



**DEPARTMENT OF ELECTRICAL ENGINEERING AND ELECTRONICS**

***Revisionary Project Specification Form 2016-2017***  
***Final Year BEng (ELEC340) and Year 3 MEng (ELEC440)***

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Project Title: Development of a C++ based user-interface for a plasma simulation tool

**Project Specification**

**A. Project Description and Methodology:**

This project develops a practical C++ based user-interface to help researchers and industry users analyze the output of plasma simulation effectively.

The existing simulation tool Plasimo will generate large amounts of output data in various formats. Thus, the main objectives of this project contain design prototype of interface and deep learning of C++ to developing this program. Specifically, it requires me to learn C++ based tools which contain Visual Studio (build GUI) and OpenGL (build 2D graphics).

In order to achieve them within 20 weeks, I need to do user requirements research first, at the meanwhile, the skill of developing C++ need to train. Next, the developing of this software need to proceed. Finally, the report and presentation of this project need to prepare.

**B. Project Tasks and Milestones:**

**Tasks:** (a task is a package of work that should be completed during a particular time period)

**Preparatory Work Week 1 ~ Week 2**

- Obtaining plasma simulation tool and relevant reading materials.

**Research Work Week 2 ~ Week 15**

- Weekly background reading for plasma discharges.
- Investigating significant data in numerous output file.
- Investigating Interface in different researching and factory software.
- Learning of corresponding software include C++ based visual studio, OpenGL.

**Developing work Week 4 ~ Week 15**

- 2D graphical model display function developed by OpenGL.
- Rapid loading text function developed by Visual Studio.
- User-friendly interface developed by Visual Studio.

**Report working Week 1 ~ Week 20**

- Project specification report form writing.
- Preliminary report writing.
- Weekly virtual log book
- Preparing presentation.
- Developing poster.
- Final report writing.

**Milestones:** (an objective that should be achieved by a particular date e.g. the completion of a task)

**Week 3**

- Obtaining plasma simulation tool and relevant reading materials.
- Investigating how to build an user-friendly interface of learning.
- Researching relevant software.
- Writing project specification report form.
- Writing preliminary report.
- updating virtual log book.

**Week 7**

- Learning C++ and OpenGL.
- Interface prototype design.
- Developing the main page of the program.
- Update virtual log book.

**Week 9**

- Developing the reading function to obtain data in text files.
- Creating the content of plasma properties.
- Taking videos of plasma properties.
- Matching videos to corresponding properties.
- Update virtual log book.

**Week 11**

- Developing the line chart function based on input data.
- Writing presentation speech draft.
- Creating presentation PPT.
- Update virtual log book.

**Week 13**

- Program testing.
- Interface optimization.

**Week 17**

- Optimization of line chart function
- Developing the 2D graphical function
- Final debug and testing.

**Week 20**

- Creating poster
- Preparing presentation at the bench.

**C. Project Deliverables:**

- The completed software of plasma simulation user interface with detailed software handbook.
- The poster with significant achievements of this project.
- The software demonstration and presentation.
- The main functions will be displayed and introduced with the software and codes.
- The final report and relevant documents of this project.

**D. Project Rationale and Industrial Relevance:**

In this project, the main areas are computer science and physical, which are both significant branches of human scientific and technological development. In addition, the relationship between these two areas and EEE are not closely. Therefore, this is a challenging opportunity to test the learning ability of new areas as an EEE undergraduate.