

## **Engineering Tripos Part IIA Project, GA4: Heat Pump, 2019-20**

### **Leader**

[Dr A J White](#) [1]

### **Timing and Structure**

Fridays 11-1pm, Tuesdays 9-11am plus afternoons

### **Prerequisites**

3A5 useful

### **Aims**

The aims of the course are to:

- To critically assess the value of heat pump technology as a way of reducing emissions of CO<sub>2</sub>.
- To design an experiment to measure the performance of the heat pump, and to make measurements which allow its performance to be modelled.
- To produce a model of the heat pump which is validated against the experimental measurements.

### **Content**

This project looks at the performance of a commercially available heat pump for domestic heating applications. Students will be required to design, build and perform an experiment to measure the performance of the heat pump, and build a model of the heat pump. This model will be used to explore the CO<sub>2</sub> saving which could be made by using heat pumps in a domestic heating application. Students will work in groups of 4 to design and perform the experiment. Individual tasks may be distributed amongst group members as decided by the group. Individual reports are required from group members, as well as group reports.

#### **Week 1**

Familiarisation with the equipment. Construction of a simple matlab model of the heat pump. Design of the experiment. First interim (group) report and review meeting (20%).

#### **Week 2**

Refine experimental plan, build apparatus and make measurements on the performance of the heat pump using an external water circuit.

#### **Week 3**

Compare models with performance values obtained from the experiment (interim report). Interim individual report (30%)

#### **Week 4**

Measurements of availability loss within the heat pump and refinement of initial model. Improved assessment of carbon saving. Final individual report (30%). Group presentation to share results with classmates (20%).

**Coursework**

Coursework	Due date	Marks
Interim Report 1 (group)	4pm Friday 15 May 2020 (review meeting Tuesday 12 May, PM session)	16 (group)
Interim Report 2 (individual)	4pm Friday 22 May 2020	16 (individual)
Final Report (individual with group component)	4pm Friday 5 June 2020	48 (individual)

**Examination Guidelines**

Please refer to [Form & conduct of the examinations](#) [2].

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**Links**

[1] <mailto:ajw36@cam.ac.uk>

[2] <https://teaching.eng.cam.ac.uk/content/form-conduct-examinations>