

Engineering Tripos Part IIA Project, GM1: Multidisciplinary Design, 2019-20

Leader

[Dr P J G Long](#) [1]

Timing and Structure

Lent term preparation: Wednesday 2-6pm (wks 4-5 + 7- 8) + First 3 weeks of project period, Thursdays 9-11 & 2-5pm, Mondays 11-1

Prerequisites

One (or more) from 3C8/3F2/4C4/3F8 useful but on essential.

Aims

The aims of the course are to:

- Introduction to rapid analysis of design requirements
- Experience the planning and development of the prototyping/testing stages of the design process
- Experience of using manual and computer based design tools (as required) 2D/3D CAD systems, FEA, CAM, standard and 'bespoke' DAQ & sensor systems, electrical/electronic CAD and simulation
- To assemble one or more prototype systems, using: ?Additive/Subtractive rapid manufacturing techniques ?PCB manufacture ?Sensors ?Low cost/low power micro-controllers where appropriate

Content

Working with mentors from local companies/organisations, Addenbrookes Hospital and CUED staff, teams will be tasked with developing a concept and prototype for a new product for the Healthcare/Assistive Technologies industry. The early concept / experimental stage is undertaken in timetabled sessions during Lent ending with a presentation and debrief during which a package of requirements is finalised. Resources will then be procured and made available to the teams at the beginning of the project period in May. During three weeks of the Easter term project period, the teams are expected to investigate, design, develop and test a prototype, and to present the technical and basic costings in two reports, and a Poster session/presentation at the end of the project.

FORMAT

Students will work in teams of 4/5

ACTIVITIES

1. Problem analysis
2. Use of mechanical, electronic and manufacturing design tools
3. Manufacture/Testing/Redesign/Preliminary costing
4. Report writing and presentation

Further notes

Examples of previous projects

- Instrumented/data logging Walking sticks
- Automated system for detection of Urinary Tract Infections
- Automated antibiotic sensitivity system
- Next generation of Stethoscope
- Remote monitoring of ear conditions
- Real time monitoring of body fluid flows
- Chyme reinfusion
- Open data collection system for the NHS

Coursework

Coursework	Due date	Marks
Presentation/Budget/Report	Lent: Wednesday week 8 (Last day of Lectures)	15 (5 Individual, 10 Group)
Interim report 2	Sunday 17 May 2020	20(12 Individual, 8 Group)
Poster Session / Presentation	Thurs 28 May - (1) 2pm->5pm	45 (25 Individual, 20 Group)
Final individual report:	Friday 29 May 2020	

Examination Guidelines

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

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Links

[1] <mailto:pjgl2@cam.ac.uk>

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