



***DEPARTMENT OF ELECTRICAL ENGINEERING AND ELECTRONICS***

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

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Supervisor: Mark Bowden Student ID No: 201138928  
Project Title: Development of a C++ based user-interface for a plasma simulation tool

**Project Specification**

**A. Project Description and Methodology:**

(Overall view of the project with proposed route to realization i.e. what are the project aims and objectives and how you are going to do it?)

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

The existing simulation tool of plasma will generate large amounts of output data in various formats. Thus the main objectives of this project contain research of plasma to select numerous output data and deep learning of C++ developing tool to build the user-interface. Specifically, it requires leaning of C++ based tools which contain Visual Studio (C++ fundamental), Qt (develop GUI) and OpenGL (build 3D graphics).

In order to achieve them within 20 weeks, background reading and research for plasma discharges should be the first objective, at the meanwhile, the skill of C++ developing tools should be practiced. Next the developing of this software should be proceeded. Finally, the report and presentation of this project should be prepared.

**B. Project Tasks and Milestones:** (indicate the tasks and milestones that should be achieved and their expected dates e.g. understanding of theory, designs of circuits, construction of circuits, software specifications, working demonstrations etc.)

**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 of learning, researching and factory software.
- Learning of corresponding software include C++ based visual studio, openGL and Qt.

**Developing work** Week 4 ~ Week 15

- 3D graphical model display function developed by openGL.
- Rapid loading text function developed by visual studio.
- Intuitive user-interface developed by Qt.

**Report working** Week 1 ~ Week 20

- Project specification report form writing.
- Preliminary report writing.
- Weekly virtual log book
- Preparing presentation.
- Creating 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 Interface of learning, researching and factory software.
- Writing project specification report form.
- Writing preliminary report.
- update virtual log book

**Week 7**

- Learning openGL.
- 3D graphical model display function development.
- Write relevant report.
- Update virtual log book.

**Week 9**

- Learning visual studio.

- Rapid loading text function development.
- Write relevant report.
- Update virtual log book.

### **Week 13**

- Learning Qt
- Intuitive user-interface development and combine all function together.
- Write relevant report
- Update virtual log book.

### **Week 15**

- Software testing and optimization.
- Update virtual log book.
- Creating poster.

### **Week 20**

- Preparing presentation.
- Writing final report.

**C. Project Deliverables:** (Indicate what should be completed at the end of the project e.g. this list should indicate what will be presented / demonstrated at the final bench inspections)

- 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.** A section on Project Rationale and Industrial Relevance must be included in the preliminary report (deadline midnight Friday 14<sup>th</sup> October 2016). This should explain how and why the project was devised, e.g. it may be a project sponsored by a company or linked to a research project.

Student Signature: \_\_\_\_\_ Date: 11/10/2016

Supervisor's Signature: \_\_\_\_\_ Date: 11/10/2016

By signing this form, the supervisor and student are confirming that the project is of a sufficiently demanding nature that it is suitable for the individual project component of an accredited engineering degree and that a student, who is capable of producing a first class performance, will be able to demonstrate his/her capabilities in this project.