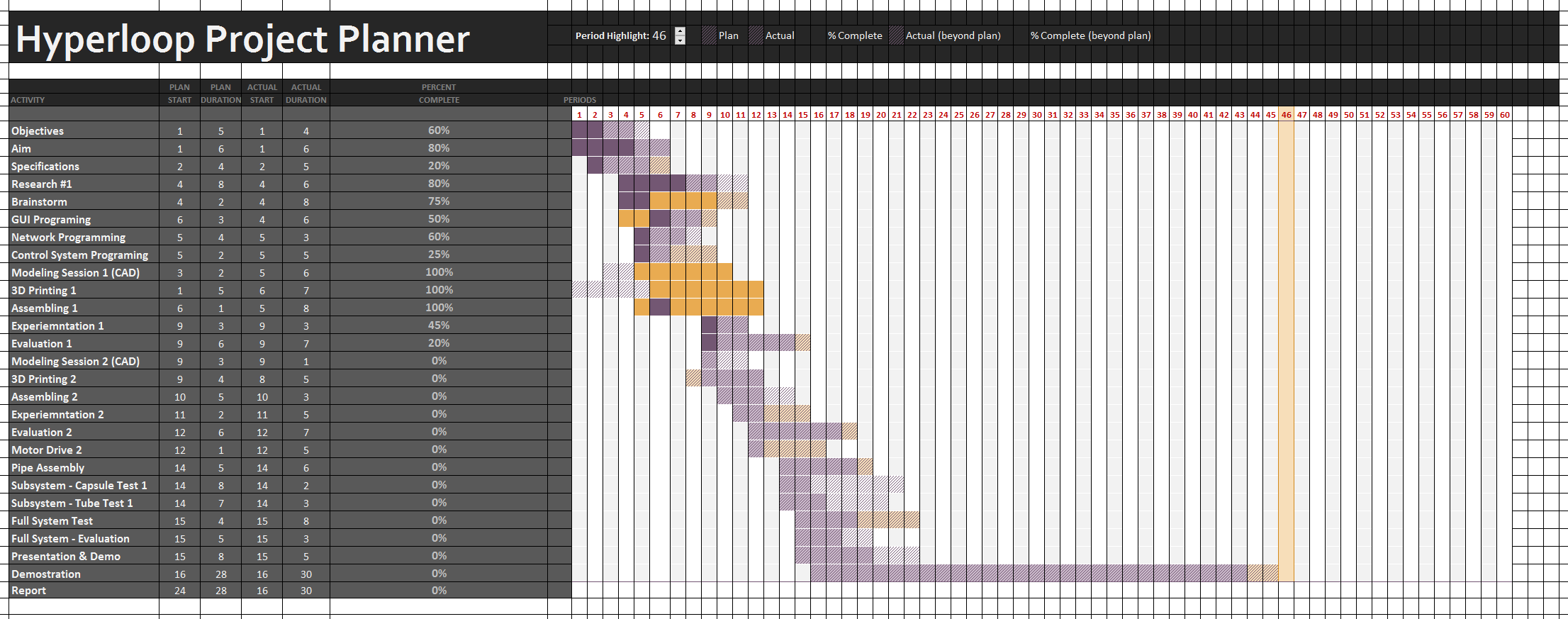
**REQUIRED KNOWLEDGE/ SKILLS/TOOLS/RESOURCES:**

*Indicate as far as possible the skills that are required for you to undertake this project. Also include any software, hardware or other tools or resources that you believe you will need.*

* CAD (Hyperloop Pod Modelling)
* CAM
* Microcontroller Systems (Particle Photon)
* Power Electronics
* 3D Printing
* GUI-Programing (Visual Studio)
* Network Programing
* Design
* Manual Circuit Analysis
* Computational Circuit Analysis

**TIMEPLAN**

*This can be a GANTT chart submitted with this document or a list of tasks, milestones and deliverables with timings. (Refer to the actual excel sheet)*

**